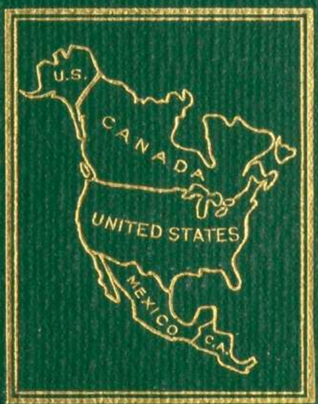
REPORT

INTERNATIONAL BOUNDARY COMMISSION

ESTABLISHMENT OF THE BOUNDARY BETWEEN

CANADA AND THE UNITED STATES

TONGASS PASSAGE TO MOUNT ST. ELIAS



DEPARTMENT OF MINES AND TECHNICAL SURVEYS

1952

THE GRAND PACIFIC GLACIER FRONT IN 1929

The boundary line across Tarr Inlet is shown by a broken white line. From left to right, Boundary Points 163 (Mount Quincy Adams), 164 (Mount Fairweather), 162 (Mount Turner), 161, and 165 (Mount Root) are shown circled in black. Photograph by the United States Navy.

INTERNATIONAL BOUNDARY COMMISSION

JOINT REPORT

UPON THE

SURVEY AND DEMARCATION OF THE BOUNDARY

BETWEEN

CANADA AND THE UNITED STATES FROM TONGASS PASSAGE TO MOUNT ST. ELIAS

IN ACCORDANCE WITH THE CONVENTION OF JANUARY 24, 1903; THE AWARD OF THE TRIBUNAL, APPOINTED UNDER THE CONVENTION, SIGNED AT LONDON, OCTOBER 20, 1903; AN EXCHANGE OF NOTES BETWEEN THE GOVERNMENTS OF GREAT BRITAIN AND THE UNITED STATES RELATIVE TO THE AWARD, SIGNED AT WASHINGTON, MARCH 25, 1905; AND THE TREATY SIGNED AT WASHINGTON, FEBRUARY 24, 1925

HIS BRITANNIC MAJESTY'S COMMISSIONER

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J. D. CRAIG, 1925–1931
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UNITED STATES COMMISSIONER

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JOHN A. ULINSKI, 1945–

Published under the Authority of
The International Boundary
Commissioners

LETTER OF TRANSMITTAL

OTTAWA, CANADA, November 26, 1951

The Honourable GEORGE PRUDHAM,
The Minister of Mines and Technical Surveys of Canada,
Ottawa.

The Honourable DEAN ACHESON,
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 Tongass Passage to Mount St. Elias, together with an atlas of thirteen signed joint maps of the boundary as now established in accordance with the provisions of Article VI of the convention between Great Britain and the United States signed at Washington, January 24, 1903; the award of the Tribunal appointed under the convention, signed at London, October 20, 1903; the exchange of notes between His Majesty's Ambassador at Washington and the Secretary of State for the United States signed at Washington, March 25, 1905, relative to the acceptance of the report of the Commissioners to complete the award; and Article IV of the treaty signed at Washington, February 24, 1925.

This report is the seventh of a series of seven reports that have been prepared by the International Boundary Commission under the provisions of existent boundary treaties. The seven reports, together with their accompanying maps, cover the survey and demarcation of the boundary between Canada and the United States and Canada and Alaska, with the exception of that part of the boundary through the St. Lawrence River and the Great Lakes that was re-established 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 thirteen 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.

Respectfully submitted,

J. Leslie Rannie

His Britannic Majesty's Commissioner

John A. Ulinski

United States Commissioner

CONTENTS

ILLUSTRATIONS

MAPS AND DRAWINGS

INTRODUCTION

This report on the establishment of the International Boundary line between Canada and the United States territory of Alaska, from Tongass Passage to Mount St. Elias, is submitted in accordance with Article VI of the Convention of January 24, 1903; the Award of the Alaska Boundary Tribunal, signed October 20 of the same year; the exchange of notes between Great Britain and the United States relative to the Award, signed at Washington, March 25, 1905; and Article IV of the Treaty of 1925.

Although the first move to have the boundary line established between Canada and Alaska was made in 1872, no definite action towards undertaking a survey for that purpose was taken until 20 years later, when a convention was signed in Washington. Article I of the convention of 1892 stipulated that a "coincident or joint survey" should be made of the territory adjacent to the boundary line between latitude 54° 40′ north and the point where it intersects the 141st Meridian. A joint survey commission was accordingly formed, which functioned from 1893 to 1895. In carrying out their survey the commissioners adopted the newly developed phototopographic method, particularly suitable to a country abounding in precipitous mountains, deeply crevassed glaciers, treacherous snow fields, and swift, uncertain glacial streams flowing in part through deep canyons, where the methods of topographic surveying generally employed in less rugged terrain would be extremely difficult and slow.

When the members of the Alaska Boundary Tribunal were in session they had before them duplicate signed copies of the maps accompanying the report of the commission of 1893-1895, and on these they marked the course the boundary line was to take. East of Stephens Passage, however, they left parts of the line undefined, as the topography on the commission's maps in that area did not extend far enough eastward. The task of identifying and marking the boundary line as decided on by the Tribunal, and of defining the parts not specifically indicated by them, devolved upon the newly appointed International Boundary Commissioners, O. H. Tittmann for the United States, and W. F. King for Canada.

The field work of delimiting, marking, and defining this section of the International Boundary line was started in 1904. It comprised in general the extension of nets of triangulation to the boundary area from the U.S. Coast and Geodetic Survey triangulation along the coast, identification of the boundary points of the Award and the exchange of notes and the projection where practicable of straight lines between them, phototopographic surveys additional to those made by the commission of 1893-95 of the country adjacent to the boundary line, setting monuments at suitable sites to mark the boundary, connecting the boundary points with the triangulation for the computation of their geographic positions, and cutting a 20-foot wide vista along the line in timbered areas. The nature of the terrain was such that the boundary could be most easily reached by way of the numerous inlets, rivers, and glaciers penetrating the coast, and as direct communication along the boundary between any one river or glacier and the next was so difficult as to be practically impossible, the work was done by isolated parties, Canadian and United States, until the virtual completion of the demarcation of the land section of the boundary in 1912. During the years 1913-1914 the demarcation of the remaining water boundary was completed by a Canadian party. Some minor adjustments to the line were made and some further field work was done by Canadian and United States parties in 1920. Maintenance in later years has been carried on under the provisions of Article IV of the treaty of 1925.

The geographic positions of the boundary points and turning points, and the boundary triangulation stations were originally based on the Southeast Alaska datum. Later it was found necessary that they should be based on the 1927 North American datum. As the duties of the Commissioners had been increased by the treaties of 1908 and 1925 to include the work of surveying, marking, and maintaining the entire boundaries between Canada and the United States, the necessity of work elsewhere after the completion of the field work from Tongass Passage to Mount St. Elias in 1920 did not allow the dispatch of field parties to that distant region. Consequently, the field work of connecting boundary stations with those of the United States Coast and Geodetic Survey based on the new datum in the coastal regions was done at convenient times by co-operative arrangement between the Commissioners, the Geodetic Survey of Canada, and the United States Coast and Geodetic Survey.

The land section of the boundary is marked by 192 boundary points, and there are 29 boundary turning points in the water section referenced by 53 monuments. The total length of the boundary from the point B of the award at the mouth of Tongass Passage to the southern extremity of the 141st Meridian boundary on the west shoulder of Mount St. Elias is 808·2 miles, of which 98·4 miles is over water and 709·8 miles is over land. The preparation of the 13 topographic maps that accompany this report is described on pages 145 and 146. The area covered by the contoured parts of the maps is about 32,000 square miles, about two-thirds of which is above tree line, and about one-third is perpetually covered by snow or ice.

CONVENTION SIGNED AT WASHINGTON, JANUARY 24, 1903, FOR THE ADJUSTMENT OF THE BOUNDARY BETWEEN THE DOMINION OF CANADA AND THE TERRITORY OF ALASKA

His Majesty the King of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, and the United States of America, equally desirous for the friendly and final adjustment of the differences which exist between them in respect to the true meaning and application of certain clauses of the Convention between Great Britain and Russia, signed under date of the 28th (16th) February, A.D. 1825, which clauses relate to the delimitation of the boundary line between the territory of Alaska, now in possession of the United States, and the British possessions in North America, have resolved to provide for the submission of the questions as hereinafter stated to a Tribunal, and to that end have appointed their respective Plenipotentiaries, as follows:

His Britannic Majesty, the Right Honourable Sir Michael H. Herbert, K.C.M.G., C.B., His Britannic Majesty's Ambassador Extraordinary and Plenipotentiary; and

The President of the United States of America, John Hay, Secretary of State of the United States;

Who, after an exchange of their full powers, which were found to be in good and due form, have agreed upon the following Articles:

Article I

A Tribunal shall be immediately appointed to consider and decide the questions set forth in Article IV of this Convention. The Tribunal shall consist of six impartial jurists of repute, who shall consider judicially the questions submitted to them, each of whom shall first subscribe an oath that he will impartially consider the arguments and evidence presented to the Tribunal, and will decide thereupon according to his true judgment. Three members of the Tribunal shall be appointed by His Britannic Majesty and three by the President of the United States. All questions considered by the Tribunal, including the final award, shall be decided by a majority of all the members thereof.

In case of the refusal to act, or of the death, incapacity, or abstention from service of any of the persons so appointed, another impartial jurist of repute shall be forthwith appointed in his place by the same authority which appointed his predecessor.

The Tribunal may appoint a Secretary and a Bailiff to perform such duties as they may prescribe, and may employ scientific experts if found to be necessary, and may fix a reasonable compensation for such officers. The Tribunal shall keep an accurate record of all its proceedings.

Each of the High Contracting Parties shall make compensation for the services of the members of the Tribunal of its own appointment and of any agent, counsel, or other person employed in its behalf, and shall pay all costs incurred in the preparation of its Case. All expenses reasonably incurred by the Tribunal in the performance of its duties shall be paid by the respective Governments in equal moieties.

The Tribunal may, subject to the provisions of this Convention, establish all proper rules for the regulation of its proceedings.

Article II

Each of the High Contracting Parties shall also name one person to attend the Tribunal as its Agent.

The written or printed Case of each of the two parties, accompanied by the documents, the official correspondence, and all other evidence in writing or print on which each Party relies,

91264—2

shall be delivered in duplicate to each member of the Tribunal and to the Agent of the other Party as soon as may be after the organization of the Tribunal but within a period not exceeding two months from the date of the exchange of ratifications of this Convention.

Within two months after the delivery on both sides of the written or printed Case, either Party may, in like manner, deliver in duplicate to each member of the Tribunal, and to the Agent of the other Party, a Counter-Case, and additional documents, correspondence and evidence, in reply to the Case, documents, correspondence and evidence so presented by the other Party. The Tribunal may, however, extend this last mentioned period when in their judgment it becomes necessary, by reason of special difficulties which may arise in the procuring of such additional papers and evidence.

If in the Case submitted to the Tribunal either Party shall have specified or referred to any report or document in its own exclusive possession without annexing a copy, such Party shall be bound, if the other Party shall demand it, within thirty days after the delivery of the Case, to furnish to the Party applying for it a duly certified copy thereof: and either Party may call upon the other, through the Tribunal, to produce the original or certified copies of any papers adduced as evidence, giving in each instance such reasonable notice as the Tribunal may require; and the original or copy so requested shall be delivered as soon as may be and within a period not exceeding forty days after receipt of notice.

Each Party may present to the Tribunal all pertinent evidence, documentary, historical, geographical, or topographical, including maps and charts, in its possession or control and applicable to the rightful decision of the questions submitted; and if it appears to the Tribunal that there is evidence pertinent to the Case in the possession of either Party, and which has not been produced, the Tribunal may in its discretion order the production of the same by the Party having control thereof.

It shall be the duty of each Party, through its Agent, or Counsel, within two months from the expiration of the time limited for the delivery of the Counter-Case on both sides, to deliver in duplicate to each member of the said Tribunal and to the Agent of the other Party a written or printed argument showing the points and referring to the evidence upon which his Government relies, and either Party may also support the same before the Tribunal by oral argument of Counsel. The Tribunal may, if they shall deem further elucidation with regard to any point necessary, require from either Party a written, printed, or oral statement or argument upon the point; but in such case the other Party shall have the right to reply thereto.

Article III

It is agreed by the High Contracting Parties that the Tribunal shall consider in the settlement of the questions submitted to its decisions the Treaties respectively concluded between His Britannic Majesty and the Emperor of All the Russias under date of the 28th (16th) February, A.D. 1825, and between the United States of America and the Emperor of All the Russias, concluded under date of the 30th (18th) March, A.D. 1867, and particularly the Articles III, IV and V of the first-mentioned Treaty, which in the original text are, word for word, as follows:

> "III. La ligne de démarcation entre les possessions des Hautes Parties Contractantes sur la côte du Continent et les Iles de l'Amérique Nord-ouest, sera tracée ainsi qu'il suit:—
>
> "A partir du point le plus méridional de l'île dite Prince of Wales, lequel point se trouve sous le parallèle du 54° 40′ de latitude nord, et entre le 131e et le 133e degré de longitude ouest (méridien de Greenwich), la dite ligne remontera au nord le long de la passe dite Portland Channel, jusqu'au point de la terre ferme où elle atteint le 56e degré de latitude nord; de ce dernier point la ligne de démarcation suivra la crête des montagnes situées parallèlement à la côte, jusqu'au point d'intersection du 141e degré de longitude ouest (même méridien); et, finalement, du dit point d'intersection, la même ligne méridienne du 141e degré formera, dans son prolongement jusqu'à la mer glaciale, la limite entre les possessions Russes et Britanniques sur le Continent de l'Amérique Nord-ouest.

"IV. Il est entendu par rapport à la ligne de démarcation déterminée dans l'Article précédent:—

"1. Que l'île dite Prince of Wales appartiendra tout entière à la Russie.

"2. Que partout où la crête des montagnes qui s'étendent dans une direction parallèle à la côte depuis le 56e degré de latitude nord au point d'intersection du 141e degré de longitude ouest se trouverait à la distance de plus de dix lieues marine de l'Océan, la limite entre les possessions Britanniques et la lisière de côte mentionnée ci-dessus comme devant appartenir à la Russie sera formée par une ligne parallèle aux sinuosités de la côte, et qui ne pourra jamais en être éloignée que de dix lieues marines.

"V. Il est convenu, en outre, que nul établissement ne sera formé par l'une des deux Parties dans les limites que les deux Articles précédents assignent aux possessions de l'autre. En conséquence, les sujets britanniques ne formeront aucun établissement soit sur la côte, soit sur la lisière de terre ferme comprise dans les limites des possessions Russes, telles qu'elles sont désignées dans les deux Articles précédents; et, de même, nul établissement ne sera formé par des sujets Russes au delà des dites limites."[1]

The Tribunal shall also take into consideration any action of the several Governments or of their respective Representatives preliminary or subsequent to the conclusion of said Treaties, so far as the same tends to show the original and effective understanding of the Parties in respect to the limits of their several territorial jurisdictions under and by virtue of the provisions of said Treaties.

Article IV

Referring to Articles III, IV, and V of the said Treaty of 1825, the said Tribunal shall answer and decide the following questions:

1. What is intended as the point of commencement of the line?

2. What channel is the Portland Channel?

3. What course should the line take from the point of commencement to the entrance to Portland Channel?

4. To what point on the 56th parallel is the line to be drawn from the head of Portland Channel, and what course should it follow between these points?

5. In extending the line of demarcation northward from said point on the parallel of the 56th degree of north latitude, following the crest of the mountains situated parallel to the coast until its intersection with the 141st degree of longitude west of Greenwich, subject to the condition that if such line should anywhere exceed the distance of 10 marine leagues from the ocean then the boundary between the British and Russian territory should be formed by a line parallel to the sinuosities of the coast and distant therefrom not more than 10 marine leagues, was it the intention and meaning of said Convention of 1825 that there should remain in the exclusive possession of Russia a continuous fringe or strip of coast on the mainland, not exceeding 10 marine leagues in width, separating the British possessions from the bays, ports, inlets, havens, and waters of the ocean, and extending from the said point on the 56th degree of latitude north to a point where such line of demarcation should intersect the 141st degree of longitude west of the meridian of Greenwich?

6. If the foregoing question should be answered in the negative, and in the event of the summit of such mountains proving to be in places more than 10 marine leagues from the coast, should the width of the *lisière* which was to belong to Russia be measured (1) from the mainland coast of the ocean, strictly so-called, along a line perpendicular thereto, or (2) was it the intention and meaning of the said Convention that where the mainland coast is indented by deep inlets forming part of the territorial waters of Russia, the width of the *lisière* was to be measured (a) from the line of the general direction of the mainland coast, or (b) from the line separating the waters of the ocean from the territorial waters of Russia, or (c) from the heads of the aforesaid inlets?

[1] For the translation of these articles, *See* the full text of the Treaty of 1825 on page 194.

7. What, if any exist, are the mountains referred to as situated parallel to the coast, which mountains, when within 10 marine leagues from the coast, are declared to form the eastern boundary?

Article V

The Tribunal shall assemble for their first meeting at London as soon as practicable after receiving their commissions, and shall themselves fix the times and places of all subsequent meetings.

The decision of the Tribunal shall be made as soon as possible after the conclusion of the arguments in the Case, and within three months thereafter, unless His Britannic Majesty and the President of the United States shall by common accord extend the time therefor. The decision shall be made in writing and dated, and shall be signed by the members of the Tribunal assenting to the same. It shall be signed in duplicate, one copy whereof shall be given to the Agent of His Britannic Majesty for his Government, and the other to the Agent of the United States of America for his Government.

Article VI

When the High Contracting Parties shall have received the decision of the Tribunal upon the questions submitted as provided in the foregoing Articles, which decision shall be final and binding upon all Parties, they will at once appoint, each on its own behalf, one or more scientific experts, who shall with all convenient speed, proceed together to lay down the boundary-line in conformity with such decision.

Should there be, unfortunately, a failure by a majority of the Tribunal to agree upon any of the points submitted for their decision, it shall be their duty to so report in writing to the respective Governments through their respective Agents. Should there be an agreement by a majority upon a part of the questions submitted, it shall be their duty to sign and report their decision upon the points of such agreement in the manner hereinbefore prescribed.

Article VII

The present Convention shall be ratified by His Britannic Majesty, and by the President of the United States, by and with the advice and consent of the Senate, and the ratifications shall be exchanged in London or in Washington as soon as the same may be effected.

In faith whereof we, the respective Plenipotentiaries, have signed this Convention, and have hereunto affixed our Seals.

Done at Washington, in duplicate, this 24th day of January, A.D. 1903.

(Signed) Michael H. Herbert.
(Signed) John Hay.

THE ALASKA BOUNDARY TRIBUNAL AWARD

Whereas by a Convention signed at Washington on the 24th day of January, 1903, by Plenipotentiaries of and on behalf of His Majesty the King of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, and of and on behalf of the United States of America, it was agreed that a Tribunal should be appointed to consider and decide the questions hereinafter set forth, such Tribunal to consist of six impartial Jurists of repute, who should consider judicially the questions submitted to them, each of whom should first subscribe an oath that he would impartially consider the arguments and evidence presented to the said Tribunal, and would decide thereupon according to his true judgment, and that three members of the said Tribunal should be appointed by His Britannic Majesty and three by the President of the United States;


MAP SHOWING AWARD OF
ALASKA BOUNDARY TRIBUNAL
OCTOBER 20, 1903.
Published at Washington, D.C.
FOR THE DEPARTMENT OF STATE
BY THE COAST AND GEODETIC SURVEY
O. H. Tittmann, Superintendent
November, 1903.
Statute Miles
Marine Leagues
MALASPINA GLACIER
Yakutat Bay (Bering Bay)
Alsek River
Cape Fairweather
Cape Spencer
Cross Sound
Cape Bingham
ICY STRAIT
CHICHAGOF ISLAND
BARANOF ISLAND
ADMIRALTY
CHATHAM STRAIT
LYNN CANAL
Dyea
Skagway
White Pass
Pyramid Hbr
Juneau
Taku River
Stephens Passage
FREDERICK SOUND
SITKA
Cape Edgecumbe
Norfolk or Sitko Sound
KUPREANOF ISLAND
KUIU ISLAND
Sumner Strait
Cape Ommaney
Christian Sound
IPHIGENIA BAY
PRINCE OF WALES ISLAND
CLARENCE STRAIT
REVILLA-GIGEDO ISLAND
PORTLAND CANAL
Observatory Inlet
Cape Muzon
Cape Chacon
DIXON ENTRANCE
Stikine River
Iskoot River
Dease River
Liard River
Teslin Lake
Inklin River
Wrangell
Cape Northumberland
Port Simpson
Dundas
Zayas I.

And whereas it was further agreed by the said Convention that the said Tribunal should consider in the settlement of the said questions submitted to its decision the Treaties respectively concluded between His Britannic Majesty and the Emperor of all the Russias, under date of the 28th (16th) February, A.D. 1825, and between the United States of America and the Emperor of all the Russias, concluded under date of the 18th (30th) March, A.D. 1867, and particularly the Articles III, IV and V of the first-mentioned Treaty, and should also take into consideration any action of the several Governments or of their respective representatives, preliminary or subsequent to the conclusion of the said Treaties, so far as the same tended to show the original and effective understanding of the parties in respect to the limits of their several territorial jurisdictions under and by virtue of the provisions of the said Treaties;

And whereas it was further agreed by the said Convention, referring to Articles III, IV, and V of the said Treaty of 1825, that the said Tribunal should answer and decide the following questions:

1. What is intended as the point of commencement of the line?

2. What channel is the Portland Channel?

3. What course should the line take from the point of commencement to the entrance to Portland Channel?

4. To what point on the 56th parallel is the line to be drawn from the head of the Portland Channel, and what course should it follow between these points?

5. In extending the line of demarcation northward from the said point on the parallel of the 56th degree of north latitude, following the crest of the mountains situated parallel to the coast until its intersection with the 141st degree of longitude west of Greenwich, subject to the conditions that if such line should anywhere exceed the distance of 10 marine leagues from the ocean, then the boundary between the British and Russian territory should be formed by a line parallel to the sinuosities of the coast and distant therefrom not more than 10 marine leagues, was it the intention and meaning of the said Convention of 1825 that there should remain in the exclusive possession of Russia a continuous fringe, or strip, of coast on the mainland, not exceeding 10 marine leagues in width, separating the British possessions from the bays, ports, inlets, havens, and waters of the ocean, and extending from the said point on the 56th degree of latitude north to a point where such line of demarcation should intersect the 141st degree of longitude west of the meridian of Greenwich?

6. If the foregoing question should be answered in the negative, and in the event of the summit of such mountains proving to be in places more than 10 marine leagues from the coast, should the width of the *lisière*, which was to belong to Russia, be measured (1) from the mainland coast of the ocean, strictly so-called, along a line perpendicular thereto, or (2) was it the intention and meaning of the said Convention that where the mainland coast is indented by deep inlets forming part of the territorial waters of Russia, the width of the *lisière* was to be measured (a) from the line of the general direction of the mainland coast, or (b) from the line separating the waters of the ocean from the territorial waters of Russia, or (c) from the heads of the aforesaid inlets?

7. What, if any exist, are the mountains referred to as situated parallel to the coast, which mountains, when within 10 marine leagues from the coast, are declared to form the eastern boundary?

And whereas His Britannic Majesty duly appointed Richard Everard, Baron Alverstone, G.C.M.G., Lord Chief Justice of England, Sir Louis Amable Jetté, K.C.M.G., Lieutenant-Governor of the Province of Quebec, and Allen Bristol Aylesworth, one of His Majesty's Counsel; and the President of the United States of America duly appointed the Honourable Elihu Root, Secretary of War of the United States, the Honourable Henry Cabot Lodge, Senator of the United States from the State of Massachusetts, and the Honourable George Turner, of the State of Washington, to be members of the said Tribunal:

Now, therefore, we, the Undersigned, having each of us first subscribed an oath, as provided by the said Convention, and having taken into consideration the matters directed by the said

Convention to be considered by us, and having judicially considered the said questions submitted to us, do hereby make Answer and Award as follows:

In answer to the first question—

The Tribunal unanimously agrees that the point of commencement of the line is Cape Muzon.

In answer to the second question—

The Tribunal unanimously agrees that the Portland Channel is the channel which runs from about 55°56′ north latitude, and passes to the north of Pearse and Wales Island.

A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner, decides that the Portland Channel, after passing to the north of Wales Island, is the channel between Wales Island and Sitklan Island, called Tongass Channel. The Portland Channel above mentioned is marked throughout its length by a dotted red line from the point B to the point marked C on the map signed in duplicate by the Members of the Tribunal at the time of signing their decision.

In answer to the third question—

A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner, decides that the course of the line from the point of commencement to the entrance to Portland Channel is the line marked A B in red on the aforesaid map.

In answer to the fourth question—

A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner, decides that the point to which the line is to be drawn from the head of the Portland Channel is the point on the 56th parallel of latitude marked D on the aforesaid map, and the course which the line should follow is drawn from C to D on the aforesaid map.[1]

In answer to the fifth question—

A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner, decides that the answer to the above question is in the affirmative.

Question five having been answered in the affirmative, question six requires no answer.

In answer to the seventh question—

A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner, decides that the mountains marked S on the aforesaid map are the mountains referred to as situated parallel to the coast on that part of the coast where such mountains marked S are situated, and that between the points marked P (mountain marked S, 8,000) on the north, and the point marked T (mountain marked S, 7,950) in the absence of further survey, the evidence is not sufficient to enable the Tribunal to say which are the mountains parallel to the coast within the meaning of the Treaty.[2]

In witness whereof we have signed the above-written decision upon the questions submitted to us.

Signed in duplicate this 20th day of October, 1903.

Alverstone.
Elihu Root.
Henry Cabot Lodge.
George Turner.

Witness:
Reginald Tower,
Secretary.

Certified to be in conformity with the original.

London, October 22nd, 1903.

(L.S.)
Foreign Office.

T. H. Sanderson,
Under Secretary of State for Foreign Affairs.

[1] C = Boundary Point No. 1, D = Boundary Point No. 7.
[2] P = Boundary Point No. 93, T = Boundary Point No. 72.

LETTERS RELATIVE TO THE COMMISSIONERS APPOINTED FOR THE DELIMITATION OF THE BOUNDARY BETWEEN CANADA AND ALASKA IN CONFORMITY WITH THE AWARD OF THE ALASKA BOUNDARY TRIBUNAL

PRIVY COUNCIL

CANADA

From Sir H. M. Durand to Lord Minto

British Embassy,
Washington,
February 6th, 1904.

My Lord: In compliance with telegraphic instructions which I received from His Majesty's Principal Secretary of State for Foreign Affairs I addressed on the 29th ultimo a Note to the Acting Secretary of State of the United States informing him that Your Excellency's Government were ready to enter into arrangements for the delimitation of the boundary between the Dominion of Canada and the Territory of Alaska in conformity with the award of the Alaska Boundary Tribunal, and that they proposed to appoint Mr. King as their representative on the delimitation Commission. I added that Mr. King would be ready to meet the expert named by the United States Government as soon as the appointment of the latter was made.

I now have the honour to transmit to Your Excellency herewith copy of a note which I have received from Mr. Loomis, stating that Mr. O. H. Tittmann, Superintendent of the Coast and Geodetic Survey, has been designated by the United States Government as their representative on the delimitation Commission, and suggesting, in view of the brief season in which work can be done to advantage, the expediency of an early conference between Mr. King and Mr. Tittmann.

I have informed His Majesty's Principal Secretary of State for Foreign Affairs by telegraph of Mr. Tittmann's appointment.

I have, etc.,

(Sgd.) H. M. Durand.

Department of Commerce and Labor
Office of the Secretary, Washington

February 11, 1904.

Sir: At the instance of the Secretary of State you are hereby designated to serve as this Government's expert representative on the Delimitation Commission for the tracing of the boundary between Alaska and Canada in conformity with the award of the Alaskan Boundary Tribunal which recently sat in London.

Respectfully,

Geo. B. Cortelyou,
Secretary.

Hon. O. H. Tittmann,
Superintendent, Coast and Geodetic Survey,
Department of Commerce and Labor.

OTTAWA, 19th February, 1904.

To

HIS EXCELLENCY
THE GOVERNOR GENERAL IN COUNCIL:

The undersigned has the honour to acknowledge receipt of the despatch, which has been referred to him, addressed to Your Excellency by His Majesty's Ambassador to the United States under date the 6th February.

His Majesty's Ambassador states that he has informed the Acting Secretary of State of the United States that Your Excellency's Government is ready to enter into arrangements for the delimitation of the boundary between the Dominion of Canada and the Territory of Alaska in conformity with the award of the Alaska Boundary Tribunal, and that they have appointed Mr. King as their representative on the Delimitation Commission. He further states that, in reply to his note, he has been informed that Mr. O. H. Tittmann, Superintendent of the Coast and Geodetic Survey, has been designated by the United States Government as their representative, and that the suggestion has been made to him by the Acting Secretary of State that, owing to the brief season in which work can be done to advantage, an early conference between Messrs. Tittmann and King, in order that work may be begun without undue delay, is expedient.

The undersigned has the honour to report that Mr. King has been instructed to communicate with Mr. Tittmann, for the purpose of arranging a meeting at which preparations for the early execution of the work may be made. Further, he begs to recommend that Your Excellency be moved to transmit copies of this Minute to His Majesty's Ambassador to the United States and to His Majesty's Principal Secretary of State for the Colonies.

Respectfully submitted,

(Sgd.) CLIFFORD SIFTON,
Minister of the Interior.

REPORT OF THE COMMISSIONERS RELATIVE TO THE PART OF THE BOUNDARY BETWEEN CANADA AND ALASKA LYING BETWEEN THE POINTS "P" AND "T" MENTIONED IN THE AWARD OF THE ALASKA BOUNDARY TRIBUNAL

We, the undersigned Commissioners on behalf of His Britannic Majesty and of the United States, respectively, having met to discuss the demarcation of the boundary line between Alaska and Canada, have considered the part lying between the points P and T mentioned in the Award of the Tribunal of 1903.

We respectfully recommend that the boundary between these points be marked by the summits whose geographical co-ordinates are given in the attached table, with the proviso that between the points 7 and 8, and 8 and T, where the distances between the peaks given in the table exceed the probable limit of intervisibility, power be granted to the Commissioners after they have secured sufficient data, to select additional and intermediate peaks, no such peak to be more than twenty-five hundred meters from the straight line joining peaks 7 and 8, or 8 and T of the attached table.

(Sgd.) W. F. KING,
H.B.M. Commissioner.

(Sgd.) O. H. TITTMANN,
U.S. Commissioner.

WASHINGTON, D.C.,
April 12, 1904.

TABLE SHOWING POSITIONS AND DISTANCES OF PEAKS

The latitudes and longitudes are taken from the maps Nos. 10 and 12 of the Surveys made by the British Commission under the Convention of 1892. The successive peaks are designated by consecutive numbers, counting southward from point P.

Points	Latitude			Longitude			Distances		
							From	To	Metres
Sheet 12	°	′	″	°	′	″			
1	58	36	29	133	41	55	P	1	15,840
2	58	31	01	133	33	14	1	2	12,800
3	58	24	40	133	26	09	2	3	13,680
4	58	22	35	133	27	09	3	4	4,000
5	58	16	10	133	21	08	4	5	13,200
6	58	13	24	133	16	48	5	6	6,960
7	58	09	07	133	11	10	6	7	9,700
Sheet 10		—			—		7	8	81,440
8	57	29	47	132	32	52	8	T	36,800

Note: P = Boundary Point No. 93; 1 = No. 92; 2 = No. 87; 3 = No. 86; 4 = No. 85; 5 = No. 84; 6 = No. 83; 7 = No. 79; 8 = No. 74; and T = No. 72.

EXCHANGE OF NOTES BETWEEN THE BRITISH AND UNITED STATES GOVERNMENTS, RELATIVE TO THE ACCEPTANCE OF THE REPORT OF THE COMMISSIONERS TO COMPLETE THE ALASKA BOUNDARY TRIBUNAL AWARD

United States Acting Secretary of State to H.M. Ambassador at Washington

Department of State, Washington, March 25, 1905.

Excellency,

Referring to your note of the 1st October, and Mr. Hay's reply of the 2nd of December, 1904, in regard to the report by Messrs. O. H. Tittmann and W. F. King, the Commissioners appointed to carry out the delimitation of the Alaska Boundary so far as it was left undefined by the Award of the London Tribunal, and concerning the character of an Agreement between the United States and Great Britain for the formal acceptance of the recommendations of the Commissioners by an exchange of notes, I have the honor to state, by direction of the President, that the Government of the United States agrees with the Government of His Britannic Majesty that the part of the boundary between Alaska and Canada lying between the points P and T mentioned in the Award of the Tribunal of 1903 shall be defined, in accordance with the general principles laid down by said Tribunal, by the summits whose geographical co-ordinates are given with sufficient approximation for identification in the attached table, provided that the Commissioners are hereby empowered, after they have secured sufficient data, to select additional and intermediate peaks between the points 7 and 8 and 8 and T where the distances between the peaks given in the table exceed the probable limit of intervisibility: Provided also that no such additional and intermediate peaks shall be more than 2,500 metres from the straight line joining peaks 7 and 8 or 8 and T of the attached table, as follows:

TABLE SHOWING THE POSITIONS AND DISTANCES OF PEAKS

The latitudes and longitudes are taken from, and refer to, the maps Nos. 10 and 12 of the surveys made by the British Commission under the Convention of 1892. The successive peaks are designated by consecutive numbers, counting southward from point P.

Points	Latitude			Longitude			Approximate distances		
							From	To	Metres
Sheet 12	°	′	″	°	′	″			
1	58	36	29	133	41	55	P	1	15,840
2	58	31	01	133	33	14	1	2	12,800
3	58	24	40	133	26	09	2	3	13,680
4	58	22	35	133	27	09	3	4	4,000
5	58	16	10	133	21	08	4	5	13,200
6	58	13	24	133	16	48	5	6	6,960
7	58	09	07	133	11	10	6	7	9,700
Sheet 10		—			—		7	8	81,440
8	57	29	47	132	32	52	8	T	36,800[1]

[1] *See* note on page 9.

Your acknowledgment of this communication, with a similar statement on behalf of the Government of His Majesty, will complete the agreed exchange of notes, and will confirm and give validity to the agreement reached by the Commissioners, thus completing the Award of the London Tribunal under the Convention of the 24th January, 1903, as to the above-described part of the Alaska boundary.

Expressing the President's satisfaction at this settlement of the matter, I have, &c.

Alvey A. Adee,
Acting Secretary of State.

Sir H. M. Durand.

H.M. Ambassador at Washington to United States Secretary of State

British Embassy, Washington, March 25, 1905.

Sir,—I have the honour to acknowledge receipt of your note of this date in regard to the Report by Messrs. W. F. King and O. H. Tittmann, the Commissioners appointed to carry out the delimitation of the Alaska boundary so far as it was left undefined by the Award of the London Tribunal, and concerning the character of an agreement between Great Britain and the United States for the formal acceptance of the recommendations of the Commissioners by an exchange of notes.

By direction and on behalf of the Government of His Britannic Majesty, I have the honour to state that the Government of His Majesty agrees with the Government of the United States that the part of the boundary between Canada and Alaska lying between the points P and T, mentioned in the Award of the Tribunal of 1903, shall be defined, in accordance with the general principles laid down by said Tribunal, by the summits whose geographical co-ordinates are given with sufficient approximation for identification in the attached table, provided that the Commissioners are hereby empowered, after they have secured sufficient data, to select additional and intermediate peaks between the points 7 and 8 and 8 and T where the distances between the peaks given in the table exceed the probable limit of intervisibility: Provided also that no such additional and intermediate peak shall be more than 2,500 meters from the straight line joining peaks 7 and 8 and 8 and T of the attached tables, as follows:

TABLE SHOWING THE POSITIONS AND DISTANCES OF PEAKS

The latitudes and longitudes are taken from, and refer to, the maps Nos. 10 and 12 of the surveys made by the British Commission under the Convention of 1892. The successive peaks are designated by consecutive numbers, counting southward from point P.

Points	Latitude			Longitude			Approximate distances		
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Sheet 12	°	′	″	°	′	″			
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4	58	22	35	133	27	09	3	4	4,000
5	58	16	10	133	21	08	4	5	13,200
6	58	13	24	133	16	48	5	6	6,960
7	58	09	07	133	11	10	6	7	9,700
Sheet 10		—			—		7	8	81,440
8	57	29	47	132	32	52	8	T	36,800[1]

[1] *See* note on page 9.

I am instructed to express the gratification of my Government that, by this exchange of notes, confirmation and validity are given to the Agreement reached by the Commissioners, thus completing the Award of the London Tribunal under the Convention of the 24th January, 1903, as to the above-described part of the Alaska Boundary.

I have, &c.,

H. M. DURAND.

The Hon. JOHN HAY.

RESERVATION OF LANDS ALONG THE INTERNATIONAL BOUNDARY

ACTION TAKEN BY THE GOVERNMENT OF THE DOMINION OF CANADA

P.C. 810

Ref. 1,569,421 on 1301 (7).

Certified copy of a Report of the Committee of the Privy Council, approved by His Excellency the Administrator on the 14th April, 1908.

On a report dated 1st April, 1908, from the Minister of the Interior with reference to a Despatch from His Majesty's Ambassador at Washington, dated 30th October, 1907, submitting for the consideration of the Dominion Government a proposal by the United States Government that joint action be taken for the reservation of a strip of land sixty feet wide on each side of the

Canada-Alaska boundary line under similar conditions to that formerly established along the Mexican boundary line by Proclamation of the President of the United States.

The Minister of the Interior submits that in his opinion such a reservation will be of great service in the protection of the revenue and in the enforcement of the law generally, and he therefore recommends that with a view to the prevention of the erection of building or permanent structures or works on or close to the boundary line, except railways, aqueducts, bridges, canals, ditches and other works of a public character and except buildings or permanent structures or works properly connected with such railways, aqueducts, bridges, canals and other works of a public character, to be authorized to reserve the land within a strip sixty feet wide along the boundary line between Canada and Alaska from sale, lease and entry so far as the lands in question are vested in the Dominion.

The Minister points out that the title to wild lands adjacent to the Canada-Alaska boundary line is vested in the Dominion to the northward only of the sixtieth parallel of latitude. South of the parallel the lands lie in the province of British Columbia and the title to the crown lands is vested in the province.

The Minister has reason to believe, however, that the province of British Columbia will be willing to give its co-operation.

In connection with this subject the Minister of the Interior desires to suggest consideration of the possibility of making a similar reservation along other parts of the common boundary line, which, besides extensive stretches of water boundary, comprises some 1,900 miles on land.

Of the 1,300 miles or thereabouts from the Strait of Georgia to the Lake of the Woods, some 400 miles lie west of the summit of the Rocky Mountains. Along this distance the Minister understands that the Government of British Columbia has already reserved a strip 66 feet wide, wherever the land has not already been disposed of, along the International Boundary Line. East of the Rocky Mountains, under the original surveys made by the Dominion Government, road allowances were left adjoining the boundary. These road allowances are no longer under the control of the Dominion Government, having now passed under the jurisdiction of the provinces of Alberta, Saskatchewan and Manitoba.

The four provinces mentioned would doubtless agree to make the road allowances and the reservation permanent, though to secure that end, concurrent agreement by the United States or by the several states affected, to reserve a similar strip would appear to be desirable.

The Minister states that along the line from the St. Lawrence River to the St. Croix the natural difficulty of enforcing the laws of the two countries along an extensive boundary line is enhanced by the fact that the property adjacent to the line, on both sides, has passed into private hands, and at many points there exist so-called "line houses" which stand close to or upon the line, and which in many instances, as has been charged, have been used for smuggling or for evasion of law, to a serious extent. While it may not be practicable, by reason of the expense which it would involve to apply the effective remedy of removing these houses altogether, it is a matter for consideration whether there are any steps which the two Governments could take to prevent the erection in future of further houses of this kind.

The Committee, concurring in the foregoing, advise that His Excellency be moved to forward a copy hereof to His Majesty's Ambassador at Washington, with a request that he inform the Government of the United States that the Dominion Government is in full accord with the principle of their proposal, and will take steps to give effect to the reservation along the frontier of the Yukon Territory, and that he further call attention to the suggestion herein contained relative to other parts of the International Boundary Line.

All which is respectfully submitted for approval.

Rodolphe Boudreau,
Clerk of the Privy Council.

To the Honourable
The Minister of the Interior.

P.C. No. 2235 M.

Ref. 1,633,875 on 1,301 (8).

Certified copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 7th August, 1908.

The Committee of the Privy Council have had under consideration a despatch, dated 22nd June, 1908, from His Majesty's Ambassador to the United States, transmitting copy of a proclamation by the President of the United States setting apart as a public reservation all unpatented lands of the United States lying within sixty feet of the boundary line between the United States and Canada. His Majesty's Ambassador draws attention to the fact that the original proposal for reservation of the Alaska frontier has now been extended so as to include the whole frontier, this being in accordance with the wishes of the Dominion Government.

The Minister of the Interior, to whom the said despatch was referred, states that under the authorization of the Order in Council of 14th April, 1908, he has withdrawn from sale, lease and entry, all public lands lying within sixty feet of the International Boundary in Yukon Territory.

The Minister recommends that the matter be brought to the attention of the Government of the province of British Columbia, which with a view to the better enforcement of the laws of that province as well as of the Dominion may find it advisable to make a similar reservation along the boundary between British Columbia and Alaska and along the 49th parallel.

In view of the fact that the lands in the road allowance which was laid off in the original surveys of Dominion Lands along the International Boundary in the Provinces of Manitoba, Saskatchewan, and Alberta, have been transferred to these provinces, the Minister further recommends that the matter be brought to the attention of the respective Provincial Governments with the suggestion that this road allowance be retained for public use only.

The Committee, concurring in the foregoing, submit the same for approval and advise that Your Excellency may be pleased to transmit the substance of this Minute, if approved, to His Majesty's Ambassador at Washington for the information of the United States Government.

Rodolphe Boudreau,
Clerk of the Privy Council.

To the Honourable
The Minister of the Interior.

Published in The Canada Gazette of 3rd April, 1909, vol. 42, for the fourth consecutive week.

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 of 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.

WM. H. TAFT.

(SEAL)

By the President:
HUNTINGTON WILSON, *Acting Secretary of State.*

RESERVATIONS BY THE PROVINCE OF BRITISH COLUMBIA

His Honour the Lieutenant-Governor of British Columbia, by and with the advice of his Executive Council, doth order as follows:

That all unalienated Crown lands within the Province of British Columbia lying within sixty feet of the 49th parallel of north latitude which is the boundary line between the United

States of America and the Dominion of Canada; and also all unalienated Crown lands lying within sixty feet of the boundary line between the Province of British Columbia and Alaska, be reserved for Government purposes.

A. Campbell Reddie,
Deputy Clerk,
Executive Council.

Approved and Ordered
this 5th day of November,
A.D. 1908.

James Dunsmuir,
Lieutenant-Governor.

TREATY BETWEEN CANADA AND THE UNITED STATES OF AMERICA TO DEFINE MORE ACCURATELY AND TO COMPLETE THE INTERNATIONAL BOUNDARY BETWEEN THE TWO COUNTRIES

Signed at Washington, February 24, 1925

(Ratifications exchanged at Washington, July 17, 1925)

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, and the United States of America, 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:

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

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

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 Dominion of Canada and the United States concluded on April 11, 1908, between Great Britain and the United States, provided for the survey and demarcation of the international boundary line between the Dominion of Canada and the United States from the mouth of Pigeon River, at the western shore of Lake Superior, to the north-westernmost point of Lake of the Woods, as defined by the treaties concluded between Great Britain and the United States 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 Dominion of Canada and the United States from the north-westernmost 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 Dominion of Canada and the United States from the mouth of the Pigeon River, at the western shore of Lake Superior, to the north-westernmost 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 north-westernmost 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 north-westernmost 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 Dominion of Canada and the United States 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, shall be the terminus of the boundary line heretofore referred to as the international boundary line between the Dominion of Canada and the United States from the mouth of Pigeon River, at the western shore of Lake Superior, to the north-westernmost point of Lake of the Woods and the initial point of the boundary line heretofore referred to as the international boundary between the Dominion of Canada and the United States from the north-westernmost point of Lake of the Woods to the summit of the Rocky Mountains, in lieu of the said north-westernmost 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 Dominion of Canada and the United States, from the mouth of Pigeon River, at the western shore of Lake Superior to the north-westernmost point of Lake of the Woods and the initial point of the boundary line heretofore referred to as the international boundary between the Dominion of Canada and the United States from the north-westernmost 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 Dominion of Canada and the United States concluded on April 11, 1908, between Great Britain and the United States 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 Dominion of Canada and the United States from the north-westernmost 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, 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° north latitude;

And whereas the average distance between adjacent monuments as thus established or re-established 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 eight-tenths 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 re-established 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 Dominion of Canada and the United States from the north-westernmost 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 Dominion of Canada and the United States from the north-westernmost 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 re-established 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 Great Britain and the United States, defined the international boundary line between the Dominion of Canada and the United States 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 Dominion of Canada and the United States 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) metres, 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.

The course so defined and laid down shall be taken and deemed to be the boundary line between the Dominion of Canada and the United States 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 Great Britain and the United States, a survey and effective demarcation of the boundary line between the Dominion of Canada and the United States 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 the Dominion of Canada and Alaska 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 Dominion of Canada and the United States from the Gulf of Georgia to Lake Superior and from the St. Lawrence River to the Atlantic Ocean and between the Dominion of Canada and Alaska 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 Dominion of Canada and the United States and between the Dominion of Canada and Alaska, 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 Dominion of Canada and the United States and between the Dominion of Canada and Alaska 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 Dominion of Canada and the United States and between the Dominion of Canada and Alaska, 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 Dominion of Canada and the United States 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 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 Ottawa or Washington 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.

(L.S.) Ernest Lapointe.
(L.S.) Charles Evans Hughes.

FURTHER APPOINTMENTS OF COMMISSIONERS

Mr. E. C. Barnard for the United States

Department of State

To all to whom these Presents shall come, Greeting:

I certify that Edward C. Barnard, of New York, has been designated a Commissioner on the part of the United States to mark the boundary and make the surveys incidental thereto between the Territory of Alaska and the Dominion of Canada, in conformity with the award of the Alaskan Boundary Tribunal and existing treaties.

In testimony whereof, I, William J. Bryan, Secretary of State of the United States of America, have hereunto subscribed my name and caused the Seal of the Department of State to be affixed.

Done at the City of Washington this thirtieth day of April, in the year of our Lord one thousand nine hundred and fifteen, and the 139th year of the Independence of the United States of America.

W. J. Bryan.

SEAL.

Mr. J. J. McArthur for His Britannic Majesty

P.C. No. 2896

Certified copy of a Report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 29th November, 1916.

The Committee of the Privy Council have had before them a report, dated 18th November, 1916, from the Minister of the Interior, stating that Article VI of the Convention of the 24th January, 1903, between Great Britain and the United States, provides for the appointment by each Government of a Commissioner to deal with the laying down of the Alaska boundary line, from the southernmost point of Prince of Wales Island to the summit of Mount St. Elias, in accordance with the terms of the award of the London Tribunal of 20th October, 1903; also that the Convention of 21st April, 1906, in Article I, provides for the appointment of a Commissioner for the demarcation of the Alaska boundary, from the summit of Mount St. Elias. along the 141st Meridian, to the Arctic Ocean.

The Minister states that Mr. James Joseph McArthur having been appointed for the Commissionership under the Treaty of 11th April, 1908, for all sections of the international boundary from the Atlantic to the Pacific Ocean (excepting the section from St. Regis to the mouth of the Pigeon River), it is desirable that Mr. McArthur be also appointed as Commissioner to succeed our late Commissioner, Dr. W. F. King, under the above mentioned Conventions of 1903 and 1906.

The Minister represents, in this connection, that all the field work on both these sections of the Alaska boundary has now been finished, but, under an agreement entered into by former Commissioners King and Tittmann, twenty-four[1] degree sheets, showing the country from the southernmost point of Prince of Wales Island to the summit of Mount St. Elias, are now in course of preparation and will require to be signed by the British and American Commissioners. Under a similar agreement between the former Commissioners, the 141st Meridian boundary was subdivided into thirty-eight sections for mapping purposes. Thirty-two of these sheets have

[1] Reduced by succeeding Commissioners from twenty-four to thirteen, each sheet covering one degree of latitude and two degrees of longitude.

already been printed and signed by former Commissioners King and Tittmann, but the six remaining sheets which are now nearly ready for the printer will need to be signed, as will also the reports called for under the Convention.

In view of the circumstances above set forth, the Minister recommends that Mr. James Joseph McArthur, Dominion Land Surveyor and former Assistant International Boundary Commissioner, be nominated to succeed the late Dr. King as Commissioner for the whole of the Alaska boundary line dealt with under the Conventions of 1903 and 1906.

The Committee, on the recommendation of the Minister of the Interior, advise that Your Excellency may be moved to inform His Majesty's Secretary of State for the Colonies of the desire of Your Excellency's advisers in this regard.

All of which is respectfully submitted for approval.

RODOLPHE BOUDREAU,
Clerk of the Privy Council.

To the Honourable
THE MINISTER OF THE INTERIOR.

MR. E. LESTER JONES FOR THE UNITED STATES

DEPARTMENT OF STATE,
Washington.

EXCELLENCY: I have the honor to inform you that Mr. E. Lester Jones was commissioned on February 28, 1921, as the Special 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 the treaty signed on April 11, 1908, and was also designated as Commissioner on the part of the United States to mark the boundary and make the surveys incidental thereto between the Territory of Alaska and the Dominion of Canada, in conformity with the Award of the Alaskan Boundary Tribunal and existing treaties.

Accept, Excellency, the renewed assurance of my highest consideration.

(Sgd.) CHARLES E. HUGHES.

HIS EXCELLENCY
THE RIGHT HONOURABLE SIR AUKLAND GEDDES, K.C.B.,
Ambassador of Great Britain.

MR. J. D. CRAIG FOR HIS BRITANNIC MAJESTY

(SIGNET) (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 or 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 Great Britain, signed at Washington on February 24, 1925, and do authorize 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) HERBERT HOOVER.

By the President:
HENRY L. STINSON, *Secretary of State.*

Mr. Noel J. Ogilvie for His Britannic Majesty

(signet) (Sgd.) George R.I.

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 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.

Mr. Thomas Riggs for the United States

FRANKLIN D. 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 Thomas Riggs, 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 of America 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 Great Britain, signed at Washington on February 24, 1925, and do authorize 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 first day of August, in the year of our Lord one thousand nine hundred and thirty-five, and of the Independence of the United States of America the one hundred and sixtieth.

FRANKLIN D. ROOSEVELT.

SEAL

By the President:
WILLIAM PHILLIPS,
Acting Secretary of State.

MR. JOHN A. ULINSKI FOR THE UNITED STATES

HARRY S. TRUMAN, PRESIDENT OF THE UNITED STATES OF AMERICA

To all who shall see these Presents, Greeting:

KNOW YE, That reposing special trust and confidence in the Integrity and Ability of John A. Ulinski, 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 Article IV of the treaty between the United States and Great Britain, signed at Washington on February 24, 1925, and do authorize 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 fifteenth day of May, in the year of our Lord one thousand nine hundred and forty-five, and of the Independence of the United States of America the one hundred and sixty-ninth.

(SEAL) HARRY S. TRUMAN.

By the President:
JOSEPH C. GREW, *Acting Secretary of State.*

MR. J. M. WARDLE FOR HIS BRITANNIC MAJESTY

(SIGNET)

(Sgd.) F. P. VARCOE,
Deputy Minister of Justice,
CANADA

(Sgd.) T. RINFRET,
Deputy Governor General,
CANADA

GEORGE THE SIXTH, by the Grace of God, of Great Britain, Ireland and the British Dominions beyond the Seas KING, Defender of the Faith.

To JAMES MOREY WARDLE, Esquire, Commander of Our Most Excellent Order of the British Empire, Bachelor of Science, Member of the Engineering Institute of Canada and Director of Special Projects, Department of Mines and Resources of the Government of Canada, of the City of Ottawa, in the Province of Ontario, Canada,

GREETING:

WHEREAS by Article VI of a Convention concluded at Washington on the twenty-fourth day of January, one thousand nine hundred and three, between His Late Majesty King Edward VII and the United States of America, respecting the adjustment of the Boundary between Canada and the Territory of Alaska, it was provided that scientific experts should be appointed by the High Contracting Parties 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 eleventh day of April, one thousand nine hundred and eight, between His Late Majesty King Edward VII and the United States of America, respecting the Demarcation of the International Boundary between the United States of America and Canada, it was provided that Commissioners should be appointed by the High Contracting Parties to define and mark the boundary line between the United States of America and Canada in accordance with the terms of the said Treaty.

NOW KNOW YOU that reposing special trust and confidence in your loyalty, integrity and ability, We have constituted and appointed, and We do hereby constitute and appoint you the said JAMES MOREY WARDLE to be Our scientific expert for the purposes of Article VI of the above-mentioned Convention, and to be Our Commissioner for the purposes of the above-mentioned Treaty.

TO HAVE, HOLD, EXERCISE AND ENJOY the said offices unto you the said JAMES MOREY WARDLE with all and every the powers, rights, authority, privileges, profits, emoluments and advantages unto the said offices of right and by Law appertaining during Our pleasure.

IN TESTIMONY WHEREOF We have caused these Our Letters to be made Patent and the Great Seal of Canada to be hereunto affixed.

WITNESS: Our Right Trusty and Well-beloved Counsellor the Right Honourable Thibaudeau Rinfret, a Member of Our Most Honourable Privy Council, Chief Justice of Canada and Deputy of Our Right Trusty and Well-beloved Cousin, Harold Rupert Leofric George, Viscount Alexander of Tunis, Knight of Our Most Noble Order of the Garter, Knight Grand Cross of Our Most Honourable Order of the Bath, Knight Grand Cross of Our Most Distinguished Order of Saint Michael and Saint George, Companion of Our Most Exalted Order of the Star of India, Companion of Our Distinguished Service Order, upon whom has been conferred the Decoration of the Military Cross, Field Marshal in Our Army, Governor General and Commander-in-Chief of Canada.

AT OUR GOVERNMENT HOUSE, in Our City of Ottawa, this Fifteenth day of November in the year of Our Lord One thousand nine hundred and forty-seven and in the Eleventh year of Our Reign.

By Command,

(Sgd.) E. H. COLEMAN,

Under Secretary of State.

MR. J. LESLIE RANNIE FOR HIS BRITANNIC MAJESTY

(SIGNET)

(Sgd.) F. P. VARCOE,
Deputy Minister of Justice,
CANADA

(Sgd.) T. RINFRET,
Deputy Governor General,
CANADA

GEORGE THE SIXTH, by the Grace of God, of Great Britain, Ireland and the British Dominions beyond the Seas KING, Defender of the Faith.

TO JOHN LESLIE RANNIE, Esquire, Dominion Geodesist, of the City of Ottawa, in the Province of Ontario,

GREETING:

WHEREAS by Article VI of a Convention concluded at Washington on the twenty-fourth day of January, one thousand nine hundred and three, between His Late Majesty King Edward VII and the United States of America, respecting the adjustment of the Boundary between Canada and the Territory of Alaska, it was provided that scientific experts should be appointed by the High Contracting Parties 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 eleventh day of April, one thousand nine hundred and eight, between His Late Majesty King Edward VII and the United States of America, respecting the Demarcation of the International Boundary between the United States of America and Canada, it was provided that Commissioners should be appointed by the High Contracting Parties to define and mark the boundary line between the United States of America and Canada in accordance with the terms of the said Treaty.

NOW KNOW YOU that reposing special trust and confidence in your loyalty, integrity and ability, We have constituted and appointed, and We do hereby constitute and appoint you the said JOHN LESLIE RANNIE to be Our scientific expert for the purposes of Article VI of the above-mentioned Convention, and to be Our Commissioner for the purposes of the above-mentioned Treaty.

TO HAVE, HOLD, EXERCISE AND ENJOY the said offices unto you the said JOHN LESLIE RANNIE with all and every the powers, rights, authority, privileges, profits, emoluments and advantages unto the said offices of right and by law appertaining during Our pleasure.

IN TESTIMONY WHEREOF We have caused these Our Letters to be made Patent and the Great Seal of Canada to be hereunto affixed.

WITNESS: Our Right Trusty and Well-beloved Counsellor the Right Honourable THIBAUDEAU RINFRET, a Member of Our Most Honourable Privy Council, Chief Justice of Canada and Deputy of Our Right Trusty and Well-beloved Cousin, Harold Rupert Leofric George, Viscount Alexander of Tunis, Knight of Our Most Noble Order of the Garter, Knight Grand Cross of Our Most Honourable Order of the Bath, Knight Grand Cross of Our Most Distinguished Order of Saint Michael and Saint George, Companion of Our Most Exalted Order of the Star of India, Companion of Our Distinguished Service Order, upon whom has been conferred the Decoration of the Military Cross, Field Marshal in Our Army, Governor General and Commander-in-Chief of Canada.

AT OUR GOVERNMENT HOUSE, in Our City of Ottawa, this First day of March in the year of Our Lord One thousand nine hundred and fifty and in the Fourteenth year of Our Reign.

By Command,
(Sgd.) W. P. J. O'MEARA,
Acting Under Secretary of State.

AGREEMENTS OF THE COMMISSIONERS AS TO THE MANNER IN WHICH THE PROVISIONS OF ARTICLE VI OF THE CONVENTION OF 1903, THE AWARD OF THE ALASKA BOUNDARY TRIBUNAL APPOINTED UNDER THAT CONVENTION, AND THE EXCHANGE OF NOTES IN 1905 BETWEEN THE GOVERNMENTS OF THE UNITED STATES AND GREAT BRITAIN SHOULD BE CARRIED OUT

At a meeting of the Commissioners held in Washington on March 14, 1904, their appointments under the concurrent action of the two Governments were presented and found to be in due form. At this and subsequent conferences it was agreed that the establishment of the boundary between Alaska and the Dominion of Canada under the provisions of Article VI of the Convention signed at Washington, January 24, 1903; the Award of the Alaska Boundary Tribunal signed at London, October 20, 1903; and the Exchange of Notes between the Governments of the United States and Great Britain should be carried out in the following manner:

I. That the survey parties of the two Governments should work independently as to precise locality, but the demarcation of the line should be subject to joint inspection of the engineers charged with carrying out the field work, and to the final inspection of the Commissioners.

II. That points on the line at or near which mines or settlements exist should be first attended to.

III. That the point "A" of the Award should be referenced by two concrete monuments of suitable design.

IV. That the point "B" of the Award should be taken as in latitude 54° 42′ 24″, longitude 130° 36′ 56″ on the Southeast Alaska Datum of 1912. (These co-ordinates have become 54° 42′ 27.″93, and 130° 36′ 50.″05 on the 1927 North American datum.)

V. That the boundary line through Portland Canal should be referenced by concrete monuments of a suitable design.

VI. That the point "C" of the Award should be marked on the ground by an aluminum-bronze monument set in a concrete base, and that this monument should constitute the initial point of the land boundary between the Dominion of Canada and Southeast Alaska.

VII. That the boundary line at the head of Portland Canal should run east (astronomic) from Monument 1 (the point "C" of the Award) to a point midway between the highwater marks on opposite sides of Portland Canal.

VIII. That the point "D" of the Award should be taken as the highest point on the 56th parallel of latitude between the Bear River on one side and the Salmon River on the other.

IX. That the land section of the boundary line should consist of a series of straight line courses between the peaks or other points designated as boundary points by the Award of the Alaska Boundary Tribunal and by the Exchange of Notes of 1905; with the exception, however, of the boundary line across the White and Chilkoot Passes, where the line should conform as closely as possible with the provisional boundary laid down under the Modus Vivendi of 1899.

X. That the boundary line should be drawn from Mount St. Elias to the 141st meridian on such a course parallel to the coast as should be found most suitable to the topographic conditions.

XI. That the peaks and points designated in the Boundary Award and the additional peaks and points selected by the Commissioners should be marked where feasible by aluminum-bronze monuments or such other markers as should be practicable; and that the straight line courses between these peaks or other points should be similarly marked when practicable at road, trail and stream crossings, and at such other important locations as might be considered advisable.

XII. That the boundary through timbered areas should be further marked by a vista of sufficient width to give a clear sky-line twenty feet wide.

XIII. That the cost of the monuments or other markers including transportation should be divided equally between the two governments.

XIV. That a triangulation should be made connecting the boundary peaks with one another and with the existing triangulation points near the coast, and that special importance should be attached to the accurate determination of azimuths between the peaks.

XV. That for the purpose of accurately defining, locating and describing the boundary as laid down by the Commissioners all boundary points, turning points, monuments, and reference monuments, or other markers should be located geodetically on the 1927 North American datum; that for this purpose the Canadian section of the Commission in co-operation with the Geodetic Survey of Canada, and the United States section of the Commission in co-operation with the United States Coast and Geodetic Survey, should do the necessary triangulation and traverses to tie the boundary triangulation to the geodetic stations on the coasts of British Columbia and Southeast Alaska; and that the positions of the boundary points, turning points, monuments, and reference monuments, or other markers so controlled should be certified by the Commissioners in their joint report as being a true description and definition of the International Boundary as established, surveyed and marked in accordance with the instructions under Article VI of the Convention of 1903, with the provisions of the Award of the Alaska Boundary Tribunal appointed by that Convention, and with the provisions of the Exchange of Notes in 1905 between the Governments of the United States and Great Britain.

XVI. That the charts of the boundary should consist of a series of 13 topographic maps, to be prepared from surveys made by the Commissioners, showing the boundary points, the course of the boundary and the topography on each side of the line. That the scale of these maps should be 1 : 250,000, with a contour interval of 250 feet, each chart covering an interval of 1° of latitude and 2° of longitude.

XVII. That on the maps of the boundary all points on the land section of the line, including monuments or other markers, unmarked Boundary Award peaks and unmarked boundary peaks selected by the Commissioners should be numbered consecutively from Portland Canal to Mount St. Elias, the monument on Portland Canal to be numbered 1, as previously stated; and that the boundary monuments or other markers should have the proper number placed upon them where practicable.

XVIII. That the maps of the boundary should be engraved on copper plates and printed from lithographic stones; that conventional symbols should be used and conventional colours, black, brown, blue and green; and that after the completion of the printing of the maps, and after they have been signed by the Commissioners, the four official sets of maps, two for each Government, which bear the Commissioners' signatures, should be preserved as permanent records.

XIX. That the Commissioners' joint report to the two Governments on the establishment of this section of the International Boundary Line under the provisions of the aforesaid Convention, Tribunal and Exchange of Notes should be printed; and that copies thereof should be distributed to other Government agencies and to depository libraries of the two countries.

FIELD OPERATIONS

During the years 1893-94-95, under the Convention of 1892, a joint preliminary survey was made of the as yet unsurveyed area over which the boundary line between Canada and southeast Alaska was to be determined. Previous to that time the only determination or survey of any part of the line was an *ex parte* one made in 1877 by Joseph Hunter, who had been commissioned by the Canadian Government to ascertain with approximate accuracy the boundary line across Stikine River. Later, in 1900, under the *modus vivendi* of the previous year for the establishment of a provisional boundary for customs purposes, three detached sections were temporarily laid down: across White Pass; across Chilkoot Pass; and across Chilkat River to the mouth of Klehini River and along the south bank of the Klehini to the mining settlement on Porcupine Creek.

When the members of the Alaska Boundary Tribunal signed their Award on October 20, 1903, they also signed duplicate copies of the maps accompanying the report of the joint survey of 1893-95 on which they had marked, during their deliberations, the general course the boundary was to take. Through Portland Canal the line was drawn along the centre of the channel from the point B, off Tongass Passage, which was defined by the Tribunal to be a part of Vancouver's "Portland Channel", to the point C at Eagle Point, at the north end of Portland Canal. The line was drawn from the point C to the point D, at the intersection of the summit of the ridge between Salmon and Bear Rivers with the 56th parallel of latitude. Northerly and westerly from the point D to Mount St. Elias, and about 30 miles inland from the general trend of the coast, the mountain peaks that were designated to be points at the ends of straight line courses were marked by the letter S followed by the approximate elevation of the peak. This winding boundary line included Hunter's line across Stikine River and the *modus vivendi* lines across White and Chilkoot Passes; but on Chilkat River the line was moved about 20 miles upstream to cross Chilkat, Tahini, and Kelsall Rivers. From the point P, near Taku River, to the point T, near Stikine River, a distance of about 125 miles was left undefined pending further surveys.

The task of identifying and marking the boundary line as indicated by the Tribunal devolved upon the newly appointed International Boundary Commissioners, O. H. Tittmann for the United States and W. F. King for Canada. By an exchange of notes between the British and United States Governments in 1904-05, the Commissioners were also authorized to define the boundary peaks and carry out the delimitation of the boundary between the points P and T.

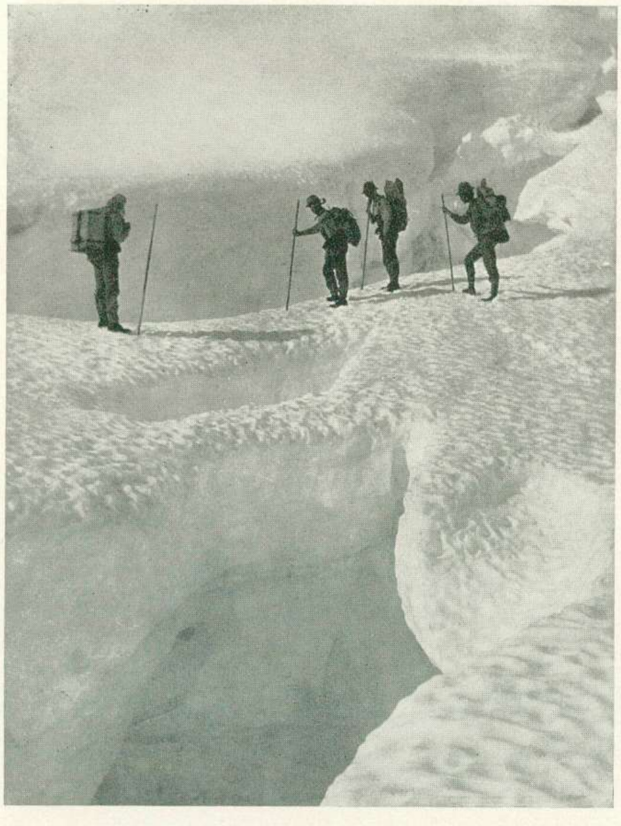
The field work of establishing and marking the boundary under the provisions of the Award was commenced in 1904. In addition to the topographical maps of the joint surveys of 1893-95, for the purpose of identification, the Commissioners had copies of the photographs taken by the joint surveys on which the boundary peaks had been marked by the Tribunal. The original triangulation and phototopography was revised and extended, monuments were set at suitable sites to mark the boundary on the ground, and a 20-foot sky-line vista was cut through most of the timbered areas.

In general the parties were organized in Vancouver or Seattle and travelled by steamer to the coastal town most convenient to the base of their season's operations. From there they continued their journey by chartered vessels or by canoes to the head of navigation. When the base of operations was some distance from a navigable stream the final stages were covered by sledding or by back-packing.

The difficulties of navigation in the swift glacial streams and the cautious, wearisome back-packing over glaciers and treacherous snow fields made transportation a much slower task than might be expected from the distances to be traversed. When Unuk River was in flood it took 10 days to "line" a poling boat the 30 miles to the boundary, and on the active Dawes Glacier it took the packers 8 hours to travel 4 miles. Though these instances were exceptional, when taken with the fact that usually a route was travelled several times to get in the supplies and equipment, they give some idea of the labour involved in transport.

Field work was usually undertaken within half a day's travel of the base camp. When the distances became too great or the route too difficult to do the necessary work and return on the same day, a fly camp with the barest necessities would be established in a convenient location. Owing to the frequent rain, snow, and fog so prevalent in this area, a great many uncomfortable days and nights were passed in these make-shift camps.

The early morning hours were generally utilized for travel on the snow fields in order to take advantage of the frozen crust. Later in the day, especially in warm weather, the snow became soft and travelling difficult. Although the men were roped together and carried alpenstocks, a route that had been quite safe early in the day often became extremely hazardous on the return journey, especially so when crevasses had to be crossed on the melting snow bridges.



Snow bridge en route to Boundary Point 157 (Tsirku River region).

Some serious accidents occurred, as might be expected in such difficult country, and on two occasions loss of life was involved. In 1909 a member of the party working east of Endicott Arm broke through the snow cornice of a mountain and fell 2,000 feet to the glacier below, and in 1913 a landslide buried two lightkeepers in their camp at Cape Muzon.

The designations of the boundary points C, D, P, T, and S followed by the approximate elevations of each boundary peak by the Tribunal have been changed to numbers ranging from 1 at the point C to 187 at the intersection of the 141st Meridian boundary with the west shoulder of Mount St. Elias.

In the following narratives of field operations the terms "Boundary Peak" or "Monument" signify the Boundary Point bearing the same number. Technical details of the field operations will be found in the narratives, or in the description of field and office methods (pp. 132 to 146).

SEASON OF 1904—KLEHINI RIVER, CHILKAT AND KELSALL RIVERS, WHITE PASS, STIKINE RIVER, AND THE HEAD OF PORTLAND CANAL

To carry out the terms of agreement between the two commissioners, field representatives were appointed, Mr. C. A. Bigger by His Britannic Majesty's Commissioner, and Mr. J. A. Flemer by the United States Commissioner. The representatives met in Seattle, Washington, on May 22, to discuss ways and means of conducting the proposed field work. It was agreed that, at the head of Chilkat River and on both sides of Klehini River, surveys should be conducted under the personal supervision of Mr. Flemer and Mr. Bigger respectively; that later in the season, when weather conditions were suitable, a United States party should work in the neighbourhood of Chilkoot and White Passes; and that one United States and one Canadian party should work on the boundary in the vicinity of Stikine River.

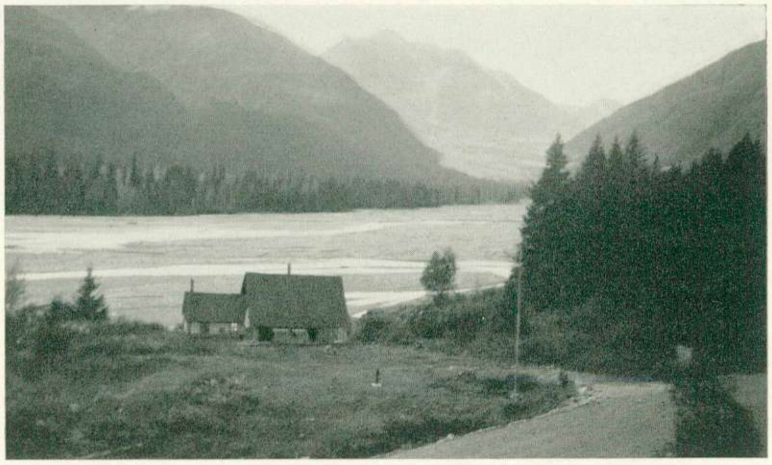
Commissioners King and Tittmann, themselves, selected the site for and erected a monument to mark the commencement of the land boundary at the head of Portland Canal[1], and afterwards inspected the boundary at some of the more accessible and important points.

Canadian Parties on Klehini River

On May 26 two parties, each consisting of ten men and two assistant surveyors, sailed from Vancouver for Skagway, en route to Pleasant Camp at the crossing of the boundary on Klehini River. From Skagway they were taken to Haines by local boat, and from Jones Point, about 5 miles above Haines, they were conveyed by Indians in dugouts up Chilkat River to the mouth of Klehini River. From there the journey was continued with horses, along the river bed to Pleasant Camp. When the representative in charge arrived on June 7, the parties, already under canvas, were completing a bridge across Klehini River.

Pleasant Camp, at the commencement of the Dalton trail to the Klondike, was established as a post by the Northwest Mounted Police during the winter of 1897-98, and during the same season John Dalton, a pioneer miner and trader, erected a depot a short distance south of the post. At the time of this survey a small force of the police, together with the families of the two senior officers, were in residence in comfortable log buildings.

[1] Boundary Point 1.



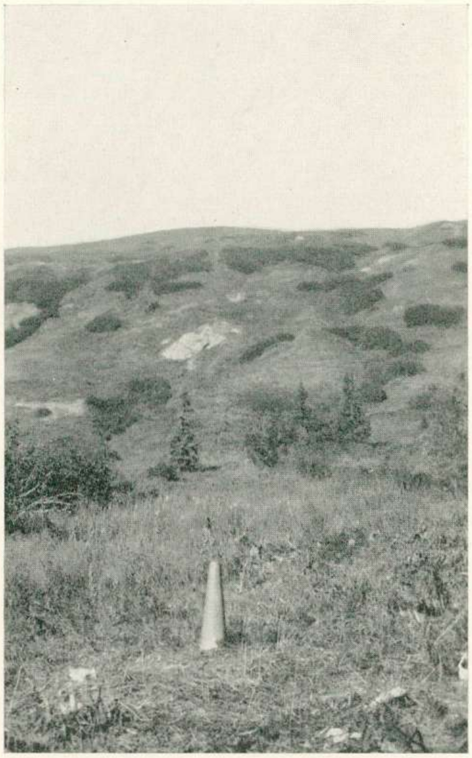
Dalton's roadhouse, built in 1898, photographed in 1946. Monument at Boundary Point 146 in middle foreground.

One of the points marked S by the Alaska Boundary Tribunal, on the map on which they designated the course of the boundary line, was not on a mountain, but was on the shingle flat in the forks of Klehini River and Jarvis Creek, near Pleasant Camp. There was no other description than the ink mark on the map, and it was the intention of the Tribunal that the Northwest Mounted Police post should be in Canadian territory. During February 1904, Captain Wilds P. Richardson of the United States army made a survey of the immediate vicinity, and, in conjunction with the officer in charge of the Northwest Mounted Police force, laid down a tentative boundary line, for customs purposes, which passed between Pleasant Camp and the Dalton depot. The commissioners, furnished with a blueprint of Richardson's survey, agreed that the boundary should be a straight line from the peak marked S 4525 by the Tribunal (Boundary Peak 144) passing between Pleasant Camp and Dalton's depot to the shingle flat, and thence continue as another straight line toward the peak marked S 5800 by the Tribunal (Boundary Peak 150), passing through a point marked by Richardson's survey situated about the middle of the point of land between Klehini River and Jarvis Creek.

The boundary line across Klehini River was so laid down. The point indicated by the Tribunal, Boundary Point 147, could not be marked permanently on account of its location on the shingle flat, but its position was referenced from the monuments on each side of the river as follows: Monument 148[1], an aluminium-bronze obelisk, was placed on the line to Boundary Peak 150 at the point marked by the Richardson survey, 189·9 metres distant, and an aluminium-bronze cone, Monument 149, was placed 139·6 metres farther along the same line. On the other side of the unmarked boundary point, Monument 146, another obelisk, was placed 361·5 metres distant on line to Boundary Peak 144, and a cone, Monument 145, was placed 112·5 metres farther along that line. Thus the position of Boundary Point 147 is referenced by the intersection of the lines produced through the two pairs of monuments, as well as by the distance from each of them. These lines were further marked by spruce posts, 8 inches square and 8 feet high, set in well-built cairns, six of the posts being placed at intervals on each line. Boundary Peak 144 was marked by a cone monument, but Boundary Peak 150, being snow covered, was not monumented.

[1] Monument 148 was found to have been washed out by erosion of the river bank and was relocated in a new position in 1936. *See* p. 122.

As soon as the positions of the monuments were established the work of cutting the vista was commenced on the two lines radiating from Boundary Point 147. While this work was in progress triangulation and phototopography were carried on during suitable weather from a base line measured on the shingle flat.



Monument at Boundary Point 143 (Yokeak Creek).

Both parties worked from Pleasant Camp until August 2, then one party moved to Yokeak Creek Valley to work in a northerly direction. The line between Boundary Peaks 144 and 142 was marked by a cone monument, No. 143 on the north side of Yokeak Creek, and by three spruce posts at intervals on each side of the creek. Farther north, the line from Boundary Peak 142 to Boundary Peak 141, across the steep valley of Rosaunt Creek, was marked by two spruce posts, 4 inches square and 5 feet high, close together on the north side of the creek, and by a cairn on the first spur south of Boundary Peak 141. The line to Boundary Peak 140, the northerly limit of the work, could not be marked on the side of the snow-covered ridge and the three northern peaks, 140, 141, and 142, also being snow covered, were not marked.

Spruce post on north side of Rosaunt Creek, placed in 1904, photographed in 1946.

Cairn on south spur of Boundary Peak 141, as found in 1946.

On September 2 the other party left Pleasant Camp for Tsirku River to extend the work southerly from Boundary Peak 151; however, on account of bad weather, transport troubles, and the necessity of bridging the river and cutting trails, they did not reach the boundary crossing of the river until September 17. Topographic surveys were made of the Tsirku Valley on the United States side of the line and camera stations were occupied on the accessible hilltops, but no work could be done on the boundary itself because of the lateness of the season and the consequent depth of snow on the mountains.

In June the United States Commissioner's representative verified the identification of the boundary peaks and approved the method by which Boundary Point 147 had been determined. Towards the end of the season a detailed survey was made of the Northwest Mounted Police post. Field work ended on October 20 and the parties returned to Vancouver.

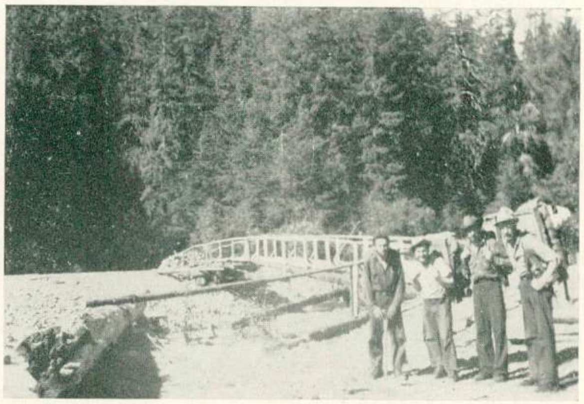
The section of the boundary established by these parties was between Boundary Peaks 140 and 150. The personnel of the parties was: representative in charge, C. A. Bigger, D.L.S.; assistants, D. R. Harris, F. W. McCready, J. M. Bates, and D. H. Nelles; and eighteen hands.

United States Party on Chilkat and Kelsall Rivers

On May 31 the party, comprising three assistant surveyors and eleven hands, sailed from Seattle for Haines, Alaska, where they arrived on the evening of June 4. Two days later the outfit and instruments, together with 3 months' supplies, were hauled in wagons to Jones Point on Chilkat River. During the next 2 days the members of the party with their outfit were conveyed, in Indian canoes, up Chilkat River to the mouth of the Klehini, near the crossing of the "Provisional Boundary Line" and close to Wells post office. From this time until July 20 the party was principally engaged in tracking and packing the outfit and stores up the Chilkat from Wells to the mouth of Kelsall River, a distance of about 14 miles.

While the main force was packing the stores up the river valley, signals were erected at triangulation stations on the upper slopes of the mountains. These stations were selected at elevations of between 3,000 and 4,000 feet so as to be above the wooded slopes and yet remain, so far as possible, below the cloud strata that envelop the mountain tops so much of the time. These cloud strata are formed by the warm humid air drifting inland from the ocean being rapidly cooled by contact with

Landing supplies on Chilkat River, about a mile above the mouth of Kelsall River.



Bridge across Kelsall River.

the névés and glaciers of the higher altitudes, a weather condition common to all the high mountain areas of southeast Alaska (which was a constant handicap to the accomplishment of the field work of the Boundary Commission). During this time also the triangulation of the lower Chilkat River, made in 1894, was connected with the triangulation of the Canadian party on the boundary peaks near Pleasant Camp, on Klehini River.

The men and stores still remaining at Wells on July 20 were moved to the mouth of Kelsall River in John Dalton's small stern-wheel steamer *Chilkat*; this was the first attempt to take the boat up the river beyond Wells, and after grounding her three times the Indian pilot made the run of 14 miles in 9 hours. From the new camp a trail was made up the Kelsall Valley to the boundary, about 12 miles. To reach the northern section of the line a bridge was built across Kelsall River at the foot of the canyon below the boundary, and a trail was cut from the bridge to the central part of the northern section. This section of the line traverses very broken country and is inaccessible from where it crosses the river. A 2-mile section of vista was cut on the north side of the river and on the

Kelsall River Valley. Monument at Boundary Point 137 in the foreground, Boundary Point 134 (Mount Ashmun) in the background.

south side a $2\frac{1}{4}$-mile section was cut as far as the upper limits of the timber. The growth was principally spruce and hemlock up to 4 feet in diameter, a few balsam and cottonwood trees, and alders up to 8 inches in diameter. Much of this cutting was done under difficulties, especially on the north side of the river, where much of the large timber stood on narrow ledges difficult of access. Five monuments, Nos. 135 to 139, were set in the vista. The monumenting and vista cutting were completed on October 6.

In the meantime the triangulation and phototopography were extended up Chilkat and Kelsall Rivers. On account of the low-hanging clouds and frequent rains many of the stations had to be visited several times, a few as many as five times, in order to complete the observations. This work was also completed early in October, and on October 8 two boat-loads of equipment were started downstream. When about 4 miles below the mouth of Kelsall River one of the boats collided with a snag and capsized; one man of the crew of two swam ashore and the other was rescued by the accompanying boat. On October 10 four canoes manned by Indians were sent up the river to bring the remainder of the party and outfit downstream, and on the following day, in a driving rain, they reached Klukwan, an Indian village below Wells.

Between October 13 and 18 the tents, bedding, and outfit were dried out and packed, and on October 19 the entire party was on board the Alaskan S.S. Company's steamer *Dolphin*, en route to Seattle.

The section of the boundary established by this party was between Boundary Peaks 134 and 140.

The personnel of the party was: representative in charge, J. A. Flemer; assistants, D. W. Eaton, J. M. Donn, and Edmund Polk; and 11 hands.

United States Party at White Pass

On Chilkat River the provisional boundary of 1900 descended the east side of the valley to the confluence of that river with Klehini River, and followed the south shore of the Klehini to a point a little above Porcupine Creek. Hence, as it was well within United States territory under the Award of 1903, it had no bearing on the work in that region; but at White and Chilkoot Passes it closely approximated the boundary as defined by the Award, so some parts of it were accepted by the commissioners in their establishment of the line across these passes.

The small United States party assigned to White Pass arrived at Skagway on July 29, and on the following day went by train to White Pass and established themselves in camp.[1] Their assignment was to identify Boundary Peaks 114 and 119 and to locate a boundary turning point on White Pass. Owing to conditions of mist and rain similar to those experienced by the party working on Chilkat River, intensified by the higher altitude of the Pass, progress was slow; only about 15 per cent of the 50 days spent in the locality were clear and bright. Frequently when nearly everything was obscured at the Pass the whole atmosphere was clear only a few miles distant in the Skagway River Valley below.

[1] The construction of the White Pass and Yukon Railway was completed in 1900.

On August 4, after two unsuccessful attempts, on account of unfavourable weather, the ascent was made to Boundary Point 119. The top of the mountain was found to be covered with deep snow, which made travelling difficult, the climbers sinking to the waist every few steps. The boundary point was selected on the summit and temporarily marked by a drill-hole in exposed rock. Boundary Peak 114 was not climbed during this season, but its well-defined summit was easily identified from the photographs of the commission of 1893-95.

The wide summit of White Pass, on which the boundary turning point was to be located, is traversed in a north and south direction by a number of ridges and canyons, so that its limits are quite indefinite. The provisional boundary monuments, four in number, had been set by the commissioners in 1900. Each consisted of a square iron bar firmly leaded into the rock, numbered consecutively from west to east. Provisional boundary monument 2 was at the point assumed to be the summit of the Pass—that is, the lowest point in the general profile of the divide between the two watersheds. As this monument was not considered to be in a suitable position to be used as a turning point between Boundary Points 114 and 119 (then designated by the Award numbers 6750 and 5550 respectively), a new point was selected for the purpose, its position to be subject to the approval of the commissioners. To show the topography of the pass and its environs, a large-scale plane-table map was made.

Late in August the two commissioners with their representatives from Klehini and Chilkat Rivers met the chief of the party at White Pass to examine the situation there. They did not then come to a final agreement, and some slight modification in the course of the line was made during the following year.

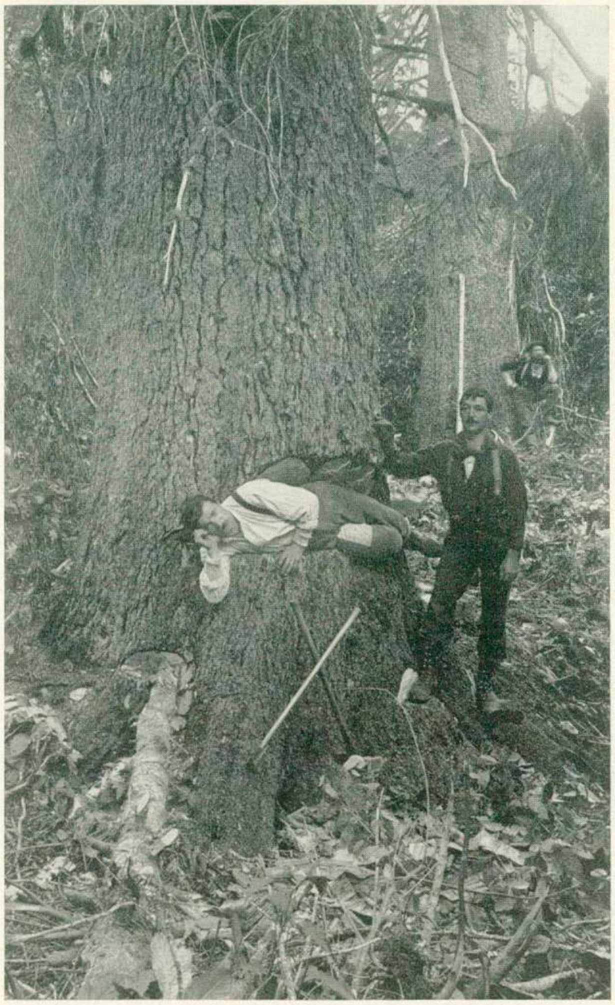
Boundary Peak 119 is easily visible from the Pass, but Boundary Peak 114 is obscured from it by a group of mountains; consequently, it was necessary to extend a system of triangulation down the south side of the Pass and then east up the main branch of Skagway River in order to connect the latter peak with the boundary turning point. Other work done by the party included the usual astronomical observations, together with photographic work for the explanation of records and description of the country. Upon the completion of the work the party sailed south from Skagway on September 18.

The personnel of the party was: engineer in charge, O. M. Leland; and 4 hands.

Canadian and United States Parties on Stikine River

The two parties met in Wrangell on June 15. The next day they took passage on the Hudson's Bay steamer *Mount Royal* for Stikine River, and in rainy weather landed at the abandoned Northwest Mounted Police buildings near the boundary. The Canadian party had authority from their Government to make use of the buildings, which were apportioned between the two parties for office use and for storage of supplies.

The Canadian party was equipped with pack-horses, but the United States party was better provided with boats for river transportation; so the former undertook the work on the south and east side of the river, where horses could apparently be used to better advantage, and the latter undertook that on the north and west side. Later in the season, however, it was found that the possession of horses was of doubtful advantage as their use was confined to the river flats, and the making of trails for their use involved slow and hard work. When the opportunity arrived the horses were disposed of to a trader from Telegraph Creek.



Cutting the vista in Stikine River Valley. The near tree showed 266 annual rings.

During the disagreeable weather that continued for a week after the arrival of the parties at the boundary, trails were made to the summits of Elbow Mountain on the north side of the river, and Mount Coté on the south side. Camp sites were selected on the upper slopes of the two mountains. The horses were used by both parties to pack supplies up to an elevation of about 800 feet. Above that elevation the trails were too steep for the horses and the packing had to be continued by the men.

Signals were erected on Boundary Peaks 66 (Elbow Mountain) and 62 (Mount Coté), but it was not until late in the afternoon of July 9 that the clouds cleared from the two summits sufficiently to permit the location of a point on the south bank of the river from which the line projection across the valley could be started. From this time on to the end of the season most of the men were at work clearing the vista along the line, their number varying according to the demands of other work. At times they were required to pack the outfits of the triangulation and topographic parties up the various mountains; at other times they were engaged in necessary trail making. In that climate little or nothing could be accomplished if work was done only on dry days, so there were comparatively few days when the men were not working in the wet. The vista ran through heavy timber, mostly hemlock and cottonwood. In the river bottom it went through a dense undergrowth of alder, willows, and devil's club. The vista was completed to the upper limit of timber growth on the north side of the river, but on the south side, on the upper slope of Mount Coté, the cutting of large trees growing on narrow benches between precipices was too hazardous and could not be completed.

When the United States party climbed Boundary Peak 66 they found a cairn that had been erected on the summit by the phototopographic survey of 1893; this cairn was replaced by an aluminium-bronze cone. On arriving at the summit of Boundary Peak 67 (Mount Gallatin) they found it to be a dome-shaped cap of snow resting on an ice-sheet that was no doubt the remnant of a glacier. The summit was temporarily marked by a triangulation signal, but no permanent mark could be left there. The observing was completed from Boundary Peak 68 (Mount Talbot), marked by an aluminium-bronze cone, early in September. Boundary Peak 69 (Castle Mountain), about 10 miles to the northwest, was intersected from the triangulation. The marking of the boundary line on the north side of the river was completed by the erection of two monuments, an aluminium-bronze cone (No. 64) on the north bank, and an aluminium-bronze obelisk (No. 65) nearly a mile farther north.

The Canadian party set Monument 62A, an aluminium-bronze obelisk, at the foot of Boundary Peak 62 (Mount Coté) and an aluminium-bronze cone at the summit. Being unable to make further progress with the vista cutting on the south side of the mountain, on August 14 they moved up Katete River to locate the boundary crossing on that river. The Katete joins the Stikine about half a mile above the boundary; it is always navigable for light scows and canoes, but its short course and the steep slopes of its valley cause it to rise and fall very rapidly in response to wet or dry weather. Because of the unusually heavy rainfall during this season, the channel was full to the banks, which made the tracking of the boats slow and laborious as tow paths had to be cut and log jams in the river cleared away. Unfortunately, very little work could be accomplished after the party arrived at their new camp on account of the continued rain and mist,

Monument at Boundary Point 62 (Mount Coté).

which persisted with scarcely a break from September 4 to October 2. By the latter date, there being no favourable prospect of improved weather conditions, work was brought to a close and the working tools and non-perishable supplies were stored in a strong cache for use in the following season.

Early in September the commissioners inspected the line work and received reports of the progress of surveying operations. The United States party started for Wrangell on September 25 and sailed for Seattle on October 4. About a week later the Canadian party, whose return down the Katete had been delayed by the wreck of one of their boats, also returned to Wrangell, whence, after drying and storing their outfits, they sailed for Vancouver.

The personnel of the parties was: engineer in charge of United States party, Fremont Morse; assistants, L. Netland and Adolf Mosheim; and 12 hands; engineer in charge of Canadian party, George R. White-Fraser, D.T.S.; assistants, E. C. Boyce and R. W. McKenzie; and 12 hands.

The Commissioners at the Head of Portland Canal

Commissioners W. F. King and O. H. Tittmann made arrangements in Victoria, British Columbia, by an extension of the regular route of the Canadian Pacific steamship *Danube*, for their transportation to the head of Portland Canal and for the assistance of the crew in erecting Monument 1, the initial monument of the land boundary. They arrived at the head of the canal on August 19.

The necessity for a special visit of the commissioners to this point arose from the fact that "Point C" designated by the Tribunal as the "head" of Portland

Monument at Boundary Point 1 at the head of Portland Canal.

Canal and the initial point of the land boundary was not, like the mountain summits, capable of exact determination from the topography. It was shown on the Tribunal map at or near the extremity of Eagle Point, the southernmost extension of the high mountain spur that divides the watersheds of Bear River in British Columbia and Salmon River in Alaska, and from the manner in which it was marked there was possible room for divergence of opinion as to the exact place intended.

The commissioners agreed that the site for Monument 1, the "Point C" of the Award, should be just above high-tide mark on the rock outcrop a few feet south of the stone storehouse built by United States engineers in 1896. The monument was an aluminium-bronze obelisk set in a concrete base.

Upon the completion of this work the commissioners went to Skagway on the S.S. *Danube* for their visit to White Pass, previously referred to.

SEASON OF 1905—TSIRKU RIVER, CHILKAT RIVER, WHITE PASS, TAKU RIVER, KATETE RIVER, UNUK RIVER, AND SALMON RIVER

Profiting by the experiences of the previous year, the commissioners agreed upon more extensive field operations for the season of 1905, and the survey parties of both sections of the Commission were greatly increased. They also agreed that the parties of each section should be accompanied by a representative of the other section to take part in the field work and, more especially, to verify the identification of the various boundary peaks. When, as sometimes happened, an agreement could not be reached in the field regarding some particular peak, a joint report was made by the engineer in charge and the accompanying representative, which was submitted to the commissioners for their decision.

Operations were resumed from Tsirku, Chilkat, and Katete Rivers, and in the vicinity of Skagway River and White Pass. The Canadian party working on Tsirku River finished there early and worked from Taku River for the remainder of the season. New work was started by a United States party from Unuk River, and by a Canadian party from Salmon River.

Canadian Party on Tsirku River

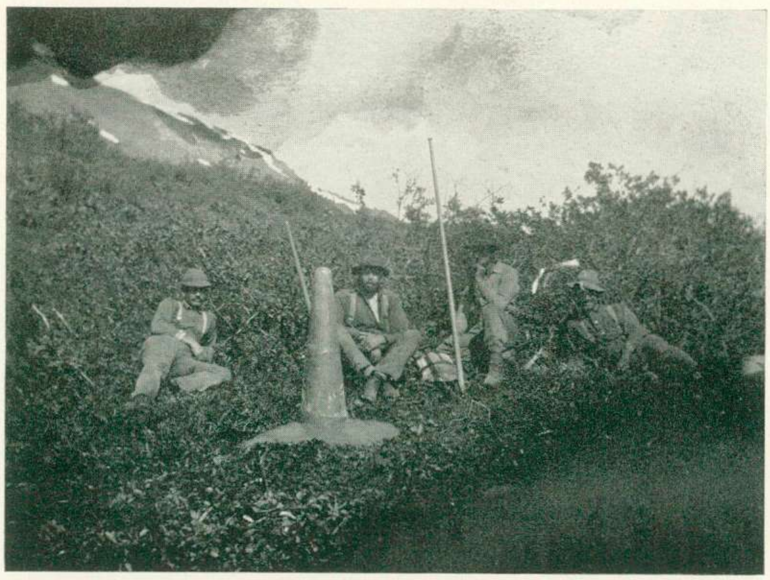
The Canadian Pacific steamship *Princess May*, which arrived at Skagway on May 25, was allowed by special permission from the United States Bureau of Customs to proceed to Haines with the party on board. From Haines they were taken up Chilkat River under sail in large Indian dugouts to Klukwan, an Indian village opposite the mouth of Tsirku River. With two Indians and one member of the party in each canoe, they ascended the swift and shallow Tsirku River to the first of the snow bridges across it, about 20 miles from its mouth. Here the Indians refused to proceed farther and the party continued their journey for the next few miles by hauling their outfit on some Yukon sleds that they found


Packing mountain goats, Tsirku River region.

n an old cache. When the base camp was established, on June 3, there was a depth of 5 feet of snow on the ground, and although the weather was comparatively mild the snow did not leave the valley for another 3 weeks.

In the boundary region of Tsirku River the mountains are precipitous and a large number of tributary glaciers descend the valleys to the river and to the glacier at its head. The southern slopes of the mountains are covered with a dense growth of stunted hemlock and alder to the snow line about 1,000 feet above the level of the river, whereas on the northern slopes the perpetual snow line is only a few hundred feet above the river.

The triangulation, which included some of the stations of the survey of 1894, was extended from Chilkat River to the most accessible of these mountains, and Boundary Peaks 151, 154, 155, and 156 were cut in by intersection. Intervening ridges made the projection of the line across the Tsirku Valley and glacier between Boundary Peaks 151 and 154 difficult, but after several unsuccessful attempts a point on line was occupied from which both boundary peaks were visible and the line was projected across the valley. Monuments 152 and 153, of the conical type, were set on line on the north side of the valley. Tributary glaciers and rock slides made it


Boundary Point 153, Tsirku River.

impracticable to place monuments on line on the south side of the valley. The phototopography carried on by the party provided data for the mapping of a considerable area of previously unsurveyed country.

The section of the boundary established was between Boundary Peaks 151 and 157. The work on the Tsirku was finished by the end of July and the party was transferred to Taku River.

Canadian Party on Taku River

The party arrived at Juneau 2 weeks after leaving Tsirku River. They ascended the first 3 miles of the Taku in two launches and continued the final 10 miles of their trip up the shallow river in Peterborough canoes, with a fisherman's skiff to assist with the transportation of the supplies. Camp was established on a small island near the boundary on August 16.

A base line was opened through the timber in the valley, observations were taken for latitude and azimuth, and a number of the stations of the survey of 1894 were recovered and incorporated in the triangulation of the valley. Boundary Peaks 87 and 92 were identified and a signal built on the latter, but the former could not be climbed from this valley although three attempts were made. The boundary line was determined between the two peaks and temporarily marked by wooden posts, and a narrow transit line was cut for a quarter mile on each side of the river. The work, which had been impeded by the usual wet weather at the end of the season, was completed by the middle of October and the party returned to Vancouver.

This was the first approach to any part of the boundary line defined by the commissioners in accordance with the exchange of notes of March 25, 1905 (*See* page 9). The section established was between Boundary Peaks 87 and 92 (the points 2 and 1 in the exchange of notes).

The personnel of the party on Tsirku and Taku Rivers was: engineer in charge, W. F. Ratz, D.L.S.; assistants, D. H. Nelles, H. S. Mussell, A. J. Rainboth; and 4 hands.

United States Party on Chilkat River

The same party as of the previous season returned to Haines early in May to continue their survey of Chilkat River beyond the mouth of Kelsall River. After some delay caused by the commencement of the fishing season, they secured three large canoes with Indian crews to take them to the "shallows" 2 miles beyond the mouth of the Kelsall. As the loaded canoes could proceed no farther up the shallow stream the Indians were discharged and a temporary camp was pitched on the steep mountain side. From this camp a towpath was cut beside the channel of the deepest of the numerous sloughs above the camp and the outfit was tracked upstream in light-draught canvas boats. By the end of May, while the water was slowly but steadily rising, the outfit and stores had been moved to a base camp near the mouth of Tahini River, about 8 miles above the Kelsall.

Between June 1 and 7, a trail was cut along the Tahini to a new camp at the head of boat navigation. After constructing a foot-bridge across the river, which at this place is a mountain torrent, the trail was continued to the forks of the Tahini near the boundary.[1] The camp was moved to the end of the new trail, and on June 21 a fly camp was pitched above timber-line on the slope of Boundary Peak 134 (Mount Ashmun) for the ascent to the summit, and shortly thereafter the climb was made. The warm weather, after the middle of May, had melted the snow dome on this peak and a low ridge of loose rock had been laid bare. A signal was erected and a cairn built around the base of the signal pole.

On June 12, while the above work was in progress, a small party left the base camp to extend the triangulation and phototopography from the mouth of Kelsall River. On June 22, being prevented by smoke of forest fires from continuing this work, they returned to the base camp and found it flooded by the rising river. On June 26 they found the foot-bridge across the Tahini had been swept away by the flood, thus cutting the communication between the upper and lower camps. The bridge was immediately rebuilt.

The line west from Boundary Peak 128 (Raymond Peak) was staked early in July and a party of six was left there to cut the boundary vista. The vista in this section was about $2\frac{1}{2}$ miles long; 1 mile was through heavy timber and the rest through smaller trees in the bottom of the valley, which had been swept by forest fires about 30 years previously. An aluminium-bronze cone, Monument 129, was placed on the east side of the Tahini, and four others, Monuments 130 to 133, were placed westerly from the river on the slope toward Boundary Peak 134. This work was completed late in August.

The progress of the triangulation, after a favourable and early start, was greatly retarded by forest fires, which were particularly active in July and August.

Monument at Boundary Point 133. Boundary Point 128 (Raymond Peak) in the background.

[1] The junction of Tahini and Flemer Rivers.

All elevated stations had to be occupied repeatedly to take advantage of the change in position of the pall of smoke that enveloped different sections at various times. In August a base line was measured and a solar azimuth observed on the upper Chilkat to check the triangulation. On August 26 the first heavy snowstorm appeared in the mountains, which made climbing and travelling above timber-line wet and disagreeable. By late September the triangulation had been carried as far as the boundary crossing on the Chilkat.

On October 1 the engineer in charge attempted to ascend Tsirku River to inspect the work done there by the Canadian party, but he was unable to reach the boundary owing to a heavy snowstorm. On his way on October 5 he met a trapper and two Indians who informed him that the Canadian party had left the Tsirku more than a month before and had gone to Taku River. This and the heavy snow that had fallen caused him to abandon the trip and return to Haines. The remainder of the party also returned to Haines on October 11, and after drying and packing their outfit embarked on October 18 on the steamer *Jefferson* for Seattle.

The section of the boundary established by the party was between Boundary Peaks 128 and 134.

The personnel of the party was: engineer in charge, J. A. Flemer; assistant, D. W. Eaton; and 6 hands.

United States Party on Skagway River and at White Pass

A larger party than that of the previous year arrived at Skagway on June 19, and from there went by train to Denver station, making their first camp on the south bank of the East Fork of Skagway River, on the trail leading to Denver Glacier. This camp was the headquarters for the season and all the lower triangulation and topographic work was done from it. Early in the summer, when the weather was unusually dry, the camp was constantly menaced by forest fires, which raged all over the locality of Dyea and Skagway, as well as the Chilkat Valley. The timber was mostly hemlock and only heavy rain could extinguish the fires that in this vicinity generally originated from sparks from passing locomotives. The proximity of the river enabled the party to keep the ground fire from reaching the camp, but as the forest was on fire on all sides they were at all times prepared, if necessary, to move camp to a gravel bar in the bed of the stream.

The survey, which incorporated the work of 1904, was extended from the United States Coast and Geodetic Survey triangulation stations on Taiya Inlet, up the Skagway Valley to the boundary area at White Pass, and from there northwesterly to Boundary Peak 119. For the purpose of marking the boundary crossing of the upper Skagway River, a camp was established near the river about 2 miles above Glacier Station of the White Pass and Yukon railroad and about a mile below the boundary. On the south side of the river, Boundary Peaks 109, 110 (Hefty Peak), and 111 were identified, but not one of the three summits was actually reached, though a number of attempts were made to climb them. The peaks, however, of 110 and 111 were sharp and well defined, and the culminating point of the large drift of snow on the summit of 109 was used, with good results, for sighting. On the north side of the river, Boundary Peak 114 was climbed and an aluminium-bronze cone monument was placed on its 4-foot wide summit. To mark the boundary crossing of the river two monuments were set: No. 112, of the conical type, on a bluff on the south side of the river; and No. 113, of the obelisk type, on the mountain slope on the north side. About two-thirds of a mile of vista was cut through the timber of the valley. This crossing of the Skagway Valley is the only part of the boundary that passes through timber from Taku River to Chilkat River; the timber is balsam and hemlock and seldom reaches 2 feet in diameter.

The boundary turning point of 1904 was established at the summit of White Pass as the turning point between Boundary Peaks 114 and 119, in accordance with the mark so placed on the Award map. But it was found from the surveys of the locality that the boundary line so laid down would intersect the crest of the pass, the natural boundary. The commissioners, therefore, considered it advisable to locate the boundary to conform more closely to the crest and so instructed their representatives to incorporate, so far as possible, the provisional boundary of 1900, which closely followed the crest, in the final delineation of the line. Accordingly, the following agreement was made by the two representatives and sent to the commissioners for their approval:

SUMMIT OF WHITE PASS, ALASKA,
August 17, 1905.

O. H. TITTMANN, Esq.,
Commissioner for the United States.

W. F. KING, Esq.,
Commissioner for Great Britain.

GENTLEMEN,

We beg to report concerning the Alaskan Boundary between Boundary Peak 6750[1] and Boundary Peak 5550[2] across White Pass, that we have personally examined the topography of the locality in question, in accordance with your instructions, and that we jointly agree upon the following as a reasonable and equitable location of this part of the Boundary.

From Boundary Peak 6750 the line will run in a northwesterly direction to a point on the east side of White Pass, thence to a point on the west side of White Pass in a westerly direction, and thence in a northwesterly direction to Boundary Peak 5550, all three sections of the boundary being straight lines between the points named.

The middle section of the line will coincide as nearly as practicable with the line passing through Monuments Nos. 1 and 3 of the Provisional Boundary established by yourselves in 1900 in accordance with the *modus vivendi*, and will pass through Monument No. 2 of that line, which monument is situated between the Canadian and United States flag-poles just west of the White Pass and Yukon railroad. Deviation from that line will only be necessary in order to render the eastern section, to Boundary Peak 6750, more readily recovered and tested by the occupation of a range point east of Boundary Peak 5550 and on the extension of that eastern section.

[1] Boundary Point 114.
[2] Boundary Point 119.

On the east, the middle section will run to a point, to be called "East White Pass", which shall lie on the ridge just west of the north branch of the White Fork and east of the Old Bennett Trail. On the west, the corresponding limiting point will be called "West White Pass" and will be located on the ridge just east of the large lake called "Blue Lake" and west of the railroad.

The western section will thus be an open line, Boundary Peak 5550 being visible from West White Pass. The eastern section, however, will be obstructed by a mountain not far from Boundary Peak 6750, but it is considered practicable to locate a range point on the easterly slope of Boundary Peak 5550 from which both East White Pass and Boundary Peak 6750 can be seen and in line with these points, so that the direction of this section can be easily determined. We have the honour, etc.,

(Sgd.) O. M. LELAND, *Representing the Commissioner for the United States.*

(Sgd.) C. A. BIGGER, *Representing the Commissioner for Great Britain.*

The commissioners accepted the agreement and the line therein described became a part of the International Boundary line. In 1920, however, when the commissioners numbered the boundary points consecutively northward from Boundary Point 1 at the head of Portland Canal, they changed the notation of the two peaks from 6750 and 5550, the approximate elevations of the peaks marked on the Award maps, to the numbers 114 and 119.

To mark the adopted line on the ground, obelisk-type monuments were erected at East White Pass, at the site of provisional boundary Monument 2 (also known as White Pass Monument) and at West White Pass, later designated respectively Boundary Points 116, 117, and 118. Provisional boundary monuments 1 and 3 were also made permanent marks by being cut off a foot above ground and being made the centres of large cairns. Southeast of Boundary Point 116 (East White Pass) and 484 metres from it a conical-type monument, No. 115, was placed on the line projected through Boundary Point 116 from "a range point on the easterly slope of Boundary Peak 5550 from which both East White Pass and Boundary Point 6750 can be seen and in line with these points". Boundary Point 119 was marked by a conical-type monument, placed on a large point of rock that shows above the snow near the middle of the summit a short distance from the point chosen in 1904, which was not considered to be a suitable site.

Rainy weather had set in for some time before the completion of the work. The tents and other outfit were dried in the freight shed of the White Pass and Yukon railroad. The party left for Seattle on the Steamer *Jefferson* on September 14.

The section of the boundary established by this party was from Boundary Peak 109 to Boundary Peak 119.

The personnel was as follows: engineer in charge, O. M. Leland; assistants, S. L. Boothroyd, P. D. Coons, J. L. Jacobs, W. F. Smith; and 15 hands. The Canadian representative was C. A. Bigger, D.L.S.

Canadian Party on Katete River

On May 26 a Canadian party returned to the old Mounted Police buildings on Stikine River to resume the demarcation of the boundary eastward from Boundary Peak 62. From their base camp at the buildings they re-erected signals on Boundary Peaks 62 and 66 (Mount Coté and Elbow Mountain). They then lined their canoes up the swift current of Katete River to the boundary crossing of the west fork, a distance of about 8 miles, where they established a camp for work on the line.

On June 1 a point on line was established on the crest of the ridge on the east side of the west fork, between Boundary Peak 62 (Mount Coté) and Boundary Peak 54 (Mount Whipple) to the eastward. At that time the summit of the latter was covered with a cap of snow, the culminating point of which was assumed to be the boundary peak. The vista was cut on both sides of the west fork valley and four monuments were set: No. 58, an aluminium-bronze cone on the crest of the ridge on the east side of the river; No. 59, a 2 inch square copper post 1 foot high on the slope of the valley on the east side; No. 60, an aluminium-bronze cone on the first bench on the slope to the west; and No. 61, a copper bolt on the east side of the western ridge. Work was started from a camp on the east fork on July 14, and upon the completion of the vista cutting three additional monuments were set: No. 55, a copper bolt a quarter mile above timber-line on the slope of the valley on the east side of the river; No. 56, an aluminium-bronze cone on the east bank; and No. 57, an aluminium-bronze cone on the top of the slope on the west side. The vista cut across the two valleys extends for 8 miles over very difficult country; often a climb of $2\frac{1}{2}$ hours had to be made before work could be commenced, and then the precipitous slopes made it hard to use axe and saw to advantage. The vista cutting was completed on August 14.

Unfavourable weather had delayed the triangulation and topography, so that Boundary Peak 54 was not climbed until the end of August. By this time the snow had melted off the summit and it was found that the highest part of the snow cap had not been directly over the highest part of the mountain itself, but about 30 feet to the northward; thus the east end of the line as cut and marked fell that much off the true boundary peak. It was, however, left as marked, subject to the decision of the commissioners. (In the autumn of 1912, the commissioners had the line corrected, each monument being moved southward its correct proportional distance to put it on the true line.) The change in position from the snow to the rock peak of Boundary Peak 54 also made necessary the re-occupation of Boundary Peaks 62 and 66 and the other immediate triangulation stations.

Upon the completion of this work the party returned to their base camp on Stikine River, and on September 4 they started up Iskut River, but on account of incessant bad weather between then and October 14, only a base line was measured and the triangulation carried a few miles above the mouth of the Iskut. Even had the weather been clear no triangulation could have been carried on later than October 1 on account of the high winds and intense cold and the difficulty of climbing the freshly snow-covered slopes.

The party left the field on October 16 and returned to Wrangell, and thence to Vancouver.

The personnel of the party was as follows: engineer in charge, A. J. Brabazon, D.L.S.; assistants, D. V. Ritchie, A. G. Gillespie, C. H. Brabazon, T. P. Reilly; and 8 hands. The United States representative was J. M. Donn.

United States Party on Unuk River

Travelling by the steamer *Alaskan* from Ketchikan, the party arrived at the mouth of Unuk River on the evening of May 16, and on the following morning a gasoline launch towed their loaded boats to the dock of the Unuk River Mining and Trading Company. It was expected that transportation to the boundary would be comparatively easy as the Mining Company was building a road from the mouth of the river to their mine several miles beyond the boundary. However, it was found that, although the road was nearly completed as far as the boundary, the company had not sufficient horses and wagons to forward their own supplies and those of the survey party as well. As river navigation was found to be impracticable because of the swift current and the numerous log jams, back-packing was the only means of transportation until June 30 when the Mining Company, having obtained additional teams, began to haul the remainder of the outfit of the party forward from the landing.

In the meantime a base line was measured on the tide flats at the head of Burroughs Bay, from which triangulation was extended to connect with several old stations of the United States Coast and Geodetic Survey, which were recovered there. The triangulation was then carried up the river as far as the boundary to control the topography and to determine the positions of the boundary peaks and monuments.

Good progress was made in spite of considerable delay caused by forest fires and spring freshets, both the results of unusually fine weather; the freshets flooded the camp and washed out several sections of the newly constructed road, and the fire burned the large bridge across Blue River.

Late in July the main camp was made about 25 miles above the mouth of the river and one-half mile below the boundary, and operations were carried on in the boundary area. A fly camp was pitched at timber-line on the slope of Boundary Peak 40 (Mount Stoeckl), from which the peak was climbed on August 15. A signal was erected there in a blinding snowstorm. On account of continued bad weather no further work could be done until August 23. At this time the engineer in charge accompanied by the Canadian representative identified several boundary peaks, among which was one thought to be Boundary Peak 28, which will be referred to later.

Boundary Peaks 23 (Mount Willibert), 24 (Mount Blaine), the assumed 28, and 47 (Mount Lewis Cass) were tied in to the triangulation by intersection, and in addition to the phototopographic work a considerable amount of plane-table work was executed in the vicinity of the boundary line. The boundary vista was cut down the south side of Boundary Peak 40 (Mount Stoeckl) and over the tops

Monument at Boundary Point 39, Unuk River region.

of the ridges between Unuk River and Boulder Creek, and in this section six aluminium-bronze monuments were set: a cone on the summit of Boundary Peak 40; No. 39, a cone at timber-line on the south slope; No. 38, an obelisk on the north side of the river; No. 37, a cone on the south side of the river; No. 36, a cone on the crest of the first ridge south of the river; and No. 35, a cone on the crest of the second ridge. It had been intended that one of the obelisks should be put on the south bank of the river, but it was lost when the canoe carrying it across capsized.

In the meantime a sub-party continued the triangulation and phototopography southward from a camp at timber-line above the head of Lake Creek, a tributary of Unuk River. The last of their observations were made on September 7, which is late in the season on the high mountains as each passing storm leaves new snow on the peaks, and a heavy snowfall means a complete blocking of further mountain work. The sub-party then joined the main party at work on the vista.

On September 22 the Mining Company's teams started moving the outfit of the party down the river. As the gasoline launch, which made weekly trips between Ketchikan and the mouth of the Unuk, was too small to accommodate the party, a steamer was chartered for their transportation back to Ketchikan. Passage for Seattle was taken on the steamer *Humbolt,* which left Ketchikan on October 9.

It has already been stated that Boundary Peak 28 was identified from Boundary Peak 40, and that a part of the boundary line was marked between the two peaks. However, when computations were made from the field notes after the close of the survey, it was found that the peak identified as Boundary Peak 28 was really Boundary Peak 18. Actually there was no prominent peak on the snow-covered ridge located in the position of Boundary Peak 28 as shown on the Award map; but there was such a peak some 5 miles farther inland, and on the photographs supplied for identification purposes this peak was marked as Boundary Peak 28; furthermore, Boundary Peak 18, visible behind the snow-covered ridge, resembled the peak marked as Boundary Peak 28 on the photographs. Had the triangulation been finished sooner and the results computed in the field, these facts would have been discovered and the line would have been left unmarked until its location had been decided upon by the commissioners. As it was the commissioners agreed that the line as marked across the Unuk Valley should be retained and that Boundary Point 28 should be the highest part of the snow-covered ridge of Mount Middleton on the direct line between Boundary Peaks 40 and 18.

The personnel of the party was: engineer in charge, Fremont Morse; assistants, L. Netland and Adolf Mosheim; and 12 hands. The Canadian representative was J. D. Craig, D.L.S.

Canadian Party on Salmon River

Arrangements were made in Victoria with the Canadian Pacific Steamship Company to transport the party to the head of Portland Canal on the steamship *Tees*, although the regular northern terminus of her run was Naas Harbour. Disembarking at Eagle Point on May 10 they pitched their first camp about a quarter mile above the mouth of Salmon River. Although the townsite of Stewart at the mouth of Bear River was in existence at that time, with a small floating population of miners, a mining-recorder's office, and a post office, there was no townsite at the mouth of Salmon River; the river flat was homesteaded, but the road up the valley had not yet been built.

For the first 2 weeks the river afforded a convenient route for transportation as the water was low, and although the stream was too swift to paddle against, the sand bars on either side gave good footing for tracking the boats and canoes. This mode of transport was abandoned when the heavy rainfall late in May and the extremely warm weather early in June melted the snow on the mountains and snow fields, and made travel impossible on the flooded river, which carried downstream large numbers of uprooted trees and huge blocks of ice from the glaciers at its head. Trails were then cut up the valley and the supplies were packed in by the men.

The party had been instructed to survey the line northerly and northwesterly towards Unuk River, and if possible to make a connection with the United States party operating from there. Their first duty was the location of Boundary Point 7, the point D of the Award, defined by the commissioners as "the highest point on the 56th parallel of latitude between the waters flowing into the Bear River on one side and the Salmon River on the other". The 56th parallel for this purpose was determined by triangulation from the United States Coast and Geodetic astronomic stations at the head of Portland Canal.[1]

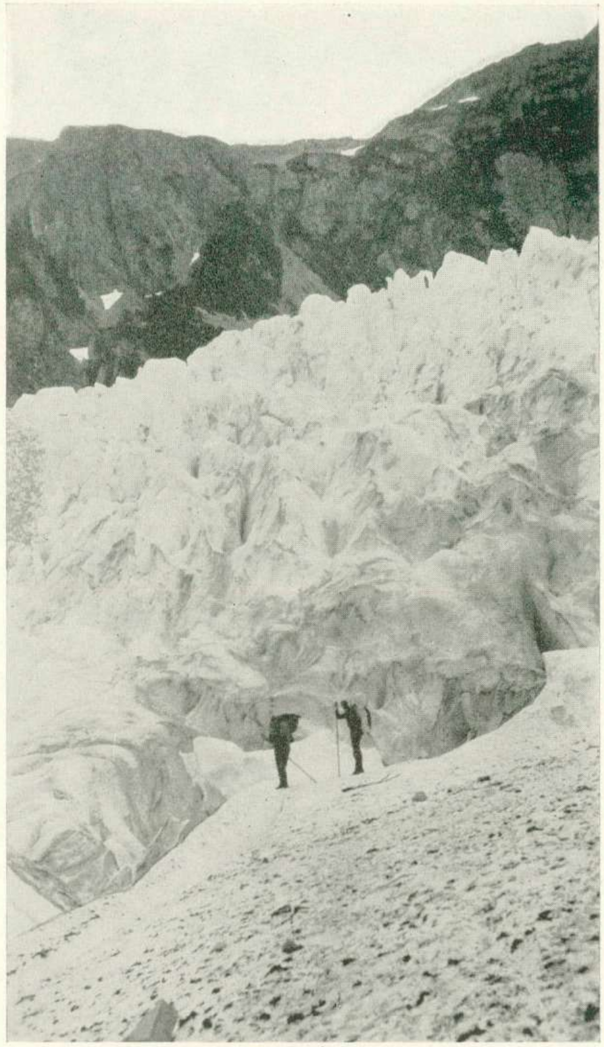
From the latter part of May until early in July, during the progress of the triangulation and phototopography up the Salmon Valley, supplies were being packed from a cache 5 miles above the mouth of the river over a trail cut by the party. The river was crossed at a point opposite the mouth of Texas Creek, about 12 miles above salt water, by means of a block running over a rope stretched between two tripods, one on each side of the river, and the trail was continued up the Texas Valley. The creek in turn was crossed by a boat attached to an overhead rope.

Early in July the river rose again, flooding the trails and destroying the rope crossings; they were rebuilt but still another flood destroyed the new trails and

[1] *See* footnote 1 on next page.

crossings, so it was not until July 18 that the base camp was finally established on Texas Creek.

On July 19 a party left the new camp to explore the Texas Glacier and to find the best way to the boundary peaks to the west. A temporary camp was made on a shelf of the steep valley side above the ice falls on the glacier, and from there Boundary Peak 15 was climbed and a signal was erected on it. The advance camp was then moved farther west. The travelling over the 5,000-foot glacial divide between Texas and Chickamin Glaciers was both difficult and dangerous; crevasses up to 20 feet wide hindered progress by necessitating wide detours or precarious crossings over snow bridges. Precautions were taken to have the men shod with spikes, provided with alpenstocks, and roped together. These precautions were amply justified on a number of occasions. Progress was also delayed by the frequent rainfall and the driving mists that are so prevalent on the elevated ice fields.



Ice falls on Texas Glacier.

In the meantime work was continued from the base camp by the main party. The latitude of Boundary Peak 8 having been ascertained from the triangulation, the calculated distance was measured south along the ridge to the 56th parallel of latitude, and an aluminium-bronze monument was erected there to mark Boundary Point 7, the point D of the Award.[1] The main party then took part in the work from the advance camp.

By this time the advance camp was on the spur of Boundary Peak 16 above the confluence of Chickamin Glacier with the ice fields to the north. Signals had been erected on Boundary Peaks 17, 18, what was supposed to be Boundary Peak 16[2], and several triangulation stations. By September 15 it had become a race with the weather to complete the observing from these stations, and after many delays it was finished, with the exception of the occupation of Boundary Peaks 17 and 18. On September 19 most of the members of the party returned to the Texas Creek camp, which they reached after trying experiences on the divide;

[1] The computation was on the basis of the Southeast Alaska datum. *See* comparison between this and the 1927 North American datum on page 146.

[2] *See* narrative for 1920, p. 113.

several of them fell into snow-covered crevasses, out of which they were pulled with difficulty. On September 21, provisions being exhausted, the remaining members of the party were obliged to abandon the work. Their return by way of the divide being cut off by the deep snow, they were forced to make their way through the canyons of the south branch of Texas Creek; they reached their camp after being 36 hours without food, and being compelled to leave behind their tents, blankets, and personal belongings. On September 28 another attempt was made to occupy Boundary Peak 15, but it too failed on account of the snow.

On October 6 the vista cutting was started from Monument 1 at Eagle Point. An aluminium-bronze cone, Monument 2, was erected three-quarters mile to the north, and another, Monument 4, at timber-line on Mount Dolly. By October 21 the vista had been opened to timber-line and the party returned on the S.S. *Tees* to Vancouver.

Though the boundary peaks mentioned formed a part of the triangulation carried up from the United States Coast and Geodetic Survey stations at the head of Portland Canal, Boundary Peak 16 was wrongly identified, and the peak so marked was later used only as a triangulation station.[1] Connection was made with the work of the United States party on Unuk River by the intersection of the peak common to both surveys, Boundary Peak 18. Further work was done along this section of the boundary in 1910.

The personnel of the party was: engineer in charge, G. R. White-Fraser, D.T.S.; assistants, J. M. Bates and E. C. Boyce; and 7 hands. The United States representative was Radcliffe Hordern.

SEASON OF 1906—YAKUTAT BAY AND ALSEK RIVER, CHILKAT AND TAIYA RIVERS, TAKU RIVER, AND WHITING RIVER

All the mountain peaks that constituted boundary points under the terms of the award of the Alaska Boundary Tribunal, from No. 172 (Mount Herbert) to No. 186 (Mount St. Elias), with the exception of one low peak, No. 184, were cut in by intersections from triangulation stations established by a United States party. This party, divided into several sub-parties, worked between Yakutat Bay, Russell Fiord, and Alsek River. The geographic positions of the triangulation were controlled from the position of Boundary Peak 164 (Mount Fairweather), the azimuths from the Yakutat astronomic station of 1892, and the lengths from the Malaspina base of 1892. An attempt was made, also, to determine the boundary crossing on Alsek River, fixed by the line between Boundary Peaks 167 and 172 (Mounts Hay and Herbert). To carry out this latter project one of the United States sub-parties and a small Canadian party ascended Alsek River, but as the above-named peaks were not visible from the river valley the determination of this section of the boundary was postponed for a future year (*See* p. 74).

[1] *See* narrative for 1920, p. 113.

The work of the preceding years was continued by United States parties between Chilkat River and White Pass and by a Canadian party on Taku River. Another Canadian party started operations from Whiting River.

United States Parties at Yakutat Bay and on Alsek River

While the field force was being organized and outfitted in San Francisco, with the intention of soon leaving for the north, the earthquake of April 18 and the resulting fire upset their plans and delayed their departure. The part of the outfit that was stored ready for shipment was burned and most of the provisions that were on the dock were confiscated for the relief of the city. As it was impossible to replace the supplies in San Francisco, two assistants were sent to Seattle on May 5 with lists of the provisions and outfit needed and instructions to purchase and assemble them there. By May 26 the whole force was assembled in Seattle and embarked on the steamship *Bertha* for Yakutat Bay.

Having passed safely through a strong gale after leaving Juneau they were landed at Yakutat on June 1. There the force was divided into four parties: No. 1 to work between Yakutat Bay and Russell Fiord; No. 2 from Ocean Cape to Italio River; No. 3 from Dry Bay to Italio River; and No. 4 from Dry Bay to the boundary area of Alsek River. A gasoline launch, the *Stockholm,* which had been chartered in Seattle for the use of the parties in the field, arrived at Yakutat under her own power late in May.

PARTY NO. 1 FROM YAKUTAT BAY TO RUSSELL FIORD

On June 6 the party left Yakutat on the launch and proceeded up the bay to Eleanor Cove, opposite Knight Island, where they made their first camp. Several attempts were made before the summit of Mount Tebenkof was reached, but from the second camp, north of Knight Island, Mount Hoortz was climbed without difficulty. On June 25, camp was moved to Cape Enchantment on the west side of Russell Fiord. Navigation through Disenchantment Bay was difficult as the launch had to force its way through the fields of floating ice discharged from the active glaciers north of the bay. From the new camp the work was continued on the peninsula between Russell Fiord and Yakutat Bay, and on both sides of Nunatak Fiord. Boundary Peak 172 was located and tied in to the triangulation, as were most of the boundary peaks from it to Boundary Peak 186 (Mount St. Elias). Intermittent fog, rain, and snow interfered with the work here, and between July 19 and 30 there was an almost continuous downpour of rain. R. S. Tarr of the United States Geological Survey, who attempted to cross the Malaspina Glacier from Yakutat Bay to Yakataga, visited the party at Cape Enchantment.

Camp was moved back to the foot of Mount Hoortz on August 1, the launch again being forced to make its way slowly through the dense ice field in Disenchantment Bay. From this camp men were dispatched with heliotropes to Ocean Cape and Port Manby as these stations had not previously been seen from the stations on the peninsula. At Malaspina Southwest Base—the United States Coast and Geodetic Survey triangulation station at Port Manby—the old signal was found still standing. On August 28 the party was moved to the mouth of Ankau River to complete the observations from Ocean Cape to Port Manby across Yakutat Bay and from the easterly stations on the peninsula; rainy weather delayed this work also, so that the observing was not fully completed until September 5.

The party returned to Yakutat and sailed for San Francisco on September 14 on the steamship *Bertha*.

PARTY NO. 2 FROM OCEAN CAPE TO ITALIO RIVER

After locating the United States Coast and Geodetic Survey triangulation station at Ocean Cape, the party established their first camp on Ankau River about a quarter mile from the cape. Before the triangulation could be started several towers had to be built on the coast for sighting over the timber between it and the mountain ranges to the east; one of these towers was built over the station at Ocean Cape and another on the small cape about half a mile south of it. On June 14 the party returned to Yakutat, whence they travelled over the cannery railroad[1] to the mouth of Situk River to build another tower on Black Sand Island.

On June 18 the party was divided, one part continuing along the coast to establish stations at the mouth of Italio River and on the mountain at its head, and the other was taken in the launch to Russell Fiord to extend the triangulation and phototopography along the Brabazon Range. Despite the stormy weather this work was accomplished and the party reassembled at Ankau River on July 10. Work was then continued from camps along the coast to Italio River and along Dangerous River to the mountains. In addition to the triangulation and phototopographic work, a transit and stadia traverse was run from Ocean Cape along the chain of rivers and channels parallel with the coast to meet a similar traverse run by party No. 3 from Dry Bay.

Observing from triangulation station "Black Tip". The surveyor is balanced on his toes over a sheer drop of about 75 feet.

The work on the coast being completed, the party was moved to Russell Fiord on September 3 to make additional observations on the Brabazon Range. They returned to Yakutat on September 19.

PARTY NO. 3 FROM DRY BAY TO ITALIO RIVER

Parties 3 and 4 left Yakutat at noon on June 8 on the launch *Stockholm*. They were piloted through the surf at Dry Bay at 11 p.m. by an Indian from a nearby village and pitched their camp on the sand that night.

[1] The Yakutat and Southern Railway, a line about 10 miles long, from Yakutat to Situk River. The management furnished the Boundary parties free transportation over the road.

After laying down a 2-mile base line, which they measured in conjunction with party No. 4, party No. 3 started their reconnaissance northwesterly towards Italio River. Triangulation and phototopography was started on July 10, but the remainder of July was so unfavourable that only three stations were occupied during that month.

Camp was moved to Akwe River on August 1 and by August 20, the triangulation being well advanced, a traverse of the coastal channels and rivers was started. Camp was moved to Italio River on September 1, from which a junction was made with the work of party No. 2, so that a continuous chain of triangulation extended between the coast and the Brabazon Range from Yakutat Bay to Alsek River.

Canoes were used by this party for transportation, and as most of the men were poorly equipped for wet weather, and most of the streams to be travelled or crossed were very shallow and full of quicksand bars, they experienced much discomfort. Their work being completed on September 13, after a gale of several days, the party started their return journey to Yakutat through the shallow channel between Italio and Dangerous Rivers, across the difficult portage to Antlen River, and behind Blacksand Island to the cannery railhead at the mouth of Situk River, and thence by train to Yakutat, where they arrived on September 21.

PARTY NO. 4 ON ALSEK RIVER

Stations were prepared on the sand bars of Dry Bay and triangulation was started from the base line towards Alsek River on June 11. On June 15 the Canadian party visited the camp on their way to the Alsek, and several days later a United States Geological Survey party made a similar visit. On July 9, however, the latter party returned, having lost their canoe and a large part of their outfit and provisions during an attempted passage of the first canyon of the Alsek; they were supplied with spare outfit and provisions to replace what they had lost by this party and by the Canadian party camped below the canyon.

During this time the weather was very unfavourable for triangulation, as not only rain and fog interfered, but often on fair days a strong wind would start the sand drifting on the bars, making observing difficult. Continuous rain prevented work of any importance during the latter 3 weeks in July. When the weather cleared on August 2 the stations still had to be kept below the high elevations that were constantly enveloped in fog. By August 20 the work had so far advanced that camp was moved to the first canyon of the Alsek. On the same day the Canadian party, which had been delayed there for 3 weeks, finally succeeded in passing through it.

The passage of the first canyon of the Alsek was a perilous undertaking, especially when the river was at flood stage. Rock slides occurred at irregular intervals from the steep mountain side that formed the north wall of the canyon, hurling large rocks far into the stream, and from the overhanging 160-foot high front of the Alsek Glacier, about 350 yards on the opposite side, huge bergs crashed into the stream, so that passage on that side of the river was out of the question.

Previous to August 15 the canyon was nearly impassable because of the high water and the rock slides; but the river began to fall rapidly toward the latter part of the month, exposing ledges that made the passage possible without too great danger from the rock slides or glacier. Although the weather became more favourable, the heavy fog that hung almost constantly around the canyon and glacier made the work of connecting the triangulation above and below the canyon most difficult. By September 22 the triangulation and topography had been carried to a point within 10 miles of the boundary and a reconnaissance survey had been completed as far as the second canyon; but neither this party nor the Canadian party succeeded in identifying Boundary Peak 167—owing to an error in the Tribunal maps supplied them.

Returning to the first canyon the party found it still enveloped in fog, so they were unable to complete the observations from the stations there. They returned to Dry Bay on September 24 to embark for Yakutat, but a heavy sea made the crossing of the bar unsafe and they were compelled to wait until 4 p.m. the next day. Navigation was difficult owing to the illness of the captain of the launch. After a dark and stormy night the party found themselves lost at sea with a broken down engine, and when the engine was finally started and land was sighted they were opposite the Sitkagi Bluffs of the Malaspina Glacier. The launch finally reached Yakutat after 44 hours at sea. Credit for her safe arrival was due chiefly to the cook of the party, who stood at the wheel continuously for 23 hours.

Although Boundary Peak 167 south of Alsek River was not identified, approximately 86 miles of the boundary line between Boundary Peak 172 (north of the Alsek) and Boundary Peak 182 was determined by these parties.

The personnel was: engineer in charge, Fremont Morse; assistants, party No. 1, Adolf Mosheim; No. 2, Thomas Riggs, Jr.; No. 3, E. R. Martin; No. 4, L. Netland; and 30 hands.

Three of these parties left Yakutat for San Francisco on the steamship *Portland* on September 29, party No. 1 having left Yakutat for San Francisco on September 14 as previously noted.

Canadian Party on Alsek River

Travelling from Seattle on the steamship *Bertha*, the party arrived at Yakutat on May 9. No power launch was available and the captains of local vessels were unwilling to attempt the passage of the uncharted channel of Dry Bay in the prevailing high winds and rough seas. Forced to depend on its own resources, the party travelled the 60 miles down the coast to Dry Bay in their heavily loaded canoes. Making their way through the shallow creeks and inlets that extend parallel with the coast, known as the Inside Passage, they were compelled to remove many large boulders that blocked their passage in the numerous shallow channels. To cross the 10 miles of portages over the sand dunes they made rough wagons with wheels improvised from old oak casks. Upon reaching Dry Bay early in June the journey was continued between the sand bars for the next 20 miles to the first canyon of Alsek River.

Several unsuccessful attempts were made to ascend the canyon during the latter part of June, but after some narrow escapes from loss of life and equipment further attempts were abandoned until early in August. The party in the meantime occupied camera stations in the vicinity of the bay in conjunction with the United States party. During this time, early in July, the United States Geological Survey party, before mentioned, had their one canoe buried under a mass of rock while relaying their outfit through the canyon; they saved themselves by standing pressed against the vertical cliff under the slide, but so narrow was their escape that one man had the shoulder of his coat torn off by a falling rock.

When the level of the river began to fall, the outfit and provisions were relayed through the canyon by tracking the canoes along the exposed ledges near the cliffs. It had been observed that after each heavy discharge of rock there would be a lull for a short time, and to make use of this interval a constant watch was kept on the side of the mountain. The party made slow and cautious progress; in spite of all caution, however, one canoe had a narrow escape from destruction when, washed on a submerged rock by the swell from a new iceberg, a large boulder falling from a nearby slide struck a granite ledge and showered huge fragments of rock around it.

Ascending the river the next 30 miles to the boundary area, they surveyed above the boundary to Tatshenshini River; but they were unable to identify Boundary Peak 167, which, as already stated, had been incorrectly shown on the Award map. Lacking the identification of this peak they were unable to mark the boundary.

Leaving Alsek River late in September the party returned along the coast to Yakutat, and there embarked for Vancouver.

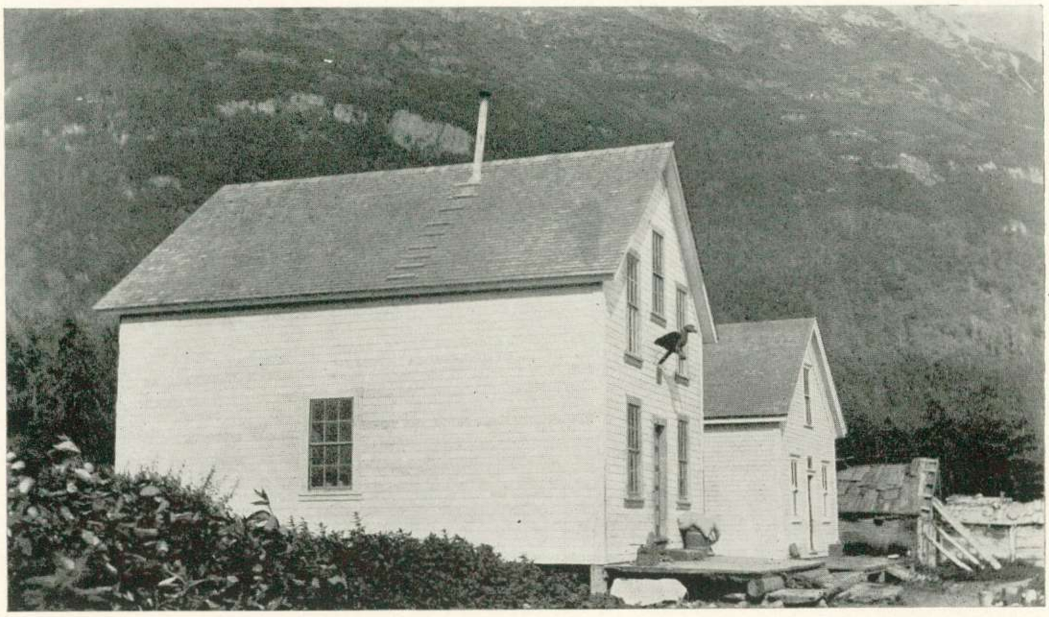
The personnel of the party was as follows: engineer in charge, A. J. Brabazon, D.L.S.; assistants, A. G. Gillespie, D. V. Ritchie, C. H. Brabazon; and 8 hands.

United States Party on Chilkat River

After being again transported up the river in Indian dugouts, as in the years 1904-05, the party established its base camp below the falls of the Chilkat, several miles from the boundary, on May 18. The triangulation and phototopography of the previous year was resumed, but as the season advanced a second scheme of triangulation was resorted to in which the stations were placed on mountain spurs below the prevailing cloud line. While this work was in progress trails were cut and foot-bridges were built over the many streams for use during the time of high water in July and August. As usual in this district the weather was bad; the mountain tops could be seen during only 4 days in July.

When the triangulation party reached the mountains in the vicinity of the Chilkat Glacier at the head of the river no point could be found, as had been expected, on line between Boundary Peaks 128 and 123 from which both peaks were visible; therefore, in order to project the boundary line northeasterly from Boundary Peak 128 it became necessary to know the geographic position of

Boundary Peak 123. With this end in view a message was sent to the engineer in charge of the Taiya River party, who then concentrated on the triangulation towards that peak.



Indian houses at Klukwan, Chilkat River region.

In addition to the phototopography that was extended to the Chilkat Glacier, a plane-table survey was made for 2 miles below the boundary. On September 14 a messenger arrived from Taiya River with the geographic position of Boundary Peak 123, and during the next 2 days the boundary line was established and marked across the valley of the Chilkat. Leaving his assistant to complete the work, the engineer in charge proceeded to Klukwan and thence up Tsirku River to inspect the work done the previous year by the Canadian party; the identification of the boundary peaks there was verified and the two monuments placed on the north side of the river were found in good order. In the meantime the assistant left in charge cut the vista through the dense timber of the Chilkat Valley to an elevation of 2,000 feet on the west side and 1,100 feet on the east, and placed two aluminium-bronze cones, Monuments 126 and 127 respectively, on the east and west sides of the river.

Assisted by Indians the party returned to Haines on October 17, and thence sailed for Seattle on the steamship *Dolphin*.

The personnel of the party was: engineer in charge, D. W. Eaton; assistant, W. B. Gilmore; and 8 hands.

United States Party on Taiya River

The work of this party was planned to be carried on in two parts, namely, in the vicinities of Chilkoot Pass and the Meade Glacier. Owing to unfavourable weather conditions and the inability of the Chilkat River party to find a point on line between Boundary Peaks 128 and 123 from which both peaks were visible, it became necessary to abandon the work towards the Meade Glacier in order to ensure the completion of the work westward from Chilkoot Pass.

The first detachment of the party arrived at Skagway about the end of May and immediately started erecting signals at Taiya Inlet for the triangulation that was to be extended up to Chilkoot Pass from the work of 1905. When the second detachment arrived on June 14 the entire party packed supplies and outfit up the old Dyea Trail. A team was secured from the only inhabitant of Dyea and the outfit was transported by wagon a few miles up the river; but the trail was overgrown and rough and the old bridges of '98 were so dilapidated that the teamster refused to risk his horses on them. The outfit was then packed the rest of the way on the men's backs. A number of foot-bridges were constructed across the river and a cable ferry was established at the old toll-bridge above Dyea. In this way the outfit was taken up the river, through the canyon, and past the still standing buildings at Canyon City and Sheep Camp to "The Scales" at the foot of the steep ascent to Chilkoot Pass where the packers' loads were checked during the Klondike "rush".

A sub-party returned to Skagway and thence to Katzehin River to work easterly towards the boundary beyond the Meade Glacier; but owing to the very unfavourable weather conditions, very little was accomplished beyond the erection of some signals and the cutting of a few trails, when the party was recalled to Chilkoot Pass to assist with the triangulation there. Towards the end of September another attempt was made to continue this work but the season was then too far advanced to accomplish more than a rough reconnaissance survey.

In August the engineer in charge and the Canadian representative made an examination of the topography at the summit of Chilkoot Pass and agreed upon the locations of monument sites. It was decided to retain the provisional boundary of 1900 and to mark it with two cone monuments; these two monuments, Nos. 120 and 121, were placed above the summit on the east and on the west sides respectively of the Pass. The two provisional boundary marks (iron bars) were cut off about 10 inches above the ground and a large cairn was built over each. This method of marking the boundary across the Pass was subsequently approved by the commissioners.

The triangulation was an extension of that of 1905, and included the reoccupation of Boundary Peak 119 and the occupation of Boundary Peaks 122 and 123. Owing to the long distances to the stations, the scarcity of timber in their localities, and the difficulty of carrying signal materials over the high mountains and ice fields, a type of signal was used that consisted of from eight to ten sections of 6-inch stove-pipe held in place by wire guys. The weather was so exceptionally bad during the entire season that it was very difficult to complete the triangulation. Some peaks were occupied five or six times before the observations were obtained.

Upon the completion of the triangulation a messenger was dispatched to the Chilkat River party with the computed azimuth between Boundary Peaks 128 and 123 for the projection of the boundary eastward on this line. Orpheus Valley, a hitherto unknown valley bearing towards Lake Bennet, was discovered south of Boundary Peak 122. Phototopography was carried on in conjunction with the triangulation and data were secured for mapping practically all of the region between Boundary Peak 119 and the great ice fields west of Boundary Peak 123.

Field work was closed just after the middle of September. It was not considered advisable, after the triangulation was completed, to wait longer for fine weather in order to do more topographic work, as the country around the Pass was covered with fresh snow, which made travelling dangerous. The outfit at "The Scales" was, therefore, packed back to Dyea. While waiting for transportation south from Skagway a few members of the party repaired the bases of the monuments at White Pass, which had been damaged by frost during the previous winter.

The work of this party and the party on Chilkat River practically completed the demarcation of the boundary from Chilkat River to White Pass.

The personnel of the party was: engineer in charge, O. M. Leland; assistants, S. L. Boothroyd and W. F. Smith; and 14 hands. The Canadian representative was Geo. White-Fraser, D.T.S.

Canadian Party on Taku River

A gasoline launch was chartered in Juneau for transportation to Taku River. On May 23 the launch took the party, with their canoes and a small launch towed behind, to a fisherman's camp at the head of tidewater on the Taku about 38 miles from Juneau. On the following day Taku River was ascended with two loaded canoes and the small launch. The canoes reached the camp site near the boundary as intended, but the launch got only 10 miles up the river where shallow water and a strong current stopped further progress. Several days later another attempt was made to take a load of supplies to camp in the launch, but this time it succeeded in getting only 3 miles up the river. Further effort to use the launch was abandoned, and an Indian with a fishing skiff was engaged to transport the remainder of the supplies to camp.

The boundary across the Taku Valley is about 15 miles above the mouth of the river, and for another 30 miles the canoeing is comparatively easy. Although the average current is between 4 and 5 miles an hour, and in a few places reaches 7 miles, there are no bad rapids or canyons for the distance of 45 miles. At the time of this survey small bands of Indians were met, either sailing or poling their skiffs, on their way to and from the Atlin Lake mining region.

Signals were again erected on the triangulation stations of 1905. On the mountain summits telescopic stove-pipe was used for signals instead of wooden poles as heretofore. Six sections of pipe were used for each signal, the bottom section being $3\frac{1}{2}$ inches in diameter; the signal was held in place by a cairn built around the base and two sets of three wire guys were placed one above the other. Eight-ounce duck was used for the flag, as ordinary muslin was found to be too light to resist the wind. Preliminary work was completed by the re-measurement of the base of 1905.

Upon the resumption of the triangulation in the vicinity of the boundary, another attempt was made to reach Boundary Peak 87, but the jagged cliffs near the summit again proved to be too much for the climbing party; they were, however, able to establish a camera station on the north spur between two hanging glaciers. Later from the new camp on the Wright Glacier they finally succeeded in climbing to the summit. The new camp, established early in June, was at the limit of vegetation near the boundary about 10 miles above the face of the glacier; supplies were transported to it by canoes up Wright Creek, then by back-packing over a very rough trail winding over the broken rock on the southern side of the glacier, and for the last 5 miles over a network of small crevasses on the glacier itself.

Although the survey work was completed beyond the southern snow fields of Wright Glacier to form a junction with that of the Whiting River party, the identification in the field of Boundary Peaks 85 and 86 was impossible, owing to a lack of detail in the vicinity on the Tribunal map; therefore, the positions of these peaks were not defined until a decision could be made by the commissioners after the mapping was completed during the following winter.

The party separated upon their return to Taku River; one detachment ascended the Tallsaykway[1], the first tributary on the north side of the Taku above the boundary, to extend the phototopography to the Tallsaykway Glacier; the other party continued the work northerly to Boundary Peaks 93 and 94. Boundary Peak 93 was easily identified. It is a magnificent peak towering fully 1,000 feet above the surrounding mountains; the upper part of the mountain being formed by three separate sharp peaks, of which the middle is the highest; its name, "Devils Paw", is quite appropriate. Boundary Peak 94 was not so easy to identify. There were two peaks of nearly the same altitude in the approximate position of the peak as shown on the Tribunal map; so the position of this boundary peak also remained undefined pending a decision by the commissioners.[2]

On October 15 the party broke camp and proceeded down stream to Taku Inlet, where they forced their way through the ice from the Taku Glacier. At the inlet they were met on the following day by a launch, which carried them back to Juneau.

The work of this party established the boundary between Boundary Peaks 85 and 94. The season was an exceptionally rainy one, as can be seen by the following summary: fine days, 33; days with clouds obscuring the summits, but no rain, 31; cloudy days with showers, 41; days of heavy rain, 42.

The personnel of the party was: engineer in charge, W. F. Ratz, D.L.S.; assistants, H. F. Lambart and D. H. Nelles; and 10 hands. The United States representative was Radcliffe Hordern.

Canadian Party on Whiting River

The work of this party was to establish the boundary across Whiting River and to make a connection with the work of the party on Taku River about 40 miles

[1] *See* page 98.

[2] The peaks in question were called "S7850A" and "S7850B". The latter was identified as the proper peak after the positions of the peaks had been computed and plotted on the map.

to the north. They sailed from Juneau in a chartered launch on May 23, and after a 7-hour trip landed at the mouth of Whiting River. From there with the assistance of three Indians they ascended the swift and dangerous river in canoes for 15 miles to establish their first camp. Before joining the party the United States' representative recovered and erected signals on two United States Coast and Geodetic Survey triangulation stations east of Stephens Passage from which to commence the season's triangulation.

As the reconnaissance was carried on up the river, signals were erected on the selected triangulation stations. Like those on Taku River, the signals were of the stove-pipe type; in fact, this type of signal, being easy to pack up the mountains and proving to be very substantial when well braced, became the predominant type of signal to be used by the survey parties. Early in July the camp was moved another 10 miles up the river to the boundary, and from there phototopography was extended southerly beyond Boundary Peak 79 and northerly to connect with that of the Taku River party working on Wright Glacier. Boundary Peaks 79, 83, and 84 were connected with the triangulation; the first two of these peaks were occupied, but the last named could not be climbed. From this direction, as was the case from Taku River, the boundary peaks on each side of the Wright Glacier could not be identified; the neighbouring peaks were cut in by the triangulation for reference to the commissioners.

Towards the end of the season a base line was measured on the river flats and the boundary line across the valley was temporarily marked by a 5-foot wide transit line and by wooden posts on each side of the river.

Late in September the party moved to the mouth of the river to connect their triangulation with the stations prepared by the United States representative at the commencement of the season. They completed their work and returned to Juneau on October 12.

The work of this party established the boundary southerly from Boundary Peaks 86 and 85 to Boundary Peak 79 (the points 3 and 4 to the point 7, respectively, of the exchange of notes of March 25, 1905; *See* page 9).

The personnel of the party was: engineer in charge, J. D. Craig, D.L.S.; assistants, J. M. Bates and T. P. Reilly; and 7 hands. The United States representative was G. C. Baldwin.

SEASON OF 1907—GLACIER BAY, EAST OF LYNN CANAL, TAKU, WHITING, AND STIKINE RIVERS, AND BRADFIELD RIVER

During this season the boundary between Boundary Peak 157, south of Tsirku River, and Boundary Peak 167, south of Alsek River, was located from the mountains bordering Glacier Bay by a United States party. Farther south another United States party extended the boundary east of Lynn Canal southerly from Boundary Peak 108, south of Skagway River, to Boundary Peak 93, north

Camp at Hugh Miller Inlet, Glacier Bay region.

of Taku River. At the same time a Canadian party completed the work at the boundary crossings of Taku and Whiting Rivers and extended the work on Stikine River northerly to Dawes Glacier east of Stephens Passage. A second Canadian party ascended Bradfield River to work northeasterly towards Iskut River, a tributary of the Stikine.

United States Party at Glacier Bay

Upon the arrival of the party in Juneau from San Franscisco on May 6 arrangements were made with the Juneau Steamship Company to take them on the steamship *Georgia* to Bartlett Cove, at the entrance of Glacier Bay. Arriving at the cove 2 days later they found a blanket of snow several feet deep at sea-level. Consequently, the work of the first few weeks of the season was confined to reconnaissance of the bay, and the search for and erection of signals on the Coast and Geodetic Survey stations on Icy Strait. Early in June, when the snow left the mountains, stations were prepared on the summits in the vicinity for observations on the distant boundary peaks.

Observations were started at the lower stations on May 28, the observing parties being taken to and from their stations in a gasoline launch chartered for this purpose. For work on the mountain stations fly camps were pitched as near as possible to the summits, so that full advantage might be taken of favourable observing weather. By the middle of June the work was advanced sufficiently to move the base camp to Hugh Miller Inlet, which camp served as the base of operations for the remainder of the season.

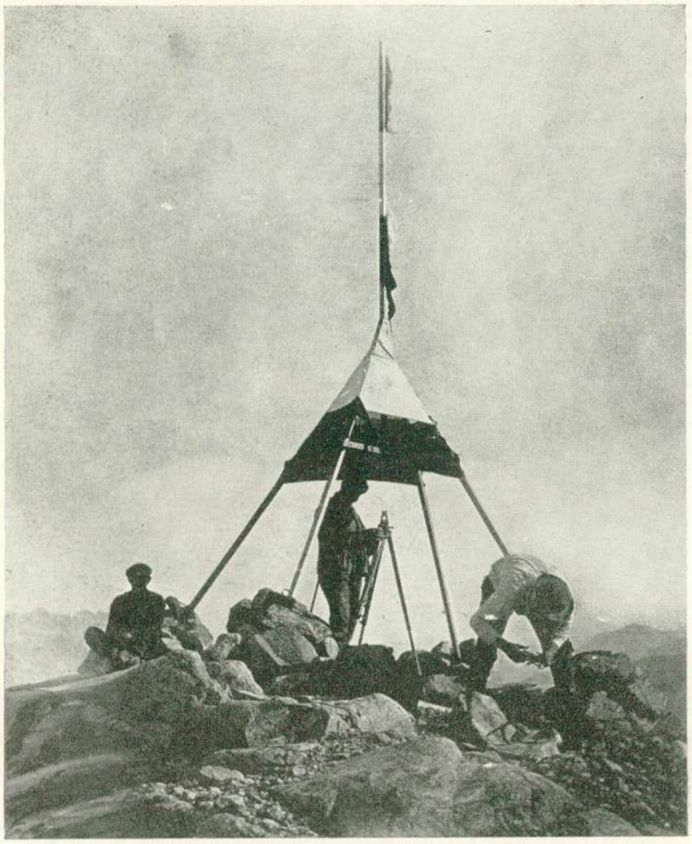
Triangulation station near sea-level, Glacier Bay region.

Small timber was plentiful at the lower part of the bay, so poles were used for the signals instead of the stove-pipes that were coming into general use in other districts. North of Willoughby Island, the shores of the bay and the numerous inlets were bare of vegetation and timber was transported from the south for both firewood and signals.

Triangulation was extended up the bay from Icy Strait to the head of Tarr Inlet at the face of Grand Pacific Glacier, a distance of some 60 miles. It had been intended to continue the triangulation along the various glaciers towards the boundary peaks, but this was found to be impracticable in the time at the

Snow field at head of Muir Glacier. Boundary Peak 155 to right of centre.

disposal of the party. Consequently, the boundary peaks were identified, and were intersected by triangulation from the mountain stations bordering the bay. For the most part, the peaks from No. 157 south of Tsirku River to No. 167 south of the Alsek were well defined; but No 167, which the Alsek River parties had been unable to identify in 1906, was referred to the commissioners for a decision as to which of the two peaks in the neighbourhood should be designated as the boundary peak.



Triangulation station on mountain, Glacier Bay region.

In addition to the triangulation a base line was measured on the shore at Hugh Miller Inlet, a survey was made of the shoreline of the west side of Glacier Bay from Reid Inlet to the north end of Willoughby Island, and a reconnaissance survey, which included hydrographic work, was made of Berg Bay. Field work was ended on September 14 and the party returned to San Francisco.

The personnel of the party was: engineer in charge, Fremont Morse; assistants, L. Netland and E. R. Martin; and 14 hands. The Canadian representative was D. H. Nelles, D.L.S.

United States Party East of Lynn Canal

On the evening of June 14, when the main party arrived at Haines from Seattle, the first camp was established near the mouth of Katzehin River. Work was resumed the next day on the trail that had been started by the Taiya River party of the previous year in their attempt to reach Meade Glacier, and at the same time a search was made for Coast and Geodetic Survey stations on Lynn Canal. When the remainder of the party arrived in camp on June 18 a sub-party was formed to work at Berners Bay, about 30 miles southerly. In the meantime a sufficient number of the old stations had been found to start triangulation. On July 15 a second sub-party, camped near Davidson Glacier on Chilkat Inlet, was left behind to continue the triangulation from the upper part of the canal while the main party ascended Meade Glacier to the boundary area.

Although the greater part of the identification and location of the boundary peaks was done from the mountain summits bordering Lynn Canal, owing to the distance from the canal to the boundary it seemed desirable to establish at least one station as near as possible to the boundary itself. As most of the mountains in the neighbourhood of Meade Glacier rise abruptly from the snow fields, the party found it difficult to secure such a station. After attempting unsuccessfully to climb several peaks in the vicinity, it was found possible to climb one of the boundary peaks, No. 105, with the necessarily heavy packs. A fly camp was placed near the summit and after a wait there of several days in a heavy snowstorm 2 good days were had for making the observations, and the summit was marked with a copper bolt. To further develop the topography, another station was occupied with the camera. During this time packing over the glacier was extremely slow as the rough surface was broken by a large number of wide crevasses. This work was completed on August 1.

On August 23 the base camp was moved from Katzehin River southerly to to the west side of the canal opposite the south end of Sullivan Island, and early in September the two sub-parties joined the main party there. The work being completed, the combined party returned to Seattle, via Skagway, on September 12.

During the course of the work it was found that at the point marked "S6200" on the Award map there was no mountain peak, so the line was held to run from S6700 to S6800 of the Award (Boundary Peaks 108 and 109).

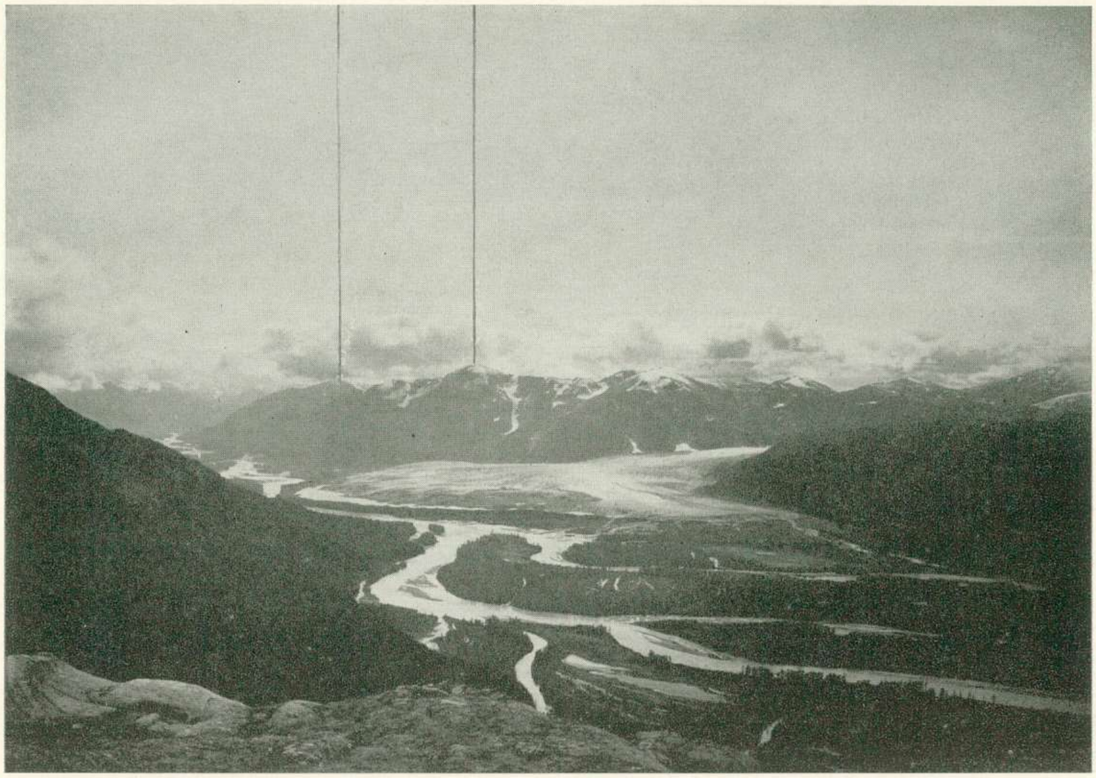
The section of the boundary established by the party extended from Boundary Peak 108 (established in 1905) southerly to Boundary Peak 95; connection was also made with the work of the Taku River party of 1906 by the location of Boundary Peak 93. Owing to their ice-caps it was not found practicable to mark any of the boundary peaks other than No. 105.

The personnel of the party was: engineer in charge, O. M. Leland; assistants, S. L. Boothroyd, S. S. Garret, and W. F. Smith; and 13 hands.

Canadian Party on Stikine, Whiting, and Taku Rivers

Although the delineation and mapping of the boundary areas of Taku and Whiting Rivers had been completed in former years, the boundary line across these valleys had been marked only by narrow transit lines and temporary wooden posts. In order to widen the transit lines to the regulation vista width and to replace the wooden posts by conical aluminium-bronze monuments, the party sailed to Taku River from Juneau on May 27 before starting their season's work on Stikine River. On June 2 the main party returned

On Stikine River, May 1907.



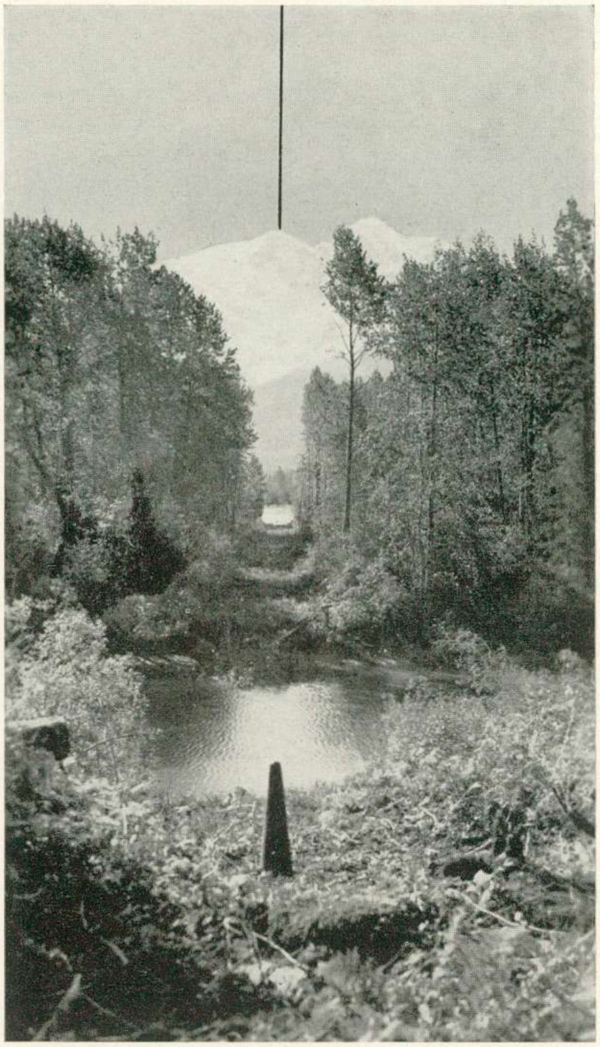
Stikine River and Great Glacier. From left to right, Boundary Point 66 (Elbow Mountain) and Glacier Mountain.

to Juneau, leaving a detachment of six men to widen the vista on the Taku and its tributary, the Sittakanay, and upon the completion of that work to do similar work on Whiting River.

The main party sailed southward to Wrangell and on June 6 embarked on the Hudson's Bay Company's steamer *Mount Royal,* which was making its second trip of the season up the Stikine to Telegraph Creek. Disembarking at "Barley Cache", about 40 miles above the boundary crossing, they made their first camp just south of Flood Glacier.

Despite its numerous crevasses Flood Glacier was found to be comparatively easy to travel over, so from a base line measured through the timber and on the sand bars of the river a system of triangulation was expanded westward across it about 20 miles towards Boundary Peaks 70, 71, and 72, and, in addition, a complete phototopographic survey was made of this formerly unmapped area. From the Flood Glacier camp the work was also extended about 10 miles up the river, and downstream towards Mud Glacier.

On September 2 the base camp was moved down the river to Mud Glacier. Although the weather had been exceptionally fine during July, early in August rainy weather became prevalent; consequently, it seemed doubtful whether the party would be able to carry the work far enough south to make a connection with that of 1904-05; but September brought better weather, and early in the month observations were made from mountain summits on 9 successive days—a very unusual occurrence in the boundary area of southeast Alaska.



Monument at Boundary Point 90, Taku River, looking south to Boundary Point 87.

At about this time the sub-party, having completed its work on Taku and Whiting Rivers, joined the main party on the Stikine. Monuments 88 to 91, inclusive, had been erected in the valleys of the Taku and Sittakanay, and Monuments 80 to 82, inclusive, in the valley of the Whiting; these monuments were all of the conical aluminium-bronze type. The party had started the ascent of Whiting River on August 7. The river, which at the best of times had a bad reputation among prospectors, was in flood, so it took over a week by double tripping to line the two canoes the 25 miles to the boundary. Later, while crossing the river, one canoe struck a snag, capsized in the swift water, and all its contents were lost. Consequently, work on the Whiting was completed on short rations during a week of extremely wet weather.

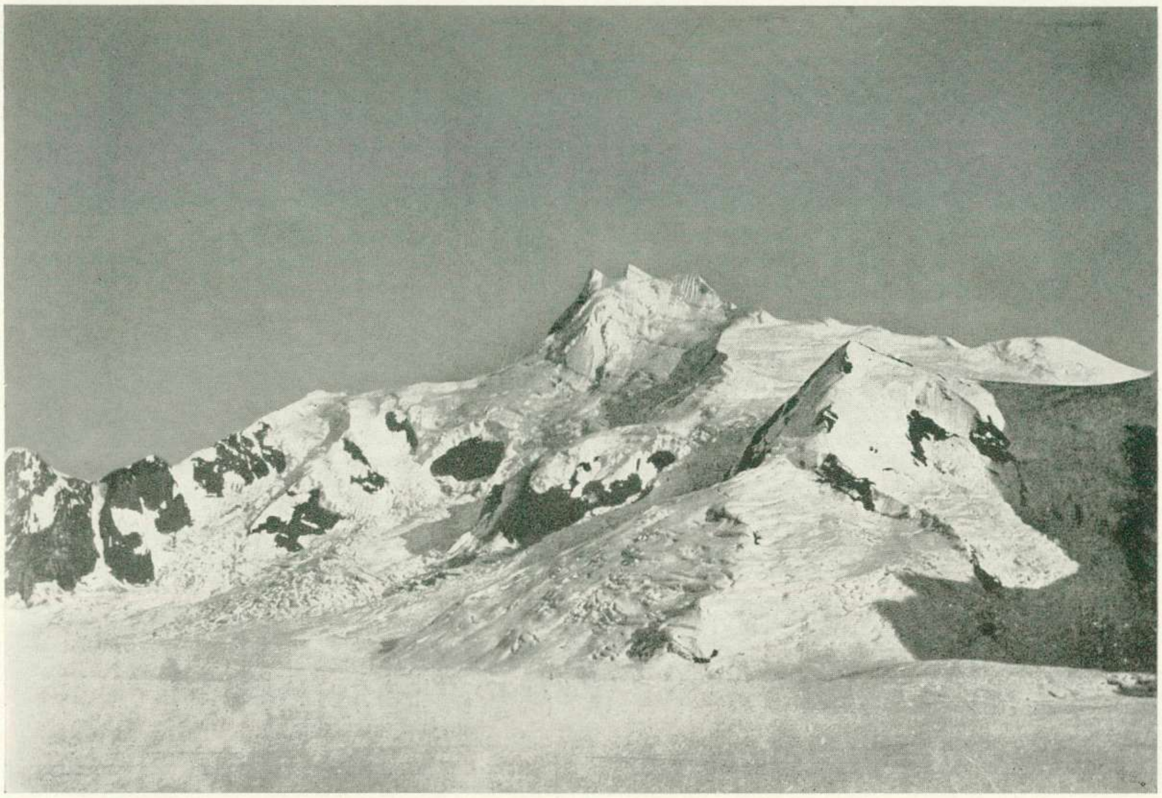
Between September 16 and October 10 the work on the Stikine was connected with the former triangulation at Boundary Peaks 62 and 66. The arrival of snow on the mountains was much later than usual. Even on October 10 (when the last climbs were made) there was very little fresh snow, whereas in former years the summits were well covered early in September.

The entire party returned to Vancouver about the middle of October. Besides completing the delimitation of the boundary across Taku, Sittakanay, and Whiting Rivers, this party extended the work north of the Stikine from Boundary Peak 69 to Boundary Peak 72 (Mount T of the Award).

The personnel of the party was: engineer in charge, W. F. Ratz, D.L.S.; assistants, H. S. Mussell and P. W. Greene; and 10 hands. The United States representative was Radcliffe Hordern.

Canadian Party on Bradfield River

The North and East Forks of Bradfield River come to a junction at the head of Bradfield Canal about 40 miles southeasterly from Wrangell. Neither of these streams exceeds 20 miles in length, the rise in elevation of each is about 250 feet



Boundary Point 70 (Kates Needle), showing resemblance to human face from the northwest.

in the first 10 miles, and thereafter their slopes increase rapidly until navigation becomes impossible. Of these two streams the North Fork, which flows southwesterly from its source in the divide just west of Boundary Peak 48, was selected for the ascent to that region.

A tug was chartered in Wrangell, which towed two large scows with the equipment of the party to the mouth of the North Fork of Bradfield River on June 5. There a preliminary camp was established just above the tide-flats. From this camp a base line and the triangulation stations were prepared at the head of Bradfield Canal and supplies were taken up the river to the base camp about 12 miles from its mouth. About 5 miles from its mouth the river was completely blocked by a log jam, and a side channel that might have offered a possible route was also blocked, so before any progress could be made beyond that point the jam had to be cut through with axes and saws—a dangerous operation in the swift water. On the second trip up the river a serious accident occurred; a rowlock of one of the canoes breaking, the canoe was swamped and a considerable amount of supplies was lost. It usually took 7 hours to take a loaded canoe upstream from a point 7 miles below the camp, but the return trip was made in 40 minutes—which gives some idea of the swiftness of the current.

Mount Cloud, about 4 miles southerly from the camp, was the first peak to be climbed, and with the knowledge gained from this ascent the season's work was planned. One sub-party was to ascend to Boundary Peak 47; a second was to work as far as possible toward Boundary Peak 53, and incidentally reconnoitre the upper part of the valley of the South Fork of Iskut River; and the remainder of the party was to carry on the main triangulation and attempt to reach Boundary Peak 48.

The route to Boundary Peak 47 was along a mountain torrent flowing through a series of box canyons, which was fordable only at the glacier at its head. This combined with the wet weather prevailing during the time of the journey made the progress of the sub-party detailed to that region very slow. They occupied a number of camera stations on prominent mountain shoulders, but their attempts to climb Boundary Peak 47 were unsuccessful. The party working towards Boundary Peak 53 was more fortunate in its route; the valley they ascended and the glacier at its head proved to be a convenient highway. They occupied camera stations in the hitherto unmapped vicinity of the divide between the sources of Bradfield, Katete, and Iskut Rivers, and were able to ascertain the nature of the topography for some 10 miles down the valley of Iskut River, so that plans could be made for future work in that region. In the meantime the main section of the party had been bringing supplies up the river and had extended the triangulation and topography towards Boundary Peak 48, which, however, they had been unable to climb.

Heavy rains setting in at the end of September, the entire party assembled at the main camp and prepared to return to tide-water. Before everything was ready a log jam formed just below the camp, which flooded the camp ground. A hasty retreat to higher ground was made at midnight with the instruments, records, and bedding. Several days later, while the return journey was being made, one of the canoes was swamped when it fouled a submerged snag; the five occupants reached shore with difficulty, but the contents of the canoe, including several instruments and a box containing eight dozen exposed photographic plates, were lost. Every effort was made to recover the plates, but to no avail, even though a small party remained for that purpose for 10 days after the departure of the main party down river to Wrangell.

In the meantime a camp was established at the mouth of the river, the base line that had been laid out in the spring was staked and measured, and the triangulation was completed with the exception of the station on Mount Tyee. On October 17, as bad weather had prevailed for some time, and as at this late date improved weather conditions were not to be expected, the party returned to Wrangell and sailed south a few days later.

Owing to the loss of so many of the photographic plates, it was necessary that a number of the camera stations should be re-occupied during the following year to complete the phototopography of this area.

The personnel of the party was: engineer in charge, J. D. Craig, D.L.S.; assistants, J. M. Bates and J. W. Melson; and 10 hands. The United States representative was D. W. Eaton.

SEASON OF 1908—ALSEK RIVER, EAST OF ENDICOTT ARM, ISKUT AND BRADFIELD RIVERS, AND UNUK AND LEDUC RIVERS

During the season of 1908 a United States party completed the work on Alsek River; a Canadian party surveyed the previously unmapped area east of Endicott Arm; a second Canadian party worked on Iskut River and also reoccupied the camera stations on the Bradfield to replace the photographic plates lost during the previous season; and a second United States party extended the survey of Unuk River to include the Blue and Leduc River areas.

United States Party on Alsek River

As in 1906 the party was partly outfitted in San Franscisco and partly in Seattle and left the latter port on May 13, reaching Yakutat 6 days later. A gasoline launch chartered from Ketchikan and another launch from Yakutat transported the bulk of the supplies and equipment to Dry Bay, while, to avoid the rough seas along the coast, a detachment of the party took the four 25-foot Peterborough canoes down the "Inside Passage", taking 11 days to make the journey.

By June 26 the party had passed through the lower canyon of the Alsek, which had given previous parties so much trouble. Fortunately the river was not at flood stage owing to the lateness of the season, which was fully a month behind the average. Bergs did not fall from the glacier when the passing canoes were in a position to be swamped by the waves, although a number did fall while the party was camped at the canyon; the rock slides, too, were quiescent, so there was little difficulty in "lining" the canoes along the shore at the foot of the mountain.

It will be recalled that the boundary across the Alsek is a straight line between Boundary Peaks 167 and 172. The geographic positions of these two peaks were determined, respectively, during the seasons of 1906 and 1907, and the length and azimuth of the line joining them was computed. From the phototopographic map plotted from the work of 1906 the approximate position of the intersection of the boundary and Alsek River was determined. During this season the triangulation of 1906 was extended up the river to near this point, the geographic positions of the stations being computed in the field. When the triangulation reached the vicinity of the boundary a base line was laid down on a high sand bar to intersect it; then the geographic positions of the ends of the base line were computed, and the distance along it was measured to the computed intersection of the boundary. From the point so obtained the boundary line was projected across the valley on an azimuth carried through the triangulation from an astronomical azimuth determined at Yakutat Bay.

The usual 20-foot boundary vista was opened through the timber in the valley bottom, through the brush on the hillsides to an elevation of 1,700 feet on the north and 1,000 feet on the south; and the line was permanently marked by four aluminium-bronze cones, Monuments 168 and 169 on the south side of the river and Monuments 170 and 171 on the north side. Upon the completion of this work the party devoted their attention to securing sufficient topographical data to map the boundary area southerly to Boundary Peak 167.

Except during the time he assisted with the work incidental to the location of the boundary line, the Canadian representative extended the phototopographic

Vista northwest of Alsek River.

work of the Canadian party of 1906 to the forks of Kaskawulsh River, and southerly along the Melbern Glacier towards the Grand Pacific Glacier.

The entire party suspended operations on September 10, and in their seven well-loaded canoes they made a swift return downstream to Dry Bay—greatly in contrast to their difficult upstream journey. A gale arose on the night of their arrival that prevented their embarking in their launch until September 15, when the bar was safely crossed. After a 9-hour run through heavy seas they arrived at Yakutat. On September 27 they embarked for Juneau, where they were transferred to a larger vessel to continue their return journey to Seattle.

The remarks of the engineer in charge of the party in closing his annual report apply equally well to the work on any of the coastal rivers. He says "I

Monument at Boundary Point 171, Alsek River, looking southeast.

would not be doing justice to the members of the party if I failed to mention the cheerful and efficient service they rendered at all times and under the many adverse and disagreeable conditions of weather and river floods. No one who has not had experience in ascending swift glacial streams in Alaska can realize the difficulties of such a task. Wading in ice-cold water for hours at a time, even in high rubber boots, is not comfortable at best, and in a day's work it was seldom indeed that any member of the party escaped getting wet to the waist".

The work of this party completed the demarcation of the boundary between Boundary Peaks 167 and 172.

The personnel of the party was: engineer in charge, Fremont Morse; assistants, L. Netland and E. R. Martin; and 14 hands. The Canadian representative was George White-Fraser, D.T.S.; assistant, D. V. Ritchie; and 1 hand.

Canadian Party East of Endicott Arm

In the exchange of notes of March 25, 1905, the part of the boundary lying between the points "P" and "7" was defined, and the course the remainder was to take through the point "8" to the point "T" was indicated.[1] During the seasons 1905-06-07 the boundary peaks between the points "P" and "7" were satisfactorily identified in the field, but the area on the old map (of 1893) southerly from the point "7" to the point "T" contained no detail near the boundary except an indefinite peak, the point "8"; consequently, it was necessary that the commissioners should have additional information regarding this area to enable them to agree on additional peaks to mark the boundary between these points. This work was assigned to a Canadian party.

The party was organized in Vancouver and Victoria, and was joined at Victoria by the representative of the United States Commissioner. They reached Juneau on May 18. There two launches were chartered that took them about 80 miles southerly to the head of Endicott Arm, where a suitable camping ground was found. During the next few days reconnaissance trips were made up Dawes and North Dawes Glaciers. Dawes Glacier was found to be badly crevassed and broken up, so it was decided to do the first work of the season from North Dawes. Then an exploratory trip was made to Fords Terror (the T-shaped inlet off Endicott Arm), which showed that the worst part of this inlet was its name. During this time supplies were transported to a camp 5 miles up North Dawes Glacier.

North Dawes, being a "dead" glacier, was not difficult to travel over except for the broken part near its face, and sleds were used to advantage for the transportation of supplies. By the middle of June the camp had been moved to the snow fields at the head of the glacier.

As it was not feasible, on account of the rugged nature of the immediate boundary area, to occupy the peaks there, the work was extended from the peaks bordering the snow field about 5 miles west of the boundary, well within the limit from which reliable phototopography could be secured. This work on the snow fields was very trying; with sleeping bags laid on the snow and cooking done on small coal-oil stoves, living conditions were most uncomfortable, and the reflection of the bright sun on the vast expanse of snow caused several severe cases of snow-blindness.

During the last week in June and the first few days in July supplies were transported to a camp on Dawes Glacier. This was difficult and hazardous work.

[1] *See* page 9.

The glacier was very active and large masses of ice were continually breaking off the discharging face. On one occasion the swell resulting from the falling of a large berg washed away a canoe with all its contents from a ledge fully 35 feet above high-water mark. Large masses of ice filled the inlet and at times the canoes were actually portaged across ice-jams. For the first 4 miles the glacier was steep in slope and broken into huge seracs separated by wide crevasses, and the smooth steep mountain sides offered no alternative pathway. The honeycombed condition of the ice was a frequent source of danger, as in jumping from one serac to another many falls were caused by the ice giving way under foot. Back-packing on any glacier is slow and tedious work, and on the Dawes it was more so than usual. Thirty-five pounds was all that a man could carry with safety, and it took the packers 8 hours to travel the 4 miles from the face of the glacier to the first camp.

After the camp was finally established time was lost on account of unfavourable weather; but on July 11 the party moved to a fly camp on the snow fields at the head of the glacier, and from within 4 miles of the boundary they identified Boundary Peak 74 (the point "8" of the exchange of notes) and connected that peak and Boundary Peaks 70, 71, and 72, which had been identified during the previous year, with the triangulation and phototopography. Boundary Peak 72, incidentally, was the point "T" of the Award and the exchange of notes, and was also the southerly peak of the undetermined section of the boundary line referred to in the exchange of notes. Moving to Brown Glacier at the head of Fords Terror, late in July, the party completed the work between North Dawes and Sawyer Glaciers. Then on August 7 they moved by launch to Tracy Arm. There the mountains rise perpendicularly from the water's edge and a suitable camping ground could not be found closer than 5 miles from the face of Sawyer Glacier. Despite the forbidding appearance of the glacier, travelling on it was comparatively easy. From a camp about 5 miles inland the neighbouring mountains were occupied to obtain the data necessary to map the boundary area northward to Boundary Peak 79, the point "7" of the exchange of notes.

On their return down the coast the party occupied several stations in the vicinity of Endicott Arm and attempted to climb Mount Sumdum, as it was expected that valuable information could be secured by its occupation as a triangulation and camera station. The sub-party that undertook the ascent of Mount Sumdum abandoned the attempt after making four unsuccessful climbs, during which snow storms were encountered at the higher altitudes. In fact, at this time, about the end of September, all mountain work had to be given up on account of continued bad weather. Rain or snow had fallen for 42 successive days; and, as at this time of the year rain in the valleys was usually accompanied by snow at the higher altitudes, the snow line was very low.

Early in October a base line site was selected and a system of shore triangulation was laid out and observed, to connect the summer's work with the United States Coast and Geodetic Survey stations in the vicinity. After completing the measurement of the base line, which was in six sections and had to be done at intervals while the tide was out, the party moved to Sumdum and, after a wait of 5 days, embarked for Juneau on October 20, whence they continued their return journey to Vancouver.

The topographic map developed from the work of this party was sufficiently complete for the commissioners to select from it the necessary additional boundary peaks between the points "7" and "8" and "8" and "T" mentioned in the exchange of notes. Further work was done in this region in the following year.

The personnel of the party was: engineer in charge, W. F. Ratz, D.L.S.[1]; assistants, H. S. Mussell and P. W. Greene; and 10 hands. The United States representative was Eberhardt Mueller.

Canadian Party on Iskut and Bradfield Rivers

Iskut River, a large tributary of Stikine River into which it flows from the east about 7 miles above the boundary crossing, lies on the Canadian side of the boundary, with the exception of several miles of the headwaters of its most southwesterly fork. It was the source of this southwesterly fork that had been discovered by the Bradfield River party in 1907. Although some work had been done near the mouth of the Iskut by the Katete River party in 1905, and the general course of the river had been plotted on the old commission map, little was known of actual conditions on the river beyond what had been learned from the reports of Indians and prospectors.

The party organized to work in this region arrived at Wrangell on May 7. At that time the Hudson's Bay Company's steamer, which was to make regular trips on Stikine River during the summer, was employed on Skeena River, from which work she was not released until late in June; consequently, other arrangements were necessary for transportation to Iskut River. It was decided that the party should paddle up the coast to Stikine River and thence to the Iskut in their three canoes. Six Indians were engaged to accompany them in a large canoe carrying the bulk of the outfit and supplies, some $2\frac{1}{2}$ tons. On the day of the departure of the party a small sub-party started for Bradfield River by canoe, accompanied by a launch carrying their outfit and supplies for 10 weeks.

The Indians acted as pilots on the up-stream journey. Tracking up the river was difficult as the water was low, with from 2 to 4 feet of snow on the bars; the snow froze during the night so the footing was good for 2 or 3 hours in the morning, but it gradually softened as the day advanced. The party arrived at the mouth of Iskut River 2 days after leaving Wrangell.

[1] The following paragraph appeared on page 17 of the "Report of the Chief Astronomer for the year ending March 31, 1909" to the Deputy Minister of the Interior, Canada.

"I regret to have to record the death of Mr. W. F. Ratz which occurred in Ottawa on February 6. Mr. Ratz had been employed on the Alaska survey since 1905. He carried out the demarcation of the line at Salmon[1] river (Chilkat district), and in part between Taku inlet and Whiting river. During the last two years he was engaged, as already stated, on the topographical survey between Whiting and Stikine rivers, not the least difficult section of a very difficult survey. His success in carrying this to completion in a relatively short time is a testimony of his capability as a surveyor as well as to his personal energy. His death, at the early age of 25, is a serious loss to the profession and to the public service."

[1] Now Tsirku.

The sloughs leading from the Stikine to the Iskut were explored for a possible short cut that would avoid the swift water at the mouth of the Iskut; but the sloughs were still full of snow and were of no use until about 2 weeks later. On May 15 the first trip was made up the Iskut and a cache was established about 7 miles from its mouth; then another cache was established farther up the river. It took seven of these steps to get the main camp to the boundary area, each step taking about a week. The load to be moved each time increased rather than decreased, as the Indians in the meantime made three trips from Wrangell with provisions. About 25 miles from the Stikine, the South Fork of the Iskut joins the main stream, and another 10 miles or so up stream the South Fork is divided into two streams—that flowing from the southwesterly direction having its source, as before mentioned, on the United States side of the boundary. Approximately 5 miles above the latter fork the valley narrows down to a canyon, impassable for canoes for over a mile, around which a trail was cut and the canoes portaged. River navigation was then resumed for the final 6 miles to the boundary area.

In order to project the boundary line from Boundary Peak 48 to Boundary Peak 53 into and across the valley of the South Fork a fly camp was made on the ridge leading to Boundary Peak 48. The peak was climbed and a point on the line was located on a ridge immediately south of the river; from there it was produced into the valley. The work of cutting out the vista was started on July 22, and a small party was kept continuously at this work until the early part of October. Four conical aluminium-bronze monuments, Nos. 49 to 52, inclusive, were established in the valley.

The remainder of the party in the meantime had been engaged on triangulation and camera work, and by August 23 had secured sufficient data to map the country down as far as the main branch of the Iskut. After that date, however, the weather turned wet and cloudy and continued so until after the completion of the vista cutting on October 5.

By June 5 the Bradfield River sub-party had located their camp at the head of canoe navigation on the North Fork of the Bradfield. From this camp they re-occupied the camera stations of the previous year, as well as several new stations that overlooked the region southerly at the head of Blue River. Early in August they ascended the East Fork of the Bradfield to complete their phototopographic work. They then, early in September, returned to Wrangell and ascended Iskut River to join the main party.

The very unfavourable weather showing no signs of improvement upon the completion of the vista cutting, the whole party started down stream. They reached the Stikine on October 12, but owing to stormy weather did not reach Wrangell until 2 days later. Transportation south could not be obtained until October 21, when they sailed for Victoria.

The personnel of the party was: engineer in charge, J. D. Craig, D.L.S.; assistants, J. M. Bates, Robert Smith, and A. G. Stewart; and 13 hands. The United States representative was D. W. Eaton.

United States Party on the Tributaries of Unuk River and Leduc River

The season's work in this district was to be an extension of that of 1905 on Unuk River, southerly to Leduc River and northwesterly to the Blue River region. As the character of the topography between the head of Lake Creek, a southern tributary of Unuk River, and Leduc River was unknown, it was thought to be most practicable to reach the boundary area of the Leduc by ascending that stream as far as possible with boats and then back-packing for the remainder of the distance. Likewise the valley of Blue River, which flows into Unuk River 6 or 7 miles below the boundary, was very little known; the lower part of the valley was known to be filled with volcanic lava, but the difficulty of travelling had prevented much prospecting there. Therefore, as it was certain that transportation would be difficult, it was deemed advisable to send an advance party into the field early in May.

A party of twelve men arrived in Ketchikan on May 12. There they were met by a launch that carried them to the head of Burroughs Bay, where they established a temporary camp at the landing place of the Unuk River Mining and Trading Company. The provisions, which had been purchased in Seattle, had been packed in bags and boxes averaging 50 pounds, appropriately marked so as to require no breaking open of packages to distribute the contents; this greatly facilitated the work of sorting the outfits for the three sub-parties. The mining company furnished wagon transportation as far as "The Bluff", about 10 miles up the Unuk. The supplies for the Lake Creek party were left at a cabin about 5 miles from the landing, but those for the Blue River party had to be back-packed over "The Bluff", a distance of about 5 miles, to the mouth of that river.

One-half of the advance party had been assigned to work on Leduc River. On May 25 they left the landing in two 20-foot skiffs that had been built for the purpose. The remaining six men continued the work of transportation and looked for suitable travelling routes along Lake Creek and Blue River. On June 22 the second detachment of the field party arrived at the landing and the force on the Unuk was then divided into two parties, one to work on Lake Creek and the other on Blue River.

THE LEDUC RIVER PARTY

Leduc River, which lies approximately parallel with Unuk River and 15 miles south of it, has its source in a small glacier about 2 miles above the boundary and empties into Chickamin River some 12 miles above its mouth. The ascent of these two rivers was slow and arduous. Many of the bars were still covered with snow and the nights were decidedly cold. Brush and tree jams made frequent portages necessary, and the many rapids delayed progress owing to the necessity of using the entire party to manage a single boat, even when only partly loaded. About 8 miles below the boundary the Leduc became quite unnavigable and supplies were back-packed from that point to a camp site near the boundary. The ascent of Chickamin and Leduc Rivers took about 6 weeks, whereas half that time had been considered a reasonable estimate.

It was found to be impracticable to climb the precipitous northern slope of Boundary Peak 18, but Boundary Peak 23 was climbed and temporarily marked by a drill hole in the rock. The boundary line was projected from the latter peak southerly to Boundary Peak 18 and westerly to Boundary Peak 24. There was a considerable amount of timber on each side of Leduc River, but the vista through it would not have been difficult to cut had it not been for the steepness of the slopes. As it was, the work progressed slowly because of insecure footing and because much of the work had to be done in the heavy rain that prevailed for most of the season. At this time the boundary line could only be temporarily marked owing to a delay in the shipment of the monuments, which did not arrive at Ketchikan in time to be taken up the river.

Besides cutting the vista across the Leduc Valley, the party occupied Boundary Peaks 23 and 24 as camera stations. Another operation engaged in was the exploration of the country northwesterly to establish a route for communication with the Lake Creek party to obtain supplies. A stream that flows northward to Unuk River has its source in a glacier west of Boundary Peak 24; this stream was named Gracey Creek, after Hiram Gracey, a member of the party, who was probably the first white man to explore its upper reaches. Although this route was found to be practicable it was quite difficult and circuitous. It was necessary to descend to Gracey Creek and then climb to the divide between that stream and the east fork of Lake Creek. At this divide there is a series of lakes enclosed by very steep and crumbling slopes, around at least one of which it was necessary to pass. The largest was selected; it was called Smith Lake for W. F. Smith, the assistant in charge of the party, who made the first trip on this route when the lake was discovered. This lake is free of floating ice for only a short time in the late summer.

The working season came to an end about the middle of September, when new snow began to fall. As it was evident that work would be required in this area during another season the non-perishable part of the outfit was stored in Gracey Creek Valley. The party then made their way to the forks of Lake Creek and combined with the party there in packing and canoeing to the coast.

THE LAKE CREEK PARTY

Leaving Unuk River, Lake Creek is easily navigable with canoes for about 4 miles, although it is quite shallow in many places, until the falls are reached. The journey to these falls from the cabin where the provisions had been stored formed the first stage of the route to the boundary, the most troublesome part of which was the crossing of the swift Unuk River. A steep trail was opened around the falls and a portage was located to a point just above a narrow rocky gorge, at which point the canoes could be used to ascend the stream for another 3 miles, by "lining", until the stream became too swift and shallow for further canoe navigation. A temporary camp was established just below a rock-jam in the stream, and from there a trail was made for about 8 miles to "Lake Creek Forks" where the permanent camp was established.

The principal feature of the work of this party was to be the location of Boundary Point 28, which, as before stated, was to be on the straight line between Boundary Peaks 18 and 40, and on the flat snow-covered ridge about midway between them (*See* page 52). There was found to be, however, another high snow-covered ridge intervening between the boundary point ridge and Boundary Peak 40, over which it would be necessary to project the line; this was called "Net Ridge". But the line crossed Net Ridge at the crest of a steep snow slope where it was difficult to set up an instrument firmly, and as it also crossed the boundary point ridge on a long stretch of snow the projection of the line at any time would be exceedingly difficult; moreover, the weather was so bad that it was seldom that both terminal peaks were visible at the same time, and at each appearance of the sun the snow melted rapidly and constantly shifted the position of the instrument. In these circumstances it was found impossible to project the line accurately, and this part of the work had to be postponed for a more favourable season.

In addition to the attempted projection of the line, two stations were occupied with the topographic camera, and one with the theodolite for triangulation. Another triangulation station was selected and a signal was erected, but the weather did not permit any further observations. This party was also actively engaged from time to time with the transportation of supplies to the Leduc River party, and during the season made a trail from Lake Creek Forks up the east fork to Smith Lake.

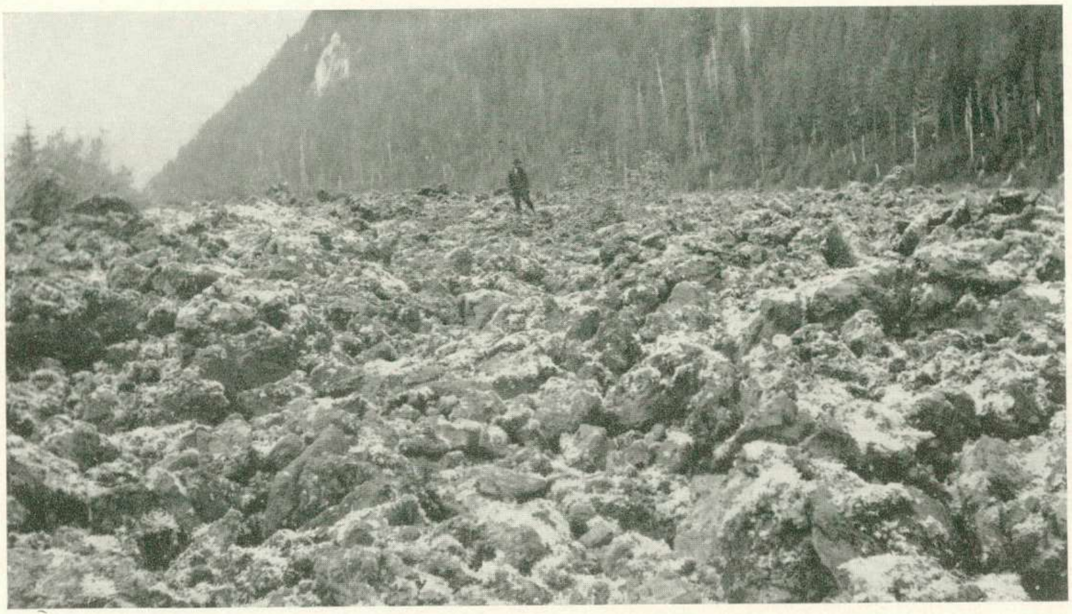
During the latter part of September and most of October the combined Lake Creek and Leduc River parties made their way down to Unuk River. At this time the weather was cold and the new snow made the work very disagreeable and dangerous.

THE BLUE RIVER PARTY

Blue River has its source in the snow fields south of Boundary Peak 47; thence it flows for some 15 miles southeasterly to Unuk River, which it joins 6 or 7 miles below the boundary. The two largest tributaries cross the boundary, the most easterly, the "Lava Fork", about 5 miles, and the "West Fork" a little over a mile, from the Blue.

Blue River Valley for the first 6 miles was found to be filled with volcanic lava of comparatively recent origin, making the surface exceedingly rough. Aside from the consequent slowness of travel, great inconvenience was caused by the rapid wearing out of footwear from the cutting action of the lava fragments; 1 or 2 days' travel making it necessary to repair new heavy boots. The roughness of the lava blocks prevented them from falling into stable positions and they rolled under the men's feet, causing a great many bad falls with severely cut hands. There had been two or three separate flows of the lava; one of them seemed to have had its origin, in part at least, only a few miles from the Unuk. It was found that the largest flow had been down the Lava Fork from its source about 2 miles above the boundary, between the Lava Fork and Canyon Creek. Some lava had also flowed down the valley of this latter stream. The mountain tops were strewn with cinders, and the trees along the edges of the lava stream had been killed by the heat.

The first camp on Blue River was pitched on the south side of the river, about 3 miles from its mouth, at the beginning of the narrow part of the valley. From there a trail was cut along the steep hillside to a point on the river where a 2-mile lake had been formed by a lava dam. A second camp was made on the lava near the upper end of a small timbered cinder cone about $1\frac{1}{2}$ miles below the Lava Fork.



Lava field in the valley of Blue River.

A mile above this camp a cache was made just above some open water where boating would not be necessary to reach the boundary. To cross the river, folding canvas boats were used, and although they were very slow as compared with ordinary canoes their greater portability made them more useful where they had to be packed for long distances.[1] Up the Lava Fork the trail followed the lava to the boundary line; this was the roughest and evidently the most recent of the lava flows. The final camp was made about one-half mile from the boundary.

A number of topographic stations were established and occupied during the season, and in the first half of August the line between Boundary Peaks 40 and 47 was located by the determination of a line point on a high snow dome about 1 mile west of Boundary Peak 40, from which it was possible to see both the boundary peaks. From this point the line was extended over the snow to the Albert Ridge between the Lava Fork and West Fork, and other similar points were established in the Lava Fork Valley. Some vista cutting was done across the valley, but about the middle of September it was found it would be impossible to complete the work. The three monuments that were to be set on the line were taken to their respective sites, but the setting of them was postponed until the following

[1] These were 14-foot "Acme" boats weighing about 80 pounds, which could be carried in two packs.

season in order that the line points might be verified. The non-perishable part of the outfit was placed in a cache, and towards the end of September the party started back to the Unuk.

Bears shot near boundary on Blue River.

Owing to the great difficulties encountered from the new snow and high water, the combined parties did not reach the mouth of the Unuk until the latter part of October.

Great and unforeseen difficulties encountered in a hitherto unknown country, together with an exceptionally rainy season, prevented the completion of the work in this district; but a good start was made and the routes of transportation were well established for continuation of the work the following season.

The personnel of the party was: engineer in charge, O. M. Leland; assistants, S. L. Boothroyd, G. I. Gavett, and W. F. Smith; and 17 hands. The Canadian representative was F. H. Mackie, D.L.S.

SEASON OF 1909—EAST OF ENDICOTT ARM, ISKUT RIVER, LEDUC RIVER, AND THE TRIBUTARIES OF UNUK RIVER

The field work of 1909 was in its entirety a continuation of the unfinished surveys of the previous year. Two Canadian parties were organized to return, respectively, to the boundary area east of Endicott Arm and to Iskut River, and likewise a United States party was organized to reascend the tributaries of Unuk River and to complete the work at the head of Leduc River.

In the spring of this year His Britannic Majesty's Commissioner placed the direction of the Canadian parties in the hands of Mr. Noel J. Ogilvie, D.L.S., previously engaged on the 49th Parallel in British Columbia; this position was held by Mr. Ogilvie until the completion of the field work of 1914.

Canadian Party East of Endicott Arm

It has already been said that the commissioners were able during the winter of 1908-09 to select the necessary additional boundary peaks between the points "7" and "8", and "8" and "T" to fulfil the requirements of the exchange of notes of 1905. The party that was to resume the survey of this area and locate the new boundary peaks by their geographical co-ordinates arrived at Juneau on May 16. Thence they continued their journey in launches to Endicott Arm and made their first camp on the south shore about 5 miles above the old mining town of Sumdum.

The routes used to the interior and the methods of transportation were the same as those of the previous year. The exceptionally heavy snowfall of the past winter, however, made the travelling more tedious and dangerous than before, for the mountain summits that had been bare of snow in the early summer of 1908 were very late in clearing. As was usual at most glacier camps, cooking was done on small alcohol or oil stoves, but on Brown Glacier some wood was found; a forest had evidently been overwhelmed by the glacier, for as the ice melted fragments of timber were exposed at the surface.

When the work on the two Dawes Glaciers had been completed, operations were transferred to Brown Glacier, and later to the vicinity of Tracy Arm. Mount Sumdum, about midway between Endicott and Tracy Arms, was occupied, greatly strengthening the triangulation system. The boundary peaks all had well-defined summits; but for the most part they were snow capped, and, owing to the extreme difficulty of travelling in the boundary area and the practical inaccessibility of the peaks themselves, they were not occupied. The work was finished and the party started their return journey to Vancouver on October 3.

A dangerous snow cornice.

One of the two fatal accidents of the entire southeast Alaska Boundary survey occurred during this season. At the summit of Bird Mountain, on the north side of Brown Glacier, the drifting snow had formed a cornice that overhung a precipice above the South Sawyer Glacier. This mountain was occupied as a triangulation station on June 11. During the progress of the observations the recorder, Joseph Shepard of Nanaimo, despite previous warnings, walked too close to the edge of the cornice. The cornice broke, carrying Shepard with it to the glacier 2,000 feet below. Although the body was seen on the glacier there was no way to get down to it from the mountain. Later a party reached the locality from Tracy Arm, but more snow had broken off Bird Mountain before their arrival and swept the body into a very deep crevasse. A brother of the dead man joined the party later in the season and, after taking part in further unsuccessful attempts to recover the body, was satisfied that everything possible had been done in that respect.

The work of this party completed the demarcation of the boundary between Boundary Peaks 72 and 79.

The personnel of the party was: engineer in charge, Noel J. Ogilvie, D.L.S.; assistants, H. S. Mussell, C. C. Courtman, and J. W. Melson; and 13 hands.

Canadian Party on Iskut River

The party arrived at Wrangell on May 16. Four days later they started by launch, with their 5 tons of freight, for the mouth of the Iskut on Stikine River. Arriving there on the next afternoon they established a supply depot. Indians had again been engaged to do the freighting by canoe, but for this season only from the depot to the head of canoe navigation on the Iskut, instead of for the whole distance from Wrangell as in the previous year.

On May 26, in a heavy rain, the party started up the Iskut, tracking and poling their canoes. On the upward journey one of the canoes was upset in the swift current while being manœuvred around a pile of driftwood; the heavier articles of the load were lost, including several instruments and all the plates, cups, and cutlery belonging to the party, but by careful search of the drift piles and river bars downstream most of the lighter articles were recovered. The party reached the boundary on June 15 and at the site of the last season's camp some plates, dishes, and cutlery were found; these were a welcome addition to the camp equipment as, since the accident, pocket-knives had been used for cutlery and empty tins for drinking cups. A trolley was strung across the river consisting of a half-inch rope tightened by means of a windlass. To cross the river a man sat on a swing seat attached to a pulley by means of which he was able to pull himself across.

Crossing river on a trolley.

The work of the previous season was resumed and carried downstream. As before the weather was bad—from June 24 to October 1 there were only 18 fine days; consequently, although sufficient phototopography was done to complete the mapping of the valley to the Stikine, it was impossible to connect the triangulation with that of 1904 on Stikine River. Early in August a canoe load of supplies was lost on the Iskut; one Indian was towing the canoe and another was in it, steering, when it fouled a partly submerged snag. Towards the end of September the river had risen very high and the snow line was creeping lower each day. Hoping to complete the triangulation to the Stikine the party stayed on, but as the bad weather continued they returned to the mouth of the Iskut on October 1. It then rained continuously until October 7. Early the next day the engineer in charge started for Wrangell in a canoe and, assisted by wind and tide, arrived there early in the afternoon. A launch was chartered to bring the party and outfit from the mouth of the Iskut and on October 17 they returned to Vancouver.

The work of this party completed the survey of Iskut River. Although the triangulation was not completed to the Stikine, the geographic control for this area was provided by the position of Boundary Peak 53, obtained from the Stikine River work of 1904, and Boundary Peak 48, from the Bradfield River work of 1907.

The personnel of the party was: engineer in charge, F. H. Mackie, D.L.S.; assistant, J. M. Bates; and 8 hands.

United States Party on the Tributaries of Unuk River and on Leduc River

The party reassembled at the mouth of Unuk River on May 8. There it was divided into three sub-parties to work on Leduc River, Blue River, and Lake Creek. Transportation was again facilitated by the use of the teams and wagons of the Unuk River Mining and Trading Company; but considerable work was necessary to clear the road of windfalls and to repair bridges. Owing to the difficulties of navigation encountered on Leduc River during the previous year it was planned that the Leduc River party should reach their field of operations by way of Lake Creek; so, while the Blue River party continued up the Unuk, the combined Lake Creek and Leduc River parties made their first camp at the log cabin a mile below the mouth of Lake Creek.

A temporary camp was made by the two parties at the old site above the Lake Creek falls on May 26, and from this camp as a base they transported their outfits and supplies from the log cabin to the forks of Lake Creek, where the permanent camp for the Lake Creek region was again established. Upon completion of the transportation, on June 24, the Leduc River party continued with the packing of their equipment up the east fork of Lake Creek to the old Gracey Creek camp site, and the Lake Creek party commenced their work in the vicinity of Turning Point 28.

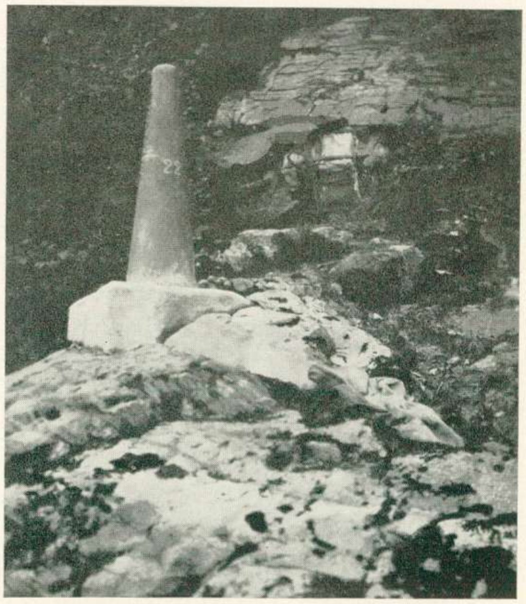
LAKE CREEK

The work on Lake Creek included the reoccupation of the old triangulation stations, the location of the line from the Unuk Valley to Turning Point 28, and the marking of the boundary line by a vista and several monuments. Bad weather again caused delays in all of the work that involved observing. The extension of the line to Turning Point 28 was attended with a continuation of the difficulties that made its completion impossible the previous year. In addition, as the season was more backward than usual, the signal on Boundary Peak 40 was obscured for a long time by a deep bank of snow just east of it. Finally, however, on August 9 Boundary Peaks 18 and 40 were both visible. The assistant in charge of the Lake Creek party placed himself on the snow-covered "Net Ridge" of 1908 and lined himself in with the theodolite on the true line between Boundary Peaks 18 and 40. From his point on line he then lined in the assistant in charge of the Leduc River party on the snow-covered slope of Mount Middleton, placing him on the true line between Boundary Peaks 18 and 40. The true line as thus established on Mount Middleton was then projected toward Boundary Peak 18 until it reached an outcrop of rock on which it could be permanently marked. A point on this outcrop was assumed by the engineer in charge to be a satisfactory position for Boundary Point 28.

Late in August the party was rejoined by the Leduc River party. The vista across the west fork of Lake Creek was then completed and two copper bolts were placed to mark the boundary, one on each side of the creek. A conical monument was also placed on the rock outcrop mentioned above to mark Boundary Point 28. But this location proved to be unsatisfactory to the commissioners, as it did not conform to their decision of 1905 regarding the point in question. As will be seen in the narrative for 1920, the monument was removed and Boundary Point 28 was shifted northwestward to the crest of Mount Middleton ridge on the line between Boundary Peaks 18 and 40.

LEDUC RIVER

After the experiences of the previous year in packing on the steep slopes around Smith Lake, a folding canvas boat was provided for crossing the lake, but owing to the backwardness of this season the lake was still covered with ice at the end of June. The snow on the slopes, however, being solid enough to support a foot-path, most of the packing around the lake was completed before it melted away. A camp was then established above the glacier at the head of Gracey Creek.



Monument at Boundary Point 22, Leduc River.

As the vista across Leduc River had been completed during the previous season it only remained to erect the monuments there, which was done from a fly camp with the smallest possible outfit. Using the Gracey Creek camp as a base the party back-packed the supplies over the divide to the Clarasmith Glacier, constructing a sledge to facilitate transportation over it. Boundary Peak 23 was occupied to put the monuments on the line to Boundary Peak 18. Two conical monuments, Nos. 21 and 22, were erected, and the line was further marked by two copper bolts, one on each side of the river. These monuments and bolts were connected with the triangulation and several camera stations were occupied in this area. While this work was in progress there was continuous rain for 10 days.

GRACEY CREEK

The Leduc River party returned to the Gracey Creek camp on August 12. Although the growth of timber here was not heavy they found it difficult to cut on the steep slopes. A monument was placed above the glacier on the east side of the valley and a copper bolt on top of a bluff on the west side. This line, however, was altered in 1920 owing to the change in the final point selected by the commissioners to mark the position of Boundary Point 28.

Upon the completion of their work in Gracey Creek Valley, on August 24, the party moved to the west fork of Lake Creek where they joined the Lake Creek party. The Lake Creek line was finished on September 8 and 3 days later the entire outfit of the two parties had collected at the forks for transportation to Unuk River. A long rainy period followed, the creek was flooded and the difficulties of transportation were increased so much that Unuk River was not reached until October 4. The combined parties then went up to Blue River to assist the party there with cutting the vista on the West Fork.

BLUE RIVER

As already stated, the Blue River party continued up Unuk River when the other parties went up Lake Creek in the latter part of May. A team was taken around "The Bluff" and used to haul the supplies and outfit to the mouth of Blue River. A temporary camp was made near the mouth of the Blue, and as the water was exceptionally low at this time the old camp below the Lava Fork could be reached without leaving the lava; this was easier than packing over the

Camp on lava bed of Blue River.

mountain trail on the southwest side of the valley. The final camp was established at the old site on the Lava Fork at the end of June.

The vista cutting was then resumed on the steep valley slopes; there the timber was mostly hemlock, the largest trees being about $2\frac{1}{2}$ feet in diameter. The cutting was completed on September 5. In the meantime the line between Boundary Peaks 40 and 47 was retraced, Monument 42 was erected at the lower end of the vista on the east side of the river and a copper bolt was embedded in the rock at the upper end; on the west side of the river Monument 43 was erected high up on the Albert Ridge and a copper bolt was embedded on the crest of the same ridge. The first of these bolts was replaced in 1920 by Monument 41 and the latter by Monument 44.

Above the mouth of the Lava Fork on Blue River, Blue Lake extends for 2 miles between steep mountain sides. This lake was formed when the flow of lava filled the river valley below it. A canoe was used on the lake and upper river to reach the work on the West Fork of Blue River.

A camp was established near the southeast end of Blue Lake from which an observing party occupied several triangulation and camera stations. This camp also served as a base for the work on the West Fork, which was started on September 7. Although it was estimated that with the assistance of the party from Lake Creek, the vista across the West Fork Valley would be completed in 2 weeks' time, owing to the late arrival of that party, on October 10, and the very bad weather, cutting was discontinued on October 15 before being completed. Monument 46 was erected on the west side of the valley and Monument 45 was taken to its site on the bluff on the east side, but because of the deep snow it was not set up; later, in 1920, it was erected by the party working in that region.

Returning to the mouth of Unuk River the whole party was assembled at the landing by October 27—a team having been secured to haul their equipment down from The Bluff. The entire party did not reach Ketchikan until November 5, well soaked by the persistent rain and snow. There a warehouse was utilized for drying and packing the outfit. They left Ketchikan for Seattle on November 8.

The work of this party virtually completed the boundary delimitation on Leduc River and on Unuk River and its tributaries. Subsequently, mining developments between Unuk and Salmon Rivers called for further work in the locality, which was done in 1920.

The personnel of the party was: engineer in charge, O. M. Leland; assistants, S. L. Boothroyd, G. I. Gavett, and Jesse Hill; and 23 hands. The Canadian representative was T. H. G. Clunn, D.L.S.

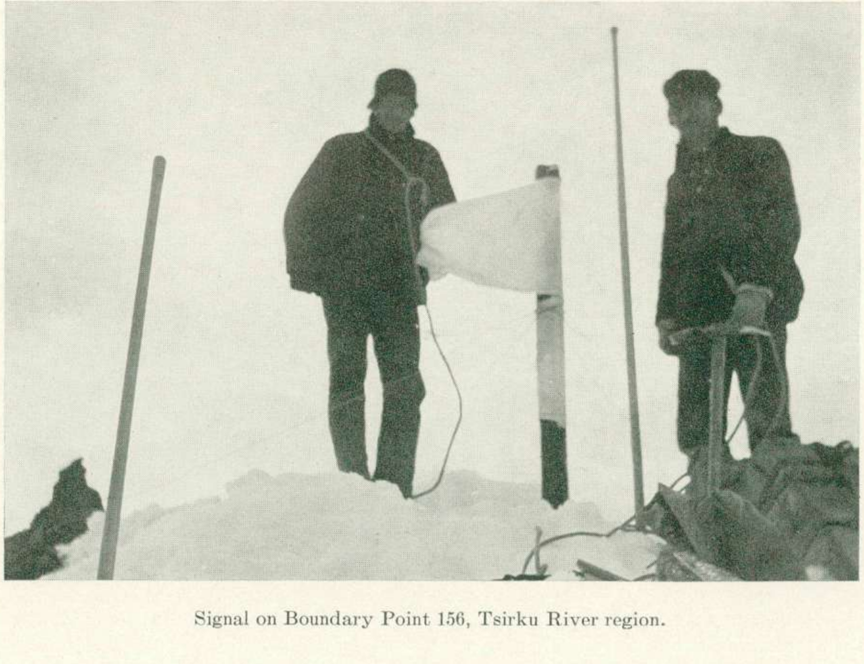
SEASON OF 1910—TSIRKU RIVER, CHILKAT RIVER, TALLSAYKWAY RIVER, AND SALMON RIVER

During the season of 1910 one United States party and three Canadian parties worked in various districts. The United States party ascended Tsirku River and, occupying the peaks southerly to Boundary Peak 157, made direct connections between the Canadian triangulation of 1905 on that river and the United States triangulation of 1907 in the vicinity of Glacier Bay. One of the Canadian parties marked the boundary across the valley of the Chilkat Glacier between Boundary Peaks 123 and 128; another extended the phototopography above the source of Tallsaykway River east of Boundary Peaks 93 and 94; and the third party made surveys additional to the work of 1905 from the mouth of Salmon River to Boundary Peak 18.

United States Party at the Head of Tsirku River

The party arrived at Haines on June 15 and the next day their outfit, supplies, and three Peterborough canoes were hauled by wagon over the government road to Klukwan, a distance of 22½ miles. As it was desirable to make the ascent of the swift and shallow Tsirku River in one trip, the services of ten Indians with five cottonwood dugouts were secured at Klukwan. The ascent was begun on June 18. Each of the Peterborough canoes, carrying a load of 1,000 to 1,200 pounds, was hauled by two men with a tow-line, a third man steered the canoe with a pole or on occasion waded in the stream to prevent its being upset in the rapids; similarly, the Indian dugouts, carrying 650 pounds each, were handled by two men, one man hauling and the other poling. In this way the party reached a point about a mile below Canyon Creek and 21 miles above Klukwan, where the river was too shallow for further navigation; there a temporary cache was made and the Indians returned to Klukwan.

Camp was made and a permanent cache was established at the mouth of Canyon Creek on June 23. From there the old trail of the Canadian party of 1905 was used and the main camp of the season was established 5 miles distant near the boundary, at an elevation of about 3,000 feet. The last week in June



Signal on Boundary Point 156, Tsirku River region.

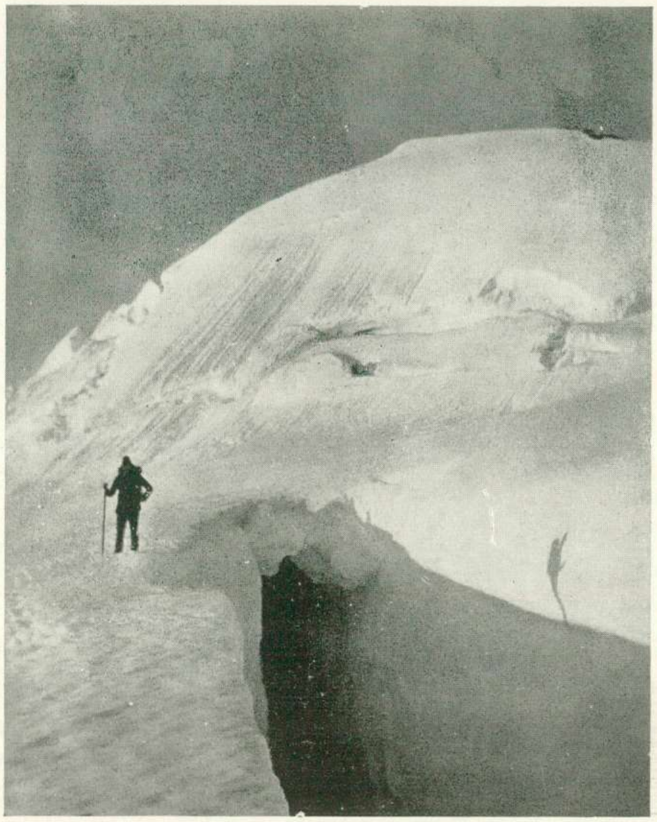
and the first 3 weeks of July were rainy and foggy, but despite the weather several of the old triangulation stations were recovered, signals were erected on them, and a temporary camp was established on the snow field between the head of Tsirku River and Glacier Bay.

On July 25 the weather finally cleared. This was the first of 6 successive clear days, and the climbing parties at the snow field camp took advantage of them to the utmost. They occupied Boundary Peaks 154 to 157 inclusive and three new triangulation stations with theodolite and topographic camera, and marked each of the boundary peaks with a copper bolt. The

Triangulation station McA 158, Tsirku River region.

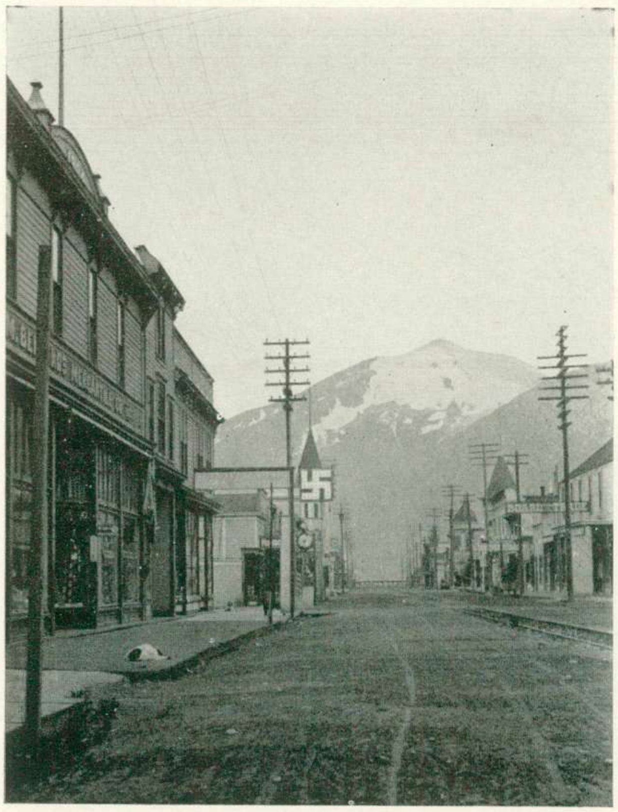
Climbing to Boundary Point 157, Tsirku River region.

ascent of these precipitous peaks was strenuous work, attended with more than usual danger. Another clear day would have been sufficient for the completion of the work on the snow fields, but July 31 was a day of rain, sleet, and snow, and as the tents were being torn to pieces by the wind the observers were forced to return to the main camp. The bad weather continued until August 9. That day was utilized to check the alinement of Monuments 152 and 153 on the north side of the Tsirku Glacier, which had been erected in 1905. These monuments were found to be from 5 to 6 metres west of the line between Boundary Peaks 151 and 154—possibly owing to the fact that in 1905 the alinement had been made from a northern shoulder of Boundary Peak 154, from which the true peak was not visible, instead of from the peak itself. The commissioners subsequently decided that the line as so marked should be the true boundary line between Boundary Peaks 151 and 154. On August 11 a small climbing party returned to the snow field and completed the observing there during the next 2 days; during the same time the observing was completed from the main camp.



Snow bridge near Tsirku River.

The party started downstream from the mouth of Canyon Creek on August 19. Although the river was shallow at the commencement of the journey a sudden flood forced the party ashore before night. By the next morning the flood had subsided so an early start was made, but below the De Blondeau Glacier the three canoes were caught in a field of floating ice. As each side of the channel was lined with the grinding ice it was impossible to get to either shore, so the men stood in the shallow water of the sand bars to keep the canoes from being crushed by the floating masses. After they had been standing for 2 hours in the ice-cold water with badly bruised legs the ice cleared sufficiently for them to reach the west shore, where they camped.



Skagway in 1910.

Several camera stations were occupied on the way down the river to furnish data for mapping the region at the head of Tahkin River. Arriving at Haines on August 29 the party went on to Skagway, where they spent the next 2 weeks running a line of precise levels from Skagway to the summit of White Pass, to connect with the Canadian levels running from that point to Yukon River (*See* page 259). This work was completed on September 14 and, after selling a large part of their outfit, the party left for Seattle the following day.

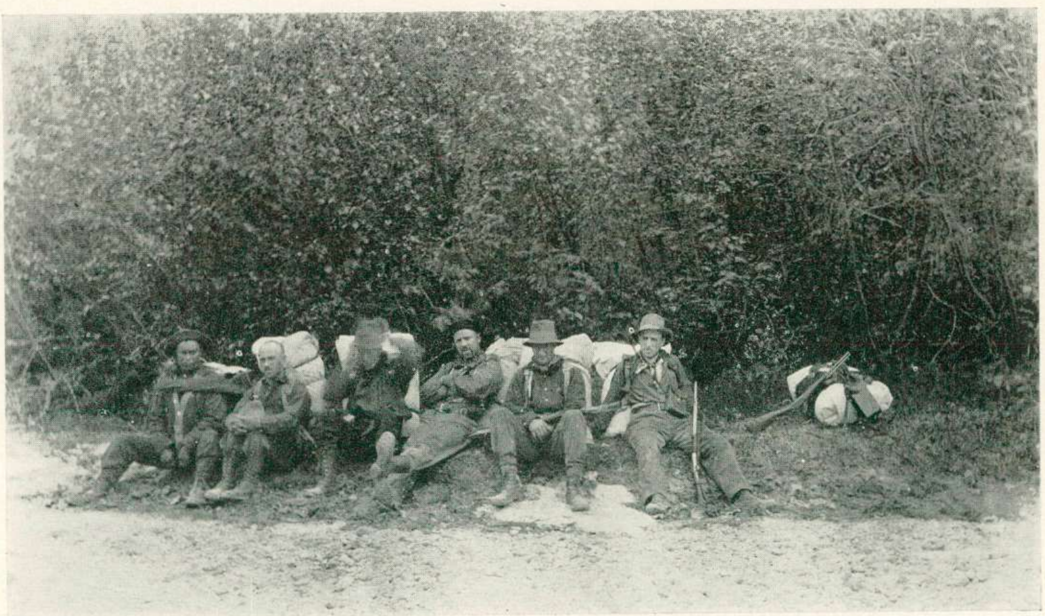
From the triangulation of this party on the snow fields west of the head of Tsirku River a connection was made to the triangulation of the United States party of 1907 in the vicinity of Glacier Bay, which in turn had been based on the United States Coast and Geodetic Survey triangulation on Icy Strait.

The personnel of the party was: engineer in charge, O. M. Leland; assistant, Jesse Hill; and 7 hands.

Canadian Party at the Head of Chilkat River

The United States party that had worked on Chilkat River in 1906 had extended the triangulation system beyond the boundary, but because of the lateness in the season when they learned of the azimuth that the boundary line was to take eastward from Boundary Peak 128, they had barely time to complete the vista cutting of the boundary crossing of Chilkat Valley and to place monuments on the two banks of the river before the wintry weather of mid-October forced them to leave the field. Consequently, the demarcation of the boundary in that region was incomplete to the extent that the boundary crossing of the Chilkat Glacier remained unmarked.

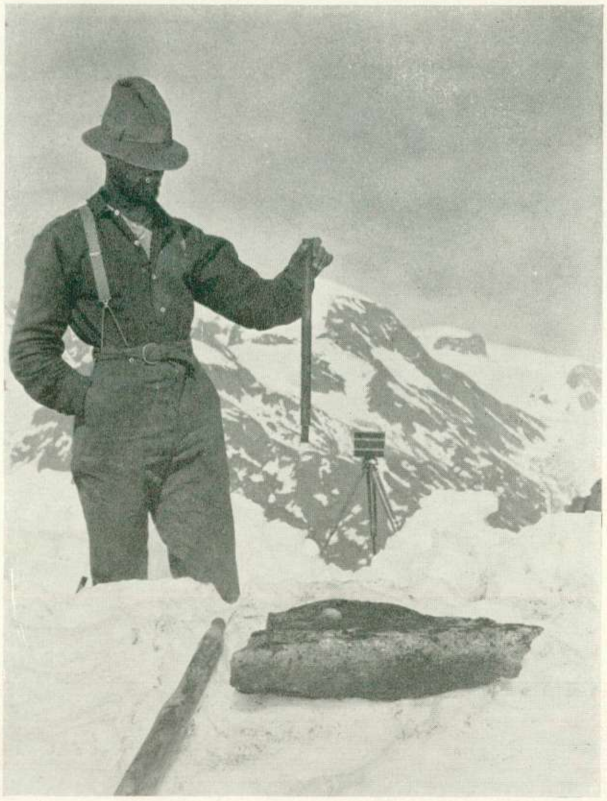
For the purpose of extending the line across this glacier a Canadian party left Vancouver on May 16. From Vancouver they sailed to Juneau and continued



Packers near boundary crossing of Chilkat River.

their journey from Juneau by steamer to Haines. Like the United States parties from 1904 to 1906, they ascended the Chilkat with the assistance of Indians from Klukwan and experienced similar difficulties of navigation. Portaging around the falls they crossed to the Canadian side of the boundary and made their base camp 4 miles farther on, about 2 miles below the face of the Chilkat Glacier.

The boundary line was then projected from Monument 127 on the west side of Chilkat River, easterly across the steep snow-



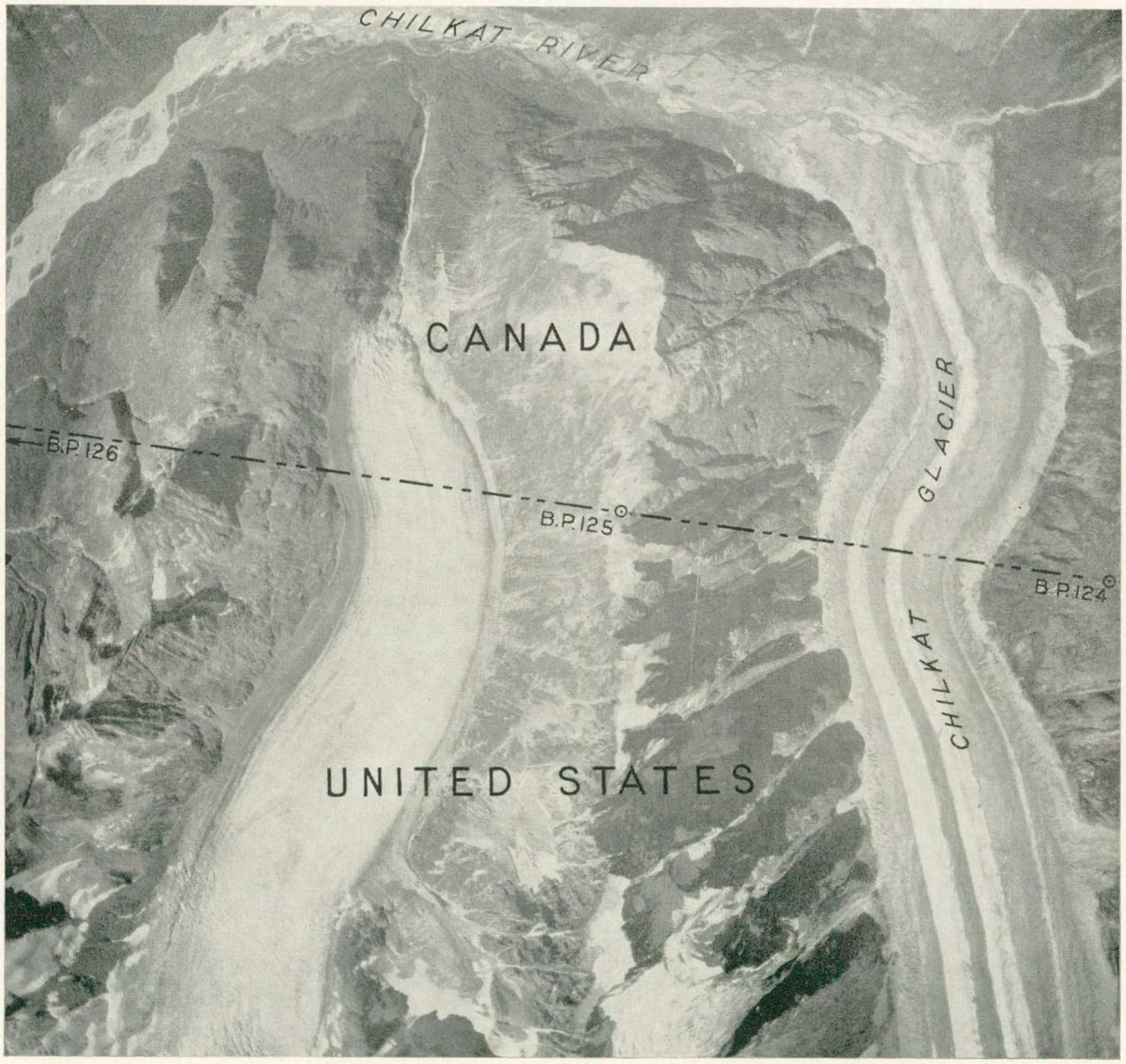
Boundary Point 124. Bolt ready to be set in rock outcrop.

Cliffs near Boundary Point 125, at the head of Chilkat River.

covered ridges to the glacier, and thence across the glacier towards Boundary Peak 123. A brass bolt, Monument 125, was embedded in the rock with several inches of it above the surface on the first ridge west of the Chilkat Glacier, and a similar bolt, Monument 124, was embedded about one-third of the way up the mountain on the east. No further permanent marks could be put on the snow-covered mountains and snow fields between the glacier and Boundary Peak 123. To connect these bolts with the river triangulation of 1906 several triangulation stations were established, which, together with the sites of the bolts, were occupied with the theodolite and topographic camera. On the return journey a few days were spent on Tahini River in order to add to the topographic data in that region. The party returned to Haines and sailed south early in August.

The work of this party completed the demarcation of the boundary and the phototopography of the Chilkat River area.

The personnel of the party was: engineer in charge, Noel J. Ogilvie, D.L.S.; assistants, C. C. Courtman and W. M. Dennis; and 6 hands.



Aerial photograph of the head of Chilkat River, by the United States Navy, 1948.

Canadian Party on Tallsaykway[1] River

This party, which had accompanied the Chilkat River party from Vancouver, arrived at Juneau on May 20. Proceeding thence to Tallsaykway River they left a cache of supplies at the forks, about 7 miles above its confluence with Taku River. There was at that time a trail along the northeastern fork to Atlin Lake and the northwestern fork was navigable to within 2 miles of its glacial source. Continuing up the northwestern fork the party established their base camp for the season at the head of canoe navigation. A great many bears were seen in the Tallsaykway Valley, but owing to the abundance of berries and fish there they did not molest the supplies of the party.

The Tallsaykway Glacier flows down from the great snow fields that extend from Devils Paw (Boundary Peak 93) northerly to White Pass. In this region of snow and ice the party was fortunate enough to find for a camp site a small patch of Canada balsam, evidently growing on a moraine near the junction of a tributary glacier flowing northeasterly from Devils Paw. The instruments and light equipment were back-packed over the comparatively smooth surface of the Tallsaykway Glacier to the upper camp, but from there the travelling to the high summit stations, which were occupied to secure data for the topography north and east of Devils Paw, was slow and difficult; on some of these ascents steep glacial slopes were scaled and the rope was almost constantly in use. After the completion of the work on the glacier the party moved by degrees down the valley to connect their triangulation with that of 1906.

About the middle of July a flood of rather peculiar origin inundated the base camp below the glacier. The Tallsaykway Valley is subject to recurring floods. Some 5 or 6 miles above the face of the glacier a subsidiary glacier flows into it from the northern slopes of Devils Paw. Melting snow and ice form a lake about 3 miles long and $\frac{2}{3}$ mile wide under the smaller glacier, which has for its outlet a subglacial tunnel to the river below. Usually this tunnel is clear, but at irregular intervals it becomes blocked with ice and the water then backs up and breaks its 200-foot glacial covering. Eventually the pressure of the stream, with its head of about 1,000 feet, clears the obstruction in the tunnel, shatters the face of the glacier, and floods the valley to a depth of 20 feet with swirling water and floating ice. Then as the lake is gradually drained the flood recedes.

Fortunately the packers were at the base camp at the commencement of the flood, so they were able to move the supplies and the greater part of the camp equipment to higher ground. When the flood had receded, after about 24 hours, the tents that had been left standing were hauled from a mass of mud, sand, and boulders, and the money box of the engineer in charge was dug up from under the

[1] There have been various spellings of the name of this river. The spelling adopted by the Canadian Board on raphical Names in 1945 is "Tulsequah".

roots of a tree where it had been placed for safe-keeping. The cache farther down the river was completely washed away.

The work of this party completed the mapping of the boundary area from Taku River to the northern ice-fields.

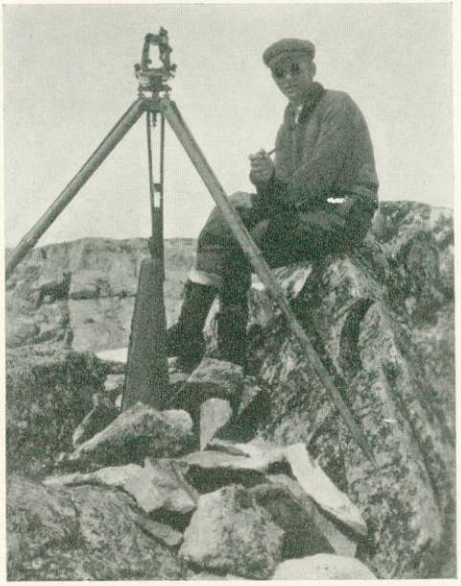
The personnel of the party was: engineer in charge, H. S. Mussell; and 9 hands.

Canadian Party on Salmon River and at the Head of Portland Canal

As the work of 1905 in the Salmon River and Texas Glacier areas had not been finished, owing to the inclement weather then experienced, a Canadian party was detailed to these areas during this season to complete the delimitation of the boundary and to obtain additional data for the phototopographic map. As in 1905, operations were to extend from the mouth of Salmon River to Boundary Peak 18, and, in addition, southerly from Salmon River to the latitude of Lion Point.

By the year 1910 this section of Alaska had begun to attract considerable attention on account of mineral discoveries. At the mouth of Bear River, on the Canadian side of the boundary, Stewart had three large hotels, several stores, two banks, and a Customs office. The town had a water supply piped through it and also had an electric light plant. During the season a railroad wharf was built out over the mud flats to deep water, and a railroad was graded part way up the Bear River Valley. On the United States side, at the mouth of Salmon River, a town was laid out on the tide flats and named "Portland City" (this name was changed some years later to "Hyder"). Half a dozen frame buildings were erected on pile foundations so as to be above the reach of the spring tides. One of these was a good-sized hotel. A wharf was started and the outer part completed, but the approach was not finished during this season. The greater development of the townsite of Stewart was due to the fact that the best mining prospects, though in the Salmon River Valley, were on the Canadian side of the boundary. Traffic up Salmon River was still by water or trail; the road up the valley was not built until 1919, the year that the Premier Mining and Smelting Company was incorporated.

There was snow to a depth of 3 feet on the ground when the party disembarked at Stewart on May 15, which made the first part of their season's work, a survey of the Salmon River flats, slow and tedious. This survey was completed by June 5. The United States representative having arrived in the meantime, the party moved by pack-train up the Salmon River Valley to a point across the river from the mouth of Texas Creek. The United States representative, however, remained with a small detachment at Portland City to erect monuments on the shores of the canal, and to extend the survey from the United States Coast and Geodetic Survey triangulation stations there northerly to form a junction with the triangulation of the main party.



Monument at Boundary Point 8 (Mount Welker).

The officers of the United States Coast and Geodetic Survey vessel *Cosmos*, which arrived at Portland City early in the season, established bench marks referred to mean sea-level; these were used by the boundary engineers as data for their elevations. At about the same time the townsite was surveyed by engineers from Ketchikan who laid out a street 60 feet wide along the boundary easterly from Monument 1 towards the shore.

On Mount Welker, east of Salmon River, much difficulty was experienced with the exceptionally deep snow. Monument No. 7, the point D of the Award, which during no year emerges from its covering of snow until well into the summer, was not exposed during the whole season and could not be found, although a careful search was made for it. On the same mountain a conical aluminium-bronze monument, No. 8, was erected at the summit (766·3 metres northerly from Monument No. 7), the boundary vista was cut northwesterly down the slope to Salmon River (a distance of about 3 miles), and a conical aluminium-bronze monument, No. 10, was erected on a knoll one-quarter mile from the river.

The routes followed and the modes of travel were much the same as those of 1905. A rope crossing was thrown across Salmon River near its junction with Texas Creek and a trail was cut up the Texas Valley. The vista was continued across the low mountain west of the river, and a conical aluminium-bronze monument, No. 11, was erected near the break of the mountain above the stream flowing from the Salmon Glacier. Fly camps were established by the triangulation and phototopographic parties on the Texas and Chickamin Glaciers at the sites used by the 1905 party, and Boundary Peaks

Fly camp at confluence of Texas and Chickamin Glaciers.

Nos. 15, 17, 18, and the supposed 16[1] were connected with the triangulation. These peaks were all occupied as triangulation stations except No. 18, which has a very sharp top, and under the snow conditions that existed it was not considered safe to climb it. Among the triangulation stations used some of those of the 1905 survey were re-occupied; all of these stations were also occupied with the camera, and eleven other phototopographic stations were established. This work was completed by August 20.

In the meantime the United States representative had completed the work from the mouth of Salmon River southerly to Lion Point. A concrete monument was erected on the east side of Portland Canal, due east from Monument 1, to reference the most northerly of the boundary turning points in the canal; three other concrete monuments were erected on the shores of the canal southerly to Lion Point, two of them being over the triangulation stations of 1895. The old brick pier, which served originally as the mounting for the astronomical transit used when the longitude of the station was determined chronometrically from Seattle and Port Simpson in 1895, was repaired to serve as a station mark. When the triangulation connection was made with the Salmon River work, the representative checked the field computations and thus verified the identification of the boundary peaks; he later made a trip up the Salmon Valley to inspect the vista cutting between Boundary Peaks 8 and 15. The party sailed south from Stewart early in September.

The demarcation of the boundary and the phototopography were virtually completed during this season from the head of Portland Canal to Boundary Peak 18, but owing to a large increase in prospecting and mining activities in 1917-18 it was found then that there would be need for marking the line in greater detail. As will be seen, this was done in 1920.

The personnel of the party was: engineer in charge, F. H. Mackie, D.L.S.; assistant, J. M. Bates; and 9 hands. The United States representative was Fremont Morse.

SEASON OF 1911—NORTH OF THE MALASPINA GLACIER, EAST OF YAKUTAT BAY, AND ON PORTLAND CANAL

From the year 1911 to the cessation of field work in 1914 only Canadian parties operated in southeast Alaska. During the preceding years the personnel of the United States parties had been larger than that of the Canadian parties, consequently, the survey of the sections allotted to them had been completed before those allotted to the Canadian parties. It should be remembered also that concurrent with the work in southeast Alaska, work was being done by the commission along the 141st Meridian, on the 49th Parallel, in the vicinity of Pigeon River, and along St. Croix River, and that all of these sections of the International Boundary drew upon the personnel of the commission.

[1] *See* pages 54 and 113.

Two small Canadian parties completed the work in the vicinity of Yakutat Bay during the season of 1911 and a third party resumed work on Portland Canal to continue the delimitation of the boundary southerly from Lion Point.

Canadian Parties on Yakutat Bay

United States parties working from Yakutat Bay in 1906 had identified and located all the boundary peaks from Mount Herbert (No. 172) to Mount St. Elias (No. 186) with one exception. They had been unable to identify Boundary Peak No. 184, a snow-covered, dome-shaped mountain of about 1,000 feet elevation above the surrounding glaciers. In addition to the identification of this peak, it was also necessary to verify by triangulation the positions of some of the boundary peaks in the vicinity of Mount Seattle (No. 178), and to secure additional topographic data in both regions.

The two parties that were to undertake this work assembled at Yakutat on May 27. Disenchantment Bay at the time was badly choked with ice and the parties were unable to enter the bay with their boats until June 15.

THE NORTHERN PARTY

After a rainy day spent in open boats on their way from Yakutat the northern party camped in the first valley north of Point Latouche, where on the flats scarcely a step could be taken without dodging eggs in sea-gull nests. In this valley there was an old Indian camp that was occupied by Indian hunters when they went to hunt seals on the ice during the breeding season.

After several attempts to force their way to the northern shore of Disenchantment Bay in Indian dugouts, the party made a successful landing through the surf on June 24. They then camped on the moraine at the extreme eastern end of the Malaspina Glacier, directly opposite the foot of the Galiano Glacier. From there a trail was cut through the tangled brush on the moraines of the Atrevida and Lucia Glaciers and the camp was moved to the eastern branch of Kwik River—a deep, swift, and icy stream issuing from the face of the Lucia Glacier. There an aerial tramway was constructed across the river, but the ten Indian packers refused to pack across the ice and to trust themselves to the aerial tramway. Hiking back to their canoes they returned across the bay to Yakutat.

Leaving all but the absolutely necessary part of their supplies and equipment at the camp site, the six white members of the party opened a trail over the lower pass of the Floral Hills and relayed their supplies up the west branch of Kwik River and across the Hayden Glacier to the margin of the Malaspina Glacier. Sleds were then used for transporting the supplies in place of the more tedious back-packing. Travelling on the glacier was usually done in the early morning hours, as after 9 a.m. the snow would become so soft that the sleds would sink to the decks, making further progress impossible for the rest of the day.

After travelling about 30 miles over the Malaspina Glacier the party attempted to reach Dome Pass through what was apparently a large gap in the Samovar

Hills. Passing to the south of the first spur of the hills they went northward to a small ice-covered lake, on the shores of which some alders and willows were growing, but after crossing to the north side of the lake they could not climb the steep cliffs with their heavy packs. They were then obliged to return with their sleds over a part of their route to the foot of the Seward Glacier. On this glacier the ice was so broken into crevasses that it was found impossible to make further use of the sleds and they again resorted to relaying with the back-packs. Some difficulty was experienced in getting off the rough sides of the glacier to the mountains on the west, but finally an indentation was found at the base of the Samovar Hills. There, as the ice was comparatively smooth and the place was partly sheltered from the bitterly cold winds, camp was established, on July 22. In this camp the silk tents were slung between alpenstocks and braced by the heavy packs. The cooking and heating was done with alcohol stoves.

From the Seward Glacier and the mountains to the east, Boundary Peak No. 184 appeared to be a small shoulder of Mount Augusta. Four summits were occupied before it was identified. The boundary point itself was occupied as a triangulation and camera station and its position was determined by direction observations on the definitely located peaks, St. Elias (No. 186), Augusta (No. 183), Cook (No. 182), Vancouver (No. 181), and the unnamed boundary peak between the Agassiz and Newton Glaciers (No. 185). The adjacent topography was also controlled by observations on these peaks.

The work was completed on August 9. By this time supplies had run extremely low. Abandoning much of the camping equipment the party travelled as speedily as possible back to the north shore of Disenchantment Bay, spending 4 nights in the open during the journey. After waiting there several days for a launch they returned to Yakutat on August 16.

THE EASTERN PARTY

Owing to drift ice in the channel the eastern party was forced to make a temporary camp in the Calahonda Valley on the southern shore of Disenchantment Bay. Leaving this camp on June 21 they forced a passage through the ice around the turn at the Hubbard Glacier and entered Russell Fiord; there they landed and established their base camp on the easterly shore about 2 miles south of the moraine of the Variegated Glacier. Then reconnoitring in the vicinity they found that the best route to the snow field behind Mount Seattle was along the Variegated Glacier.

On July 1 they began to pack supplies up the glacier. The party was divided into two groups of three men each to do the necessary back-packing and to make the climbs. The three men in the rear packed supplies from the cache behind to their temporary camp, and on the following day carried them to the forward cache; from there the three forward men packed on days that were unsuitable for survey work, but when a fine day arrived they were always in camp at the foot of the mountain they were to climb. After a climb, having supplies already ahead of them, they could move forward to be in a position for the next climb.

Four triangulation and camera stations were occupied, and attempts to occupy a number of others were unsuccessful on account of the difficulty of getting off the glacier. The Variegated Glacier Valley is very narrow with almost perpendicular sides, and a lateral crevasse runs continuously around the base of the mountains; this lateral crevasse limited attempts to climb out of the valley to the few places where it could be crossed. Five attempts were made to climb Mount Jetté (Boundary Peak No. 177), but it was finally given up as too dangerous. After crossing the summit of the Variegated Glacier at Mineral Hill only one mountain, about 3 miles to the north, was climbed; further advance was checked by ice cascades and the bergschrund around the base of the mountains. When this work was completed the party returned to Russell Fiord.

Late in July camp was established up Nunatak Fiord for the occupation of camera stations to be used with those at the end of the Variegated Glacier for plotting the topography in the area south of Mount Jetté.

At the commencement of the season it was estimated that in such a rough locality it would take one season to find a route into the country and another to complete the work, but the party was able to do sufficient triangulation and phototopography to complete the assignment in one season.

Both parties left Yakutat for Vancouver, via Seattle, early in September.

The personnel of the two parties was: engineer in charge of the northern party, H. S. Mussell; and 5 hands; engineer in charge of the eastern party, W. M. Dennis; and 5 hands.

Canadian Party on Portland Canal

The same party as of the previous year returned to Stewart, and on May 24 established their first camp at Portland City. They then started the preparation of triangulation stations southerly from Lion Point. This triangulation was to be the foundation for a phototopographic survey of the country bordering the canal. In addition to the topographic work, boundary reference monuments were to be erected opposite the turning points of the boundary line, which had previously been marked by the commissioners on a large-scale map, and these monuments were to be connected with the United States Coast and Geodetic Survey triangulation of 1888. In addition to this connection the reference monuments were, wherever practicable, to be connected with the mountain triangulation.

The party was divided into two small parties, one to go in advance and select the triangulation points, put up signals, and take photographs for the topography, the other to make all the mountain triangulation observations and to do some of the triangulation for the location of the reference monuments. The rest of the latter triangulation was done by the United States representative. The reference monument sites were selected as the work progressed, and the monuments were constructed by the advance party towards the end of the season.

As the work progressed the two parties moved their camps southerly. By August 6 the shore triangulation had been completed as far as Fords Cove, about 20 miles from the head of the canal. Between that date and September 15, twelve

Typical Portland Canal reference monument from S-21 about 23 miles south of Hyder to C-26 near Hyder at the head of Portland Canal.

reference monuments were constructed. Each monument was built of concrete in the form of a frustum of a square pyramid, with a base 12 by 12 inches, tapering in a height of 3 feet to 6 by 6 inches.

The work was retarded early in June by the slow melting of the snow on the peaks, and later there were many wet and foggy days to hinder the observing. After the middle of July, however, progress was rapid. Work was suspended on September 15 and the party returned to Stewart, sailing to Vancouver on September 21.

The personnel of the party was: engineer in charge, F. H. Mackie, D.L.S.[1]; assistant, J. M. Bates; and 8 hands. The United States representative was Fremont Morse.

SEASON OF 1912—NUNATAK GLACIER, TAKU RIVER, GLACIER BAY, KATETE RIVER, AND PORTLAND CANAL

During the season of 1912 Canadian parties completed the phototopography and triangulation in the vicinity of Nunatak Glacier and tied in by triangulation the four monuments that had been set in Taku River Valley in 1907; they completed the phototopography and triangulation in the vicinity of Glacier Bay, corrected the alinement of the monuments set in the valley of Katete River in 1905 between Boundary Peaks 54 and 62, and continued the work of the previous season along Portland Canal.

Canadian Party on Nunatak Glacier

The Nunatak Glacier and Glacier Bay parties left Vancouver on May 20 and sailed north to Juneau, where they arrived on May 24. On June 3 the Nunatak Glacier party left Juneau and arrived at Yakutat on the following day. At that time, however, Disenchantment Bay was completely blocked with ice, which, the local Indians said, would probably remain for several weeks. As it was impossible to force a boat through the ice in the bay the party cut a trail 11 miles across the Yakutat Peninsula from Humpback Creek to Russell Fiord.

[1] Mr. Mackie fell ill after his return from the field in 1911. He died on December 23, 1912. Before his work in southeast Alaska he had been engaged on the survey of the 49th Parallel through the Coast Range. His colleagues held him in high esteem, and in him the International Boundary Commission lost one of its most useful officials.

After 16 days of trail cutting and packing through heavy brush and many windfalls the party reached the fiord. The last part of the journey was down a steep gully for about 700 feet, and there their cypress canoe was badly damaged. This canoe had been taken in preference to one of cedar for extra lightness in portaging, but the wood was too brittle for the rough handling; it was necessary to repair twenty-five holes before the canoe could be launched in the fiord. While the trail work was in progress an eruption of Mount Katmai, about 600 miles westward, took place and the atmosphere became so filled with volcanic dust that mountain summits 10 miles distant were scarcely visible[1]; this dust also greatly aggravated the irritation caused by scratches and the bites from swarms of black flies and mosquitoes.

After 3 days of heavy rain the party paddled north to Nunatak Fiord, and through it to the moraine of Nunatak Glacier. This glacier had been one of the routes to the Yukon gold fields during the "rush" years; it was littered from end to end with old sleds, discarded clothing, and tin cans. On July 28 camp was established on a large patch of heather at the crest of the glacier. From this camp five mountain stations were occupied with the transit and camera to complete the topography in the region between Boundary Peak No. 175 and Alsek River. Considerable time was lost during the 3 weeks occupation of this camp owing to the haziness of the dust-laden atmosphere. After several days spent on the return journey the party arrived back in Yakutat on August 22, and after a wait of over a week for a steamer they re-embarked for Juneau.

The personnel of the party was: engineer in charge, H. S. Mussell; and 6 hands.

Canadian Party on Taku River

The Nunatak Glacier party arrived at Juneau on September 2 and 3 days later four of the party were taken by launch to Taku River. A heavy down-river wind was met when they reached Taku Inlet, which caused a delay of 3 days before they were able to start up the river in their canoe. The distance from salt water to the boundary line there is about 16 miles, and under ordinary circumstances takes about a day's travel. Owing to the rain and heavy winds it took the party 6 days to make the trip.

Monuments 88 to 91 were occupied and the angles were read between the visible boundary peaks and triangulation stations. Vista clearing was done between the monuments and the river banks. On October 12 the party left the boundary line and paddled back to Juneau, arriving there on October 15, after being delayed for a day by a storm in Taku Inlet. They sailed for Vancouver on October 18.

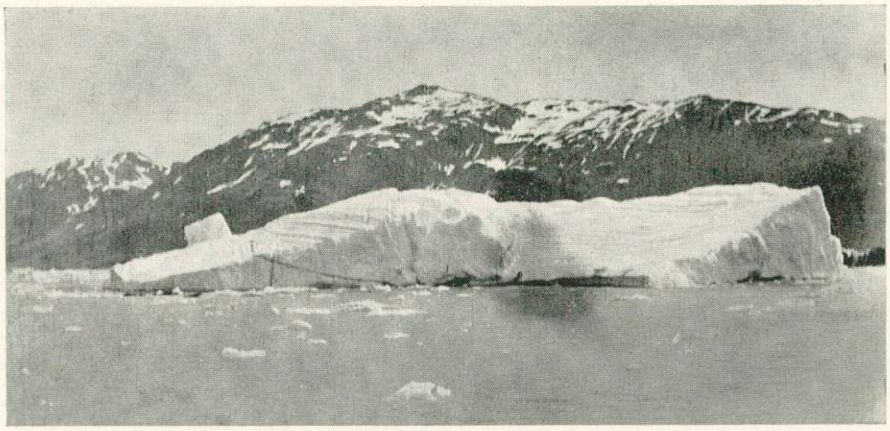
Canadian Party at Glacier Bay

After some difficulty in obtaining one launch for use in the work and another for transportation to Glacier Bay, the party left Juneau on May 24. On the following morning they ran into an ice barrier in Glacier Bay and were forced to

[1] This same phenomenon was noted on the Arctic Coast by members of the survey parties on the 141st Meridian boundary.

land at Hugh Miller Inlet, where they pitched their first camp. Besides a 22-foot launch they had two canoes. With these craft they had to exercise great care to avoid being crushed while forcing their way through the closely packed and swirling ice cakes, and to keep away from the larger bergs, which in melting were likely at any time to assume a new centre of gravity, roll over, and create tidal waves that would overturn any small craft.

On June 25 a camp was established about 2 miles below the face of the Grand Pacific Glacier, and from this camp supplies were back-packed to a new camp site at the junction of the Grand Pacific and Melbern Glaciers. At that time the face



Iceberg in Glacier Bay.

of the Grand Pacific Glacier was about 200 feet high. The only feasible route to the interior led for about $\frac{1}{3}$ mile along a bench on its eastern side some 100 feet above the glacier and 400 feet below the remains of a lateral moraine that rested on a sheet of ice that at some previous time had been a part of the glacier. For 10 days the packers crossed this bench, each with a 65-pound pack, and returned in the evening, having many narrow escapes on the uncertain footing in avoiding the rock slides that rolled down intermittently from the moraine above them.

Two of the triangulation stations of 1907 were recovered and the scheme was continued about 20 miles to the boundary. A phototopographic survey was made of the rock and ice region in the vicinity of Boundary Peak No. 167, and afterwards work was extended beyond the divide and some distance down the Melbern Glacier to join the topography done by the Alsek River party of 1908.

Ice worms about the size of an ordinary pin were seen above the nunatak at the junction of the glaciers on July 4. In the early morning there were only a few and they disappeared during the day, but in the evening they completely covered the glacier. They were distributed about one to the square inch where the ice was hundreds of feet thick and they were seen many feet down in the water holes in the ice, but there were none in the shallow ice near the nunatak. On the following day they had entirely disappeared. Some specimens of the worms were preserved and later sent to McGill University.[1]

[1] The worms were identified as *Mesenchytraeus Solifugus*, an annelid worm. Others of the same genus are known, as for instance two species found on Mount Ranier, Washington.

The party broke camp on July 28 and arrived in Juneau on July 31. A detachment sailed from there to assist in the work along Portland Canal, and the rest of the party embarked for Katete River.

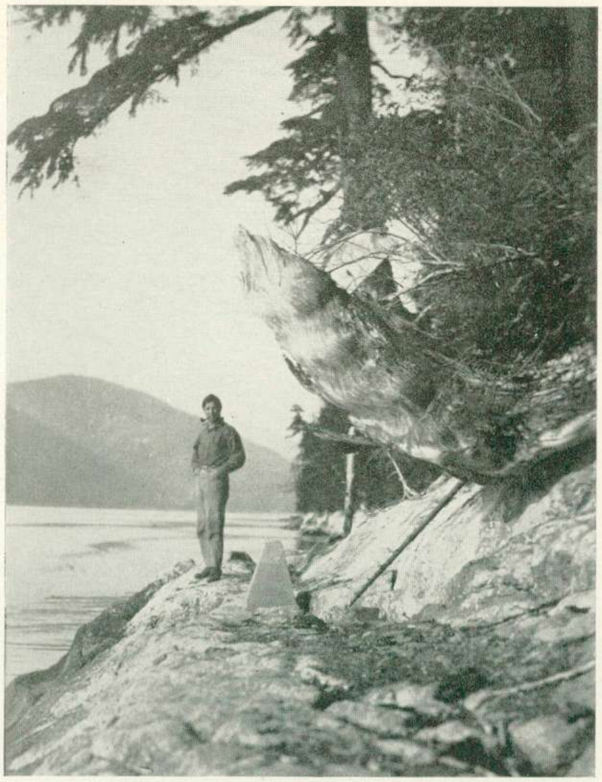
The personnel of the party was: engineer in charge, W. M. Dennis, D.L.S.; assistant, J. M. Bates; and 7 hands.

Canadian Party on Katete River

The Katete River party sailed south from Juneau to Wrangell. On August 5 they left Wrangell and ascended Stikine and Katete Rivers to the west fork of the latter and up this fork, where they established their base camp at the boundary crossing on August 10.

As stated in the narrative for the year 1905 the east end of the boundary line, as marked between Boundary Peaks 54 and 62, fell about 30 feet north of the highest part of the former peak. This party re-occupied Boundary Peak 62 and projected the true line between it and the highest part of Boundary Peak 54, which at this late time in the season was bare of snow. They then moved each of the intervening monuments southward its correct proportional distance to the true line between the Boundary Peaks. In addition to this work, some vista cutting was done in the valley of the west fork. The party returned to Wrangell on October 8 and thence sailed to Vancouver.

Canadian Party on Portland Canal



Typical Portland Canal reference monument from R.M. S-1 & 2 at the mouth of Tongass Passage to C-20 on Pirie Point.

To resume their work of the previous year on Portland Canal the party disembarked at Stewart on May 24. Securing a motor boat there they moved south to Maple Bay on the east shore about 30 miles from Stewart, and established their first camp. The work then proceeded as in former years. The United States representative arrived on July 19, and later in the season the party was further reinforced by the detachment from the Glacier Bay party. Camp was moved three times, each move being about 20 miles southward.

As usual on Portland Canal the weather this year was unfavourable for triangulation and phototopography; and here, too, the eruption of Mount Katmai early in the season so filled the atmosphere with dust that the distant mountain summits were obscured for several days, and it left a haze that prevented good photographic work for some weeks. For the most part the elevations of the stations varied between 2,000 and 4,500 feet. Devil's club abounded on the lower slopes and timber-line was reached at an elevation of about 3,500 feet, after which the ascents were over rock or deep soft snow; but towards the mouth of Pearse Canal the country flattened out, the mountains were lower, and topographical details were quite difficult to secure.

Twenty-nine concrete monuments were built to reference the boundary turning points. The monuments were made to different dimensions from those of the previous year, which were considered to be too tall and slender to withstand continual weathering; they were 14 by 14 inches at the base, tapering in a height of 18 inches to 6 by 6 inches at the top. The work was suspended at the southern end of Pearse Canal on October 8, and on October 20 the party returned to Vancouver.

The personnel of the party was: engineer in charge, T. C. Dennis, D.L.S.; assistants, D. J. Fraser, D.L.S., J. M. Sheppard; and 12 hands. The United States representative was Fremont Morse.

SEASON OF 1913—CANADIAN PARTY AT DIXON ENTRANCE, PEARSE CANAL, AND STIKINE RIVER

By the end of the field season of 1912 the demarcation of the International Boundary between Canada and Alaska from the west shoulder of Mount St. Elias, where the 141st Meridian boundary terminates, to the entrance of Portland Canal was virtually complete. There remained to be laid down, however, a system of triangulation to connect the point "A" of the Award at Cape Muzon with the point "B" of the Award off the entrance to Tongass Passage where the boundary line commences. This was to be first-order work and was to form a link in the proposed geodetic triangulation of the Pacific Coast northerly from the 49th Parallel, which was being done by the geodetic organizations of the two countries. In addition to this triangulation, the demarcation of the water boundary was to be completed from the southern end of Pearse Canal through Tongass Passage to the point "B" of the Award, a number of camera stations were to be re-occupied to replace photographs that had been found unsatisfactory due to the bad atmospheric conditions of the previous year, and an additional monument was to be placed on the land boundary on the south bank of Stikine River.

The party that was to do this work sailed from Vancouver for Port Simpson and by May 22 was assembled at the cannery on Wales Island to prepare for the field work. A sea-going vessel was chartered and, it having been decided to begin work near the ocean and proceed eastward, an observing party was sent to Cape Muzon and lightkeepers were landed on North Island, Cape Chacon, and Tow Hill to operate the heliotropes[1] during the day and the lamps at night. In the meantime a small party remained at Wales Island to resume the work on Pearse Canal.

[1] In surveying, an instrument for reflecting the sun's rays from one station to another so that directions may be accurately determined.

On account of the great length of the lines to be observed across Dixon Entrance, triangulation stations of considerable height had to be located on the various islands. Each station was marked by a brass bolt, either embedded in concrete or cemented in a hole drilled in bedrock, over which was constructed a concrete pier, 18 inches square and about 40 inches high. As the mountains on which these stations were situated were from 2,000 to 3,000 feet high the cutting of trails and the back-packing of 150 pounds of cement and 400 pounds of sand necessary for each of the piers was a difficult task. Two concrete monuments were built on the shore south of Cape Muzon to reference the point "A" of the Award; they were each 36 inches square at the base, 28 inches high, and 8 inches square at the top.

The weather, as usual, was very unfavourable for primary triangulation. Cloudy and foggy weather prevailed; North Island in particular seemed to be the birthplace of fogs; consequently, during the entire season, from May to September, only two stations were completed, Cape Muzon and North Island.

The observations at Cape Chacon were partly completed when there occurred, during the night of September 6-7, an unfortunate accident in which the two lightkeepers at Cape Muzon lost their lives. There had been a heavy storm and rainfall for several days and that night an immense landslide buried their camp. It was nearly a week before news of the accident reached the main camp. The lightkeepers had been in the habit of visiting one of the two settlers near them every few days, and when they did not make their accustomed call the settlers became uneasy and went down the trail leading to their camp to see them. They had great difficulty in getting to where the camp had been, as they had to cross ten or twelve landslides with timber and earth piled up in some places 20 feet high. They saw nothing of the camp except a sack of flour, a few tins of canned goods, and a plate. They notified the crew of a fishing launch, who in turn notified the magistrate at Sulzer near Ketchikan of the accident. The Canadian lighthouse tender *Quadra* was then intercepted by wireless from Prince Rupert and asked to go to the scene of the accident and render any possible assistance. A launch was also sent to Cape Muzon from Ketchikan and the tender of the triangulation party went there from Cape Chacon. The *Quadra* was first on the scene, but soon reported by wireless that the camp was covered by 20 feet of mud and there was no hope for the men. The two launches reached Cape Muzon soon after the *Quadra* had left; they also made an examination, but were unable to find any traces of the bodies. This put an end to the field work for the season.

The men from the observing camp and from the neighbouring triangulation stations were collected and all taken to Cape Muzon, where an unsuccessful attempt was made to recover the bodies of their unfortunate comrades. The position of the camp was determined as closely as possible and a large wooden cross was erected on which was inscribed: "Killed here September 6, 1913, G. R. Roberts and C. H. Bode, International Boundary Surveys".

The small party that had remained at Wales Island built nine concrete reference monuments, similar to those of the previous year, which they connected to the Portland Canal triangulation; they then connected this triangulation with the old United States Coast and Geodetic stations "Boston", "Garnet", and "Whitly". During the summer they also re-occupied a number of camera stations on Portland Canal. In September the Canadian representative accompanied an expedition of the International Geological Congress to Yakutat Bay and the Malaspina Glacier; and later, towards the end of September, he and the United States representative made an examination of the boundary across the Stikine Valley and superintended the erection of a monument on the south bank of the river. The entire party sailed from Prince Rupert for Vancouver on October 10.

The personnel of the party was: engineer in charge, Noel J. Ogilvie, D.L.S.; assistants, W. M. Dennis, D.L.S., W. H. McTavish, J. M. Bates, E. T. Decoeli; and 15 hands. The United States representative was Fremont Morse.

SEASON OF 1914—TRIANGULATION AT DIXON ENTRANCE

In 1914 a Canadian party in charge of the Canadian representative was assembled at Port Simpson on April 30 to complete the triangulation between Cape Muzon and the minor triangulation from Portland Canal. The party was divided into three small parties, two for triangulation on Dixon Entrance and the third to do reconnaissance work down the east side of Hecate Strait, to locate and prepare stations for the future southerly extension of the work by the Geodetic Survey of Canada.

During the season primary stations "Chacon", "Dundas", "Stephens", "Wark", "Rupert", and "Tow Hill" were occupied and the observations on them were completed.

After the outbreak of war in August, German cruisers were reported to be operating off the North Pacific coast. The members of the party were, consequently, stationed on look-out duty on the mountains around Dixon Entrance and Hecate Strait, to keep the military authorities in Prince Rupert informed regarding the movements of vessels in those waters. The undertaking of this special duty interfered with the progress of the reconnaissance work southerly. On October 17, the emergency being over, the party sailed from Prince Rupert.

The personnel of the party was: engineer in charge, Noel J. Ogilvie, D.L.S.; assistants, W. M. Dennis, D.L.S., H. S. Mussell, W. H. McTavish, Kimball Keeping; and 25 hands.

SEASON OF 1920—HEAD OF PORTLAND CANAL, SALMON RIVER, AND UNUK RIVER AND ITS TRIBUTARIES

It had been anticipated that with the close of the field operations in 1914 no further field work would be required for the demarcation of the International Boundary between Alaska and Canada under the Award of the Alaska Boundary

Tribunal. But a very considerable amount of mining activity had developed in the region immediately north of Portland Canal since the last operations were conducted in that region, in the year 1910; and as a consequence the Commissioners decided, at a conference held in Washington in March 1920, that further field work should be undertaken between the head of Portland Canal and Blue River, the northern tributary of Unuk River. It was agreed that in this region vistas should be opened or re-opened; that small bolts used to mark the boundary should be replaced by monuments in the form of 8-inch manganese-bronze posts; that the boundary peaks should where possible be marked by monuments; and that the monuments, already placed and to be placed, should be marked consecutively from the monument placed at the point C on Portland Canal in 1905, which was to be numbered 1. Advantage was also to be taken to correct the location of the boundary between Boundary Peaks 24 and 28, and to do some additional topography.

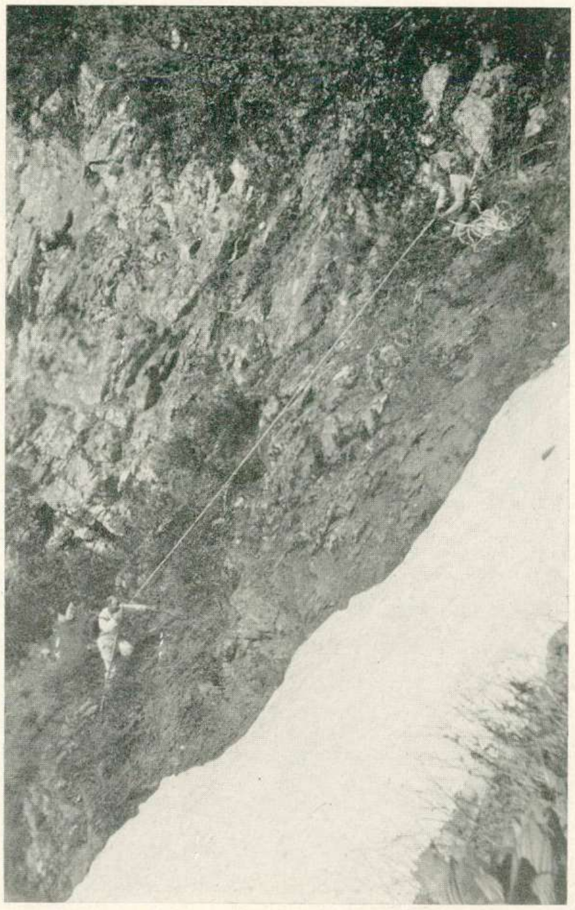
Canadian Party at the Head of Portland Canal and on Salmon River

The equipment used on the Quebec-Maine Highlands in 1919 was shipped to Stewart, B.C., via Prince Rupert early in April, but owing to a rockslide in the mountains its arrival in Stewart was delayed until May 26, several days after the arrival of the party there.

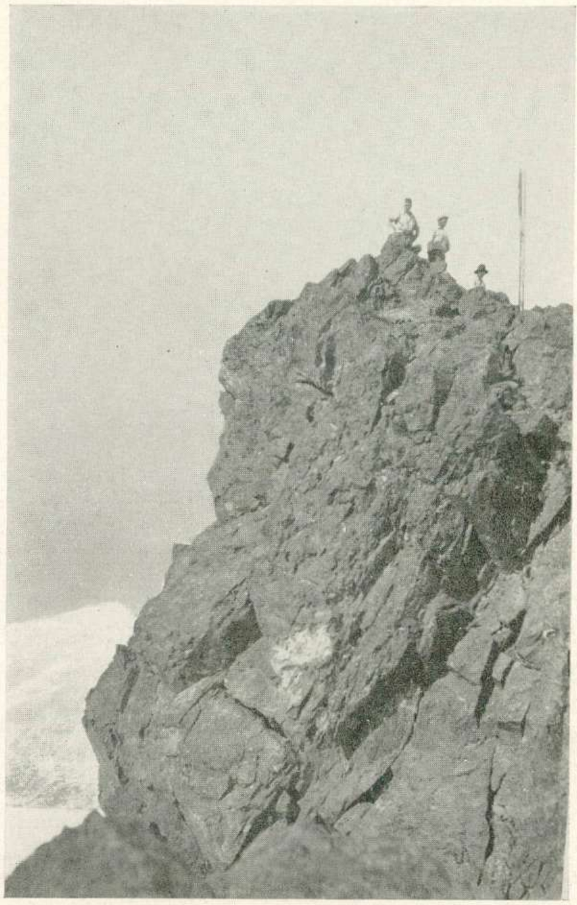
A camp was established on Salmon River just above Hyder. An ascent was first made to find Monument 4 at an elevation of 2,770 feet, on the ridge between Salmon and Bear Rivers; but as there was a covering of about 25 feet of snow on the ridge, work was done only in the lower altitudes during the early part of the season. A plan was made of Hyder, Alaska, and plane-table work was carried up the valley of Salmon River.

On June 24 camp was moved to Ninemile, on the road up Salmon River to the Premier mine. As the snow was still too deep for work on the ridge a trail was made up the valley of Texas Creek to Texas Glacier, and across the divide to the Salmon Glacier. On July 6 a climb was made from the Salmon Glacier to Boundary Peak 15, where a monument was set to replace the bolt set there in 1905. A fly camp was then established below the glacier, from which Monuments 13 and 14 were set and tied in by triangulation, and a base line was measured on the floor of the valley below the glacier. During this time the extremely hot weather melted the snow in the higher altitudes, causing a flood that washed out the bridge across Salmon River. The return to the main camp was made over an extremely rough detour, which included aerial tramways over Cascade Creek and Salmon River.

On July 14 six men were hired to help with the trail cutting and back-packing (which up to this time had been done solely by the assistants), and to start work on the vista. A cache was established at the ice falls on the Texas Glacier to facilitate the establishment of a fly camp for the work in the vicinity of the Chickamin Glacier. On July 24 the triangulation party left the cache for this



Climbing to Boundary Point 15 (Mount Bayard).



Boundary Point 15 (Mount Bayard).

point, but losing their way in a fog on the divide they returned to the cache. Several days later they crossed the divide, dropping fragments of playing cards on the snow for guides across it during foggy weather, and established their camp in small timber, at an elevation of about 3,700 feet, on a point on the north side of the glacier. But heavy rains started, floods increased, and the Salmon River bridge was washed away for the second time, so through lack of provisions they were forced to return to Ninemile a week later.

On August 9 the site of the camp at Ninemile was covered with flood waters, the camp having been hurriedly moved to higher ground. Rain and flood prevented the return of the triangulation party to their fly camp until August 20, by which time a cable and trolley had replaced the washed-away bridge across the river. Between August 24 and 31 climbs were made to Boundary Peaks 16, 17, and 18. The bolts that had been set to mark Boundary Peaks 16 and 17 were found, with the remains of the old signals near them. The bolt and signal intended for Boundary Peak 16,[1] however, were found on the wrong part of the mountain—the peak that had been designated by the Award was in deep snow and could not

[1] *See* pages 54 and 101.

Observing at Boundary Point 16 (Mount Jefferson Coolidge).

be permanently marked. Consequently, a monument, No. 15A, was placed on the boundary line as close as possible to the peak. But even then it was about a mile distant and near the position of the bolt set in 1905, which was now used as a triangulation station. On Boundary Peak 17 the bolt was removed and a monument was put in its place. The sharp summit of Boundary Peak 18 was not reached. It is separated from the bulk of the mountain by a narrow cleft, which could not be crossed. To reference it a monument was set on the minor peak, distant 37·3 metres and about 5 feet lower in elevation.

In August, Commissioners McArthur and Barnard arrived at Ninemile on a visit of inspection, the vista cutting from Boundary Peaks 8 to 15 was completed, and toward the end of the month the United States representative started the

Setting monument at Boundary Point 15A.

Observing at Boundary Point 18 reference monument.

Monument at Boundary Point 10, Salmon River region, Commissioners McArthur and Barnard.

projection of the line across Mount Dolly to Boundary Peak 7, using as a back sight a signal on the east side of Portland Canal on line with the monuments on the ridge. In this work the United States representative was assisted by the triangulation party after their return to the main camp. Monuments 5 and 6 were placed on this line, and Monument 9 was placed on the line between Boundary Peaks 8 and 15. About September 7 the main camp was moved back to Hyder, and vista cutting was started up the slope of Mount Dolly, where Monument 3 was established at an elevation of 1,442 feet. On September 26 the party left Stewart for Vancouver.

The personnel of the party was: engineer in charge, J. D. Craig, D.L.S.; assistants, T. C. Dennis, D.L.S., C. R. Westland, D.L.S., H. M. Barton, D.L.S., G. T. Prinsep, D.L.S., T. P. Reilly, and J. N. Ingersoll; and 6 hands. The United States representative was F. H. Brundage; assistant, Theodore Cole.

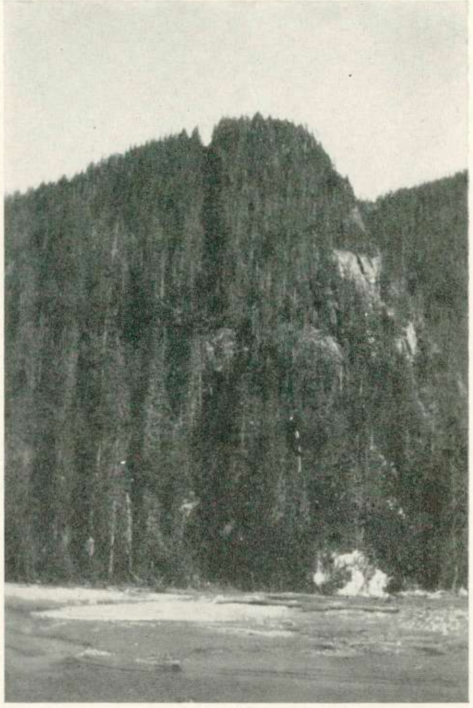
United States Party on Unuk River and Its Tributaries

Immediately following the meeting of the Commissioners in March the United States Commissioner communicated with the officers of the Forest Service in Ketchikan, and through them purchased 5,500 pounds of provisions for the use of the Unuk River party. He also made a contract with two experienced packers, who were to deliver these provisions at the boundary, some 30 miles from the mouth of the river, and return to Ketchikan by May 18 for the party, with whom they agreed to work during the field season. The packers were supplied with a Yukon poling boat, built to their specifications in Ketchikan. With one man and an Eskimo dog on the tow line and two men in the boat with poles, they relayed the provisions up the river to a cache near the boundary in 17 days.

Lining poling boat up Unuk River.

The party was organized in Seattle, where an 18-foot Oldtown canoe, a 13-foot King canvas folding boat, sail-silk tents, and further provisions were purchased. They arrived in Ketchikan on May 13, and 4 days later established camp in the abandoned storehouse of the Unuk River Mining and Transportation Company. An attempt was made to reach the boundary by the old mining road; but bridges had been washed out, fills around the rocky bluffs had caved in, and the snow was too deep in the woods for effective trail making. Consequently, the whole party made their way up the river, with their supplies and equipment, in the poling boat. They stopped at four camps en route, and the journey was made in relays, two trips between each camp. Great difficulty was experienced in passing through the canyon where Blue River enters the Unuk. In the last 500 feet of this canyon there was a vicious cross current with eddies on each side. After a struggle with the swift current the boat was got to a small island upstream. There a rope was tied to a tree and the supplies were ferried up to it by alternately allowing the boat to drift downstream and hauling it up again hand over hand. On June 1 the last boat load was taken from the fourth camp to the cache near the boundary.

It had been believed that the vista on the southeast side of Unuk River had been completely cut in 1905, but it was found that this was not so. Most of June was spent clearing this vista, which proved to be difficult work through the heavy timber on the steep slopes. During this time an attempt was made to get a trail up Boulder Creek and across the divide to Gracey Creek, but the attempt was abandoned as impracticable.



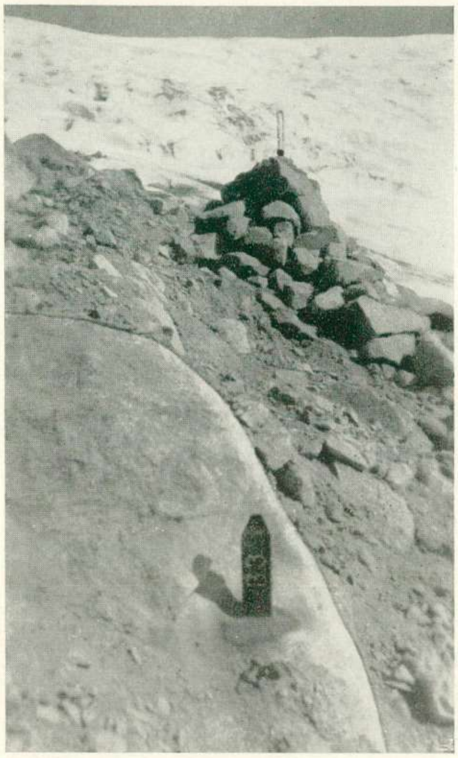
Vista on the south side of Unuk River. The crest is about 1,200 feet above the river bed.

On June 30, the engineer in charge left camp early in the morning and arrived at the mouth of the river in the afternoon. He was accompanied by the two packers and their assistant who had decided to leave the party, and by a member of the party who was suffering from appendicitis. They were taken to Ketchikan by launch on the following day. While there, the poling boat was overhauled and a frame was put on the stern for attaching an Evinrude motor. On July 12, with four new men, the engineer in charge returned to Unuk River, which was by this time in flood. By using oars and motor they reached the foot of the canyon on July 15, but upon resuming their voyage upstream the next morning they could make no headway against the swift current, so they again resorted to their 500 feet of tow line. Two men went ahead with the line and from a convenient spot let one end downstream attached to a float, which was picked up by the men in the boat. The line was then tied to a tree to which the men hauled their boat, using the motor to keep it away from the shore. By continually repeating this operation it took them 2 days to ascend the 1-mile length of the canyon.

In the meantime a base line had been measured on the bars of Unuk River near the main camp, Monument 34 was set, and this monument, together with Nos. 35 to 38 inclusive, set in 1905, was tied in to the triangulation; during that time also the Canadian representative started phototopographic work between Unuk River and Boulder Creek.

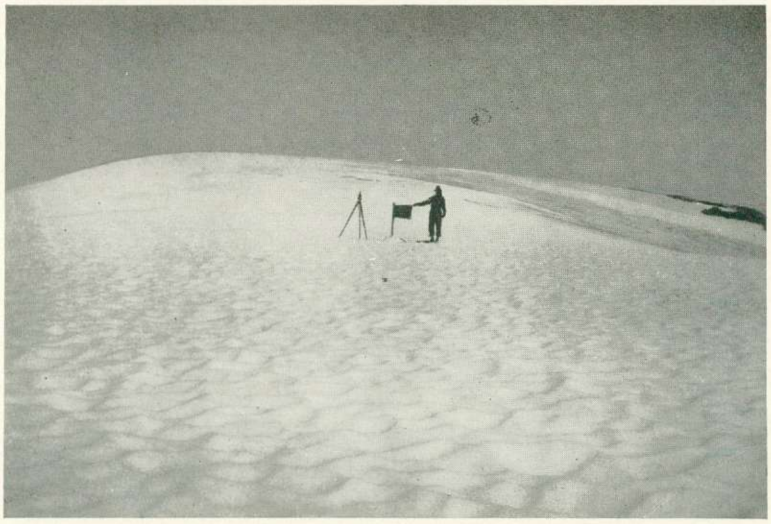
Poling boat at upper end of first canyon of Unuk River.

Operations were delayed early in August by heavy rains and floods, but on August 7 the floods began to subside. The triangulation and monument-setting party then crossed the Net Ridge to Lake Creek, from where they resumed the work of 1909. On the line between Boundary Points 40 (Mount Stoeckl) and 18 (Mount John Jay), a point on Net Ridge marked by a pole and cairn during that year was recovered and used for the selection of a site for Monument 32. From this monument the vista was reopened in both directions. On the northwesterly side of the ridge Monument 33 was set on the highest rock ledge crossed by the line. Southeasterly, Monument 29 was set just below the snow field on Mount Middleton, Monument 30 was set on the east side of Lake Creek by removing the bolt set in 1909 and drilling a larger hole, and Monument 31 was set 0·051 metre southeasterly along the line from the bolt established during the same year on the west side of Lake Creek.



Monument at Boundary Point 33 and reference cairn, Unuk River region.

On August 17 packs were taken over the snow ridge of Mount Middleton to Gracey Creek, and between that date and August 29 camps were established on Gracey Creek and Leduc River. Turning Point 28 was re-established, on the highest part of the snow ridge of Mount Middleton over which the line between Boundary Peaks 40 and 18 passed, as specified by the commissioners in their definition of this point in 1905.[1] From Turning Point 28 the line was re-run across Gracey Creek toward Boundary Peak 24, and the new vista was cleared. Monuments 25, 26, and 27 were set on this line, Nos. 25 and 26 replacing the monuments set on the old line in 1909. The remains of the old monuments were built into cairns referencing the new monuments. Monuments were also placed on Boundary Peaks 23

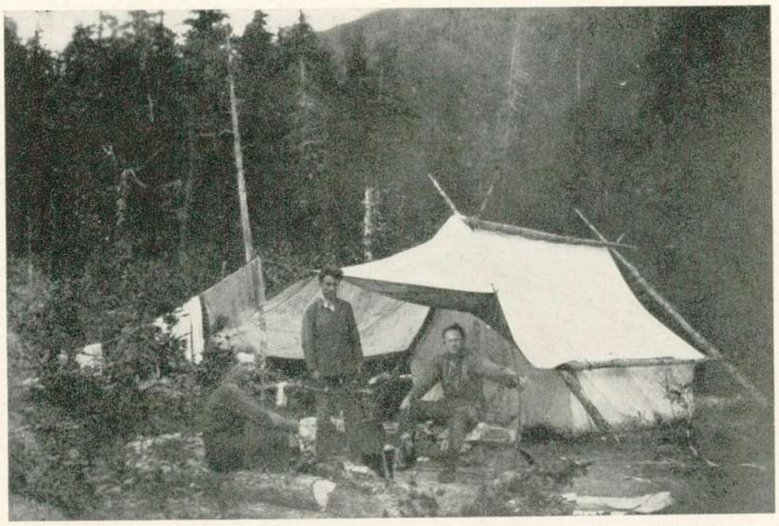


Flag at Boundary Point 28, on the snow-covered ridge of Mount Middleton.

[1] *See* page 53.

and 24, the bolt set in 1909 on the latter peak being left to serve as a reference monument. From the Leduc River camp the vista was re-cut across the river between Boundary Peaks 23 and 18. On this line Monument 19 was set on a spur of the ridge of Boundary Peak 18, the terminus of operations for the Canadian party working from Salmon River; Monument 20 was set near the bolt set in 1909 on the south side of Leduc River; Monument 21 set in 1909 on the north side of the river and Monument 22 also set in 1909 on the slope of Boundary Peak 23 were numbered.

By September 1 the whole party had reassembled at the Unuk River camp. After several days of rain and wind, while the vista cutting, phototopography, and monument numbering were being completed in that region, supplies and equipment were moved down Unuk River to the mouth of Blue River. Light outfits were taken over the lava to fly camps near the boundary in the vicinities of the Lava Fork and the West Fork of Blue River. On Blue River above the Lava Fork the canvas folding boat was used to cross Blue Lake, and it was then lined up the river to the mouth of the West Fork. From the Lava Fork camp Monument 41 was set at the site of the bolt set in 1909 near the glacier on the east, and Monument 42 on the east side of the Lava Fork was numbered. On the west side of the Lava Fork, Monument 43 was numbered and Monument 44 was set on the Albert ridge near the site of the bolt placed there in 1909. From the West Fork camp Monument 45 was set. This was the cone-type monument that had been left west of the Albert ridge in 1909; it was set over a cross on the rock that had been located by triangulation during that year. In addition, 1½ days were spent in cutting vista that had not been cleared in 1909.



Fly camp on the West Fork of Blue River.

On September 28 the party moved down Unuk River to the storehouse at its mouth. On their way down the boat was swept under an overhanging tree and swamped, but by quick work most of the equipment and all of the records and photographic plates were saved. The photographic plates, having become wet from their immersion, were developed in Ketchikan. On October 10 the party was disbanded in Seattle.

The personnel of the party was: engineer in charge, Jesse Hill; assistant, Nelson W. Smith; and 6 hands. The Canadian representative was J. A. Pounder, D.L.S.; assistant, D. F. Chisholm.

MAINTENANCE UNDER THE TREATY OF 1925

Since the adoption of the Treaty of 1925, maintenance on the boundary from the entrance of Tongass Passage to Mount St. Elias has been carried on from time to time by the Commissioners as briefly outlined below. More detailed accounts of these operations are contained in the annual reports that the Commissioners are required to present to their respective Governments under the provisions of Article IV of the Treaty of 1925.

Season of 1925—Stikine River

The vista across the valley of Stikine River was recleared in 1925 by arrangement between the Commissioners and the United States General Land Office.

Season of 1927—Portland Canal

During this year the Commissioners inspected the boundary reference monuments on Portland Canal and the boundary monuments and vista at the head of the canal. No immediate maintenance operations were considered to be necessary on this part of the boundary.

Season of 1929—Stikine and Taku Rivers, Stephens Passage, and Burroughs Bay

During the year 1929 some additional triangulation was required in southeast Alaska to more completely tie the boundary triangulation to the first-order net of triangulation of the United States Coast and Geodetic Survey. This was necessary to enable the Commissioners to determine the geodetic location of the International Boundary line from the entrance of Tongass Passage to Mount St. Elias on the recently adopted 1927 North American datum, common to both countries.

The work was done for the Commission by the United States Coast and Geodetic Survey in conjunction with other triangulation being done in Alaska by field parties of that bureau. This co-operative arrangement between the Commission and the Coast and Geodetic Survey resulted in a considerable saving of public funds as it obviated the duplication of expense that otherwise would have been incurred had separate field parties of the two organizations been sent to this distant locality.

STIKINE RIVER TRIANGULATION (horizontal and vertical angles)

Origin: first-order stations "Dry Pass east base" and "Rynda" on Dry Strait.

Terminus: Boundary Points 62 and 66 (Mount Coté and Elbow Mountain); intersections on Boundary Points 54, 69, 70, and 71.

Length of net	26 miles
Second-order stations occupied	12
Unoccupied check stations	2
Average closure of triangles	3.″4
Maximum closure of triangles	4.″7

TAKU RIVER TRIANGULATION (horizontal and vertical angles)

Origin: first-order stations "Bishop" and "Arden" on Stephens Passage.
Terminus: stations "Twin" and "Azimuth" of the Boundary Commission's 1906 triangulation, 7 miles below the boundary; intersections on Boundary Points 86, 93, and 94.

Length of net	32 miles
Second-order stations occupied	30
Unoccupied check stations	2
Average closure of triangles	2″5
Maximum closure of triangles	6″8

In addition, 17 stations of the Taku Inlet triangulation, executed in 1888, 1890, and 1893, were recovered and tied into the new net.

STEPHENS PASSAGE AND WHITING RIVER

In 1906 the Boundary Commission had extended a net of triangulation by way of Port Snettisham and Whiting River to connect the boundary points of this region with the Coast and Geodetic Survey triangulation of 1888 on the west side of Stephens Passage. The plan for 1929 was to tie two or more of the Boundary Commission's stations to the recent first-order net of the Coast and Geodetic Survey along Stephens Passage. While the party was at work in this region, however, early in June, the stations of 1906 could not be occupied on account of the depth of snow. In lieu of the aforementioned plan, an attempt was made to recover the stations of 1888 on the coast from which the Commission's triangulation had been started, but only one of the 1888 stations could be found, station "Zinc". In these circumstances it was decided that the incorporation of station "Zinc" in a quadrilateral with three first-order stations of the Coast and Geodetic Survey in Stephens Passage would be acceptable for the new adjustment of the boundary triangulation. This was accordingly done. The mean and maximum closures of the four triangles involved in this connection were 1″2 and 2″5 respectively.

BURROUGHS BAY (horizontal angles)

Origin: first-order stations "Act" and "North Base, 91" at the entrance of Burroughs Bay.
Terminus: stations "Dick" and "Tab" of the Boundary Commission's 1905 triangulation.

Length of net	7½ miles
Second-order stations occupied	12
Unoccupied check stations	1

SEASON OF 1936—KLEHINI RIVER, WHITE PASS, AND TARR INLET

Further work in connection with the transferring of geographic positions of the boundary triangulation stations from the southeast Alaska to the 1927 North American datum was undertaken in 1936. During this year the Engineer to the United States Section of the Commission in co-operation with officers of the United States Coast and Geodetic Survey extended a net of second-order triangulation up Chilkat Inlet and Chilkat and Klehini Rivers and a net of first-order triangulation from Taiya Inlet to White Pass. In addition, boundary maintenance was carried on in the vicinities of Pleasant Camp on Klehini River and at White Pass, and two boundary points were established on the shores of Tarr Inlet.

CHILKAT INLET, CHILKAT AND KLEHINI RIVER TRIANGULATION

Origin: first-order stations "Riley", "Ripinski", and "Vil".

Terminus: stations "Knob", "Emerge", and "Hen" of the Boundary Commission's 1904 triangulation and a new station "Fork" to replace station "Divide 2", not recovered.

Length of net	30 miles
Second-order stations occupied	12
Average closure of triangles	1″.8
Maximum closure of triangles	3″.7

TAIYA INLET AND WHITE PASS TRIANGULATION

Origin: first-order stations "Tai" and "Skag" on Taiya Inlet.

Terminus: "Boundary Point 119 ecc." and "Summit" at White Pass.

Length of net	17 miles
First-order stations established and occupied	10
Third-order or minor stations of 1904 recovered	4
Average closure of first-order triangulation	0″.85
Maximum closure of first-order triangulation	2″.29

KLEHINI RIVER BOUNDARY MAINTENANCE

Boundary Point 145 (numbered in 1920)[1]: monument in good condition.

Boundary Point 146 (numbered in 1920)[1]: monument in good condition.

Boundary Point 147 (unmarked boundary point at the forks of Klehini River and Jarvis Creek): temporary cairn and pole erected.

Boundary Point 148: monument had been washed out by the cutting away of the river bank and was found in a gravel bar about 30 feet from shore. The monument was broken out of its concrete base and moved to a new site, about 200 feet westward on line between Boundary Points 147 and 149, where it was reset in a new concrete base and numbered "148".

Boundary Point 149 (numbered in 1920)[1]: monument in good condition.

The boundary vista had practically disappeared as a result of the new growth of trees. It was recleared for a distance of about one-quarter mile on each side of Klehini River.

WHITE PASS BOUNDARY MAINTENANCE

Boundary Point 115: monument in good condition, numbered.

Boundary Point 116: monument in good condition, numbered.

Boundary Point 117 (numbered in 1920)[1]: monument in good condition.

Boundary Point 118: minor repairs to top of concrete base of monument, numbered.

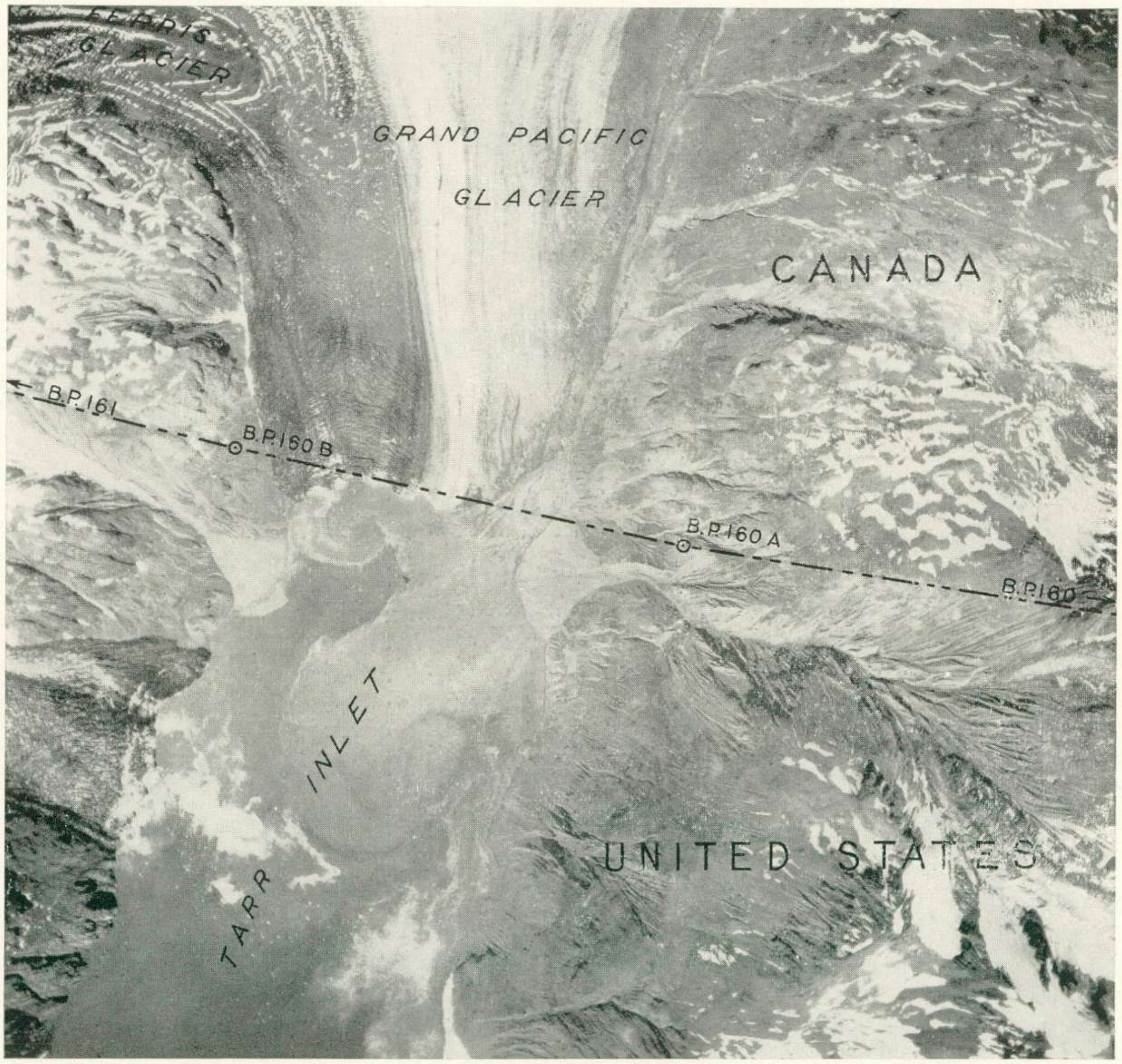
Boundary Point 119: monument in good condition.

TARR INLET

The gradual recession of the Grand Pacific Glacier in the hundred years between Vancouver's visit to Icy Strait in 1794 and the exploratory surveys of

[1] By the Commissioners during their inspection of these sections of the boundary.

1894 is mentioned in Appendix III, page 249. In 1912 the glacier front was found to be nearly on the boundary. In 1924 it was reported that the deep water of Tarr Inlet extended across the boundary into British Columbia. In 1925 the District Engineer of the British Columbia Department of Public Works had made an inspection and reported that the front of the glacier was about 3,400 feet north of the boundary and that a narrow gravel beach had made its appearance at the eastern half of the glacier front, the western half being still in the water. A second inspection in 1928 showed a further recession of about 300 feet and only a small part of the glacier front, at its centre, still in the water. In view of this recession of the glacier front across the boundary, the Commissioners had had it in mind for some years that the line should be marked on the shores of Tarr Inlet on the first convenient occasion. Accordingly, at the conclusion of the work on



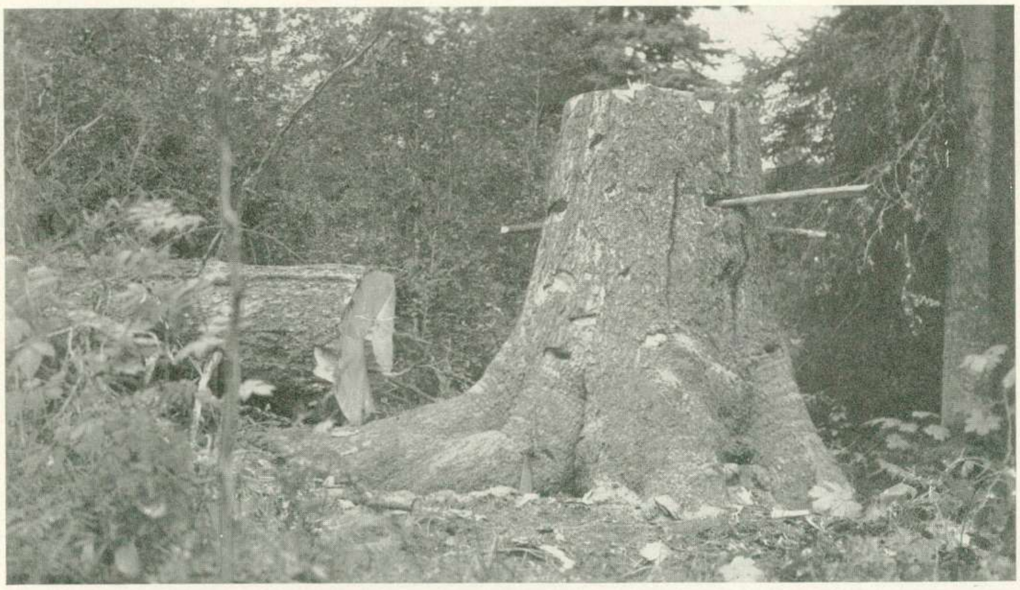
Aerial photograph of the Grand Pacific Glacier front, taken by U. S. Navy in 1948.

Klehini River, the party proceeded north in the United States Coast and Geodetic Survey motor vessel *Westdahl.*

The boundary was determined by a survey from the existing triangulation stations of 1912 and checked by lining in directly between the adjacent mountain peaks, Boundary Points 160 and 161. Two small bronze disks, Nos. 160-A and 160-B, were set in rock in place well up on the hillsides, one on each side of Tarr Inlet at elevations 920 feet and 320 feet, respectively, above high-water mark, and two wooden markers were erected on line near tide water. At this time the glacier front was found to be about one-third mile north of the boundary and there was a small amount of beach in front of it at high tide.[1]

Season of 1938—Taku, Skagway, and Stikine Rivers

A maintenance party was organized by the Engineer to the United States Section of the Commission in Juneau, about the middle of June. Work was commenced on Taku River, which was reached by launch from Juneau to the mouth of the river and thence to the boundary by river boats. After completion of the work on Taku River the party returned to Juneau and proceeded thence by boat and rail via Skagway to Glacier Station on the White Pass and Yukon Railway. From Glacier Station a trail cut by the United States Forest Service in 1936 on the south side of Skagway River was used as far as Lawton Glacier, and from there the old trail of 1905 was followed, after reclearing, to the boundary. The boundary crossing of Stikine River was reached by river boat from Wrangell.



Spruce stump at side of recleared vista, Stikine River Valley.

In addition to monument inspection and vista reclearing, the elevations of the monuments in Taku River Valley were determined by means of vertical angle readings from an assumed elevation of 40 feet above mean sea-level at the water surface of the river at the boundary, and the elevations of the monuments in

[1] In 1948 the glacier front had again advanced to the boundary line (*See* page 144).

Stikine River Valley were determined by the same means from the elevations of Boundary Points 62 and 66 as determined by the United States Coast and Geodetic Survey in 1929.

TAKU RIVER

Boundary Point 88: monument in good condition, numbered, elevation 1,340 feet.

Boundary Point 89 (numbered in 1920)[1]: monument in good condition, but only about 18 inches of the 30-inch cone was above the river sediment that had been deposited in the 31 years since the monument was erected, elevation 50 feet.

Boundary Point 90 (numbered in 1920)[1]: monument in good condition, elevation 74 feet.

Boundary Point 91: monument in good condition, numbered, elevation 2,160 feet.

About 5 miles of boundary vista was recleared across the valleys of Taku River and its tributary, the Sittakanay. Some of the spruce and hemlock trees that were cut at the sides of the vista measured up to 4 feet on the stump.

SKAGWAY RIVER

Boundary Point 112: monument in good condition, numbered.

Boundary Point 113: monument in good condition, numbered.

About one-half mile of boundary vista was recleared across the river. The growth was scrubby spruce and alder.

WHITE PASS

Boundary Point 115 (numbered in 1936): new top put on concrete base of monument.

Boundary Point 116 (numbered in 1936): monument in good condition.

STIKINE RIVER

Boundary Point 62 (Mount Coté): elevation of monument determined by United States Coast and Geodetic Survey in 1929, 4,378 feet.

Boundary Point 62-A: monument in good condition, numbered, elevation 119 feet.

Boundary Point 63: monument lost by erosion; new monument of the hollow aluminium-bronze cone type was set in its stead in a concrete base 2 feet square and 3 feet in the ground on a knoll 118 metres south of the river bank; the monument was numbered; elevation 59 feet.[2]

Boundary Point 64 (numbered in 1920)[1]: monument in good condition; elevation 60 feet.

Boundary Point 65: monument in good condition, numbered; elevation 115 feet.

About $4\frac{1}{2}$ miles of boundary vista was recleared across the valley of Stikine River. The growth was dense underbrush and small spruce and hemlock. Some of the large trees that were cut at the sides of the vista measured up to 6 feet on the stump.

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[1] By the Commissioners during their inspection of these sections of the boundary.

[2] Later lost by further erosion of the river bank (*See* page 131).

Inspection by the Commissioners

During July 1938 the Commissioners, travelling by boat and plane, inspected a number of points on the sections of the boundary line from Tongass Passage to Mount St. Elias and from Mount St. Elias to the Arctic Ocean. On the Tongass Passage-Mount St. Elias section, inspections were made as follows: the Portland Canal and Salmon River regions; the boundary crossing of Taku River where maintenance operations were being conducted by the party of the United States section of the Commission; White Pass; and, by plane, the extremely mountainous and almost inaccessible region between Chilkoot Pass and Tsirku River. The boundary peaks in this latter region were easily identified from map No. 9 of the series of maps that accompanies this report, and the boundary vista was clearly distinguishable through the timber in the valleys.

Season of 1944—Portland Canal and Salmon River

A party of the Canadian section of the Commission conducted maintenance operations on Portland Canal and in the vicinity of Salmon River during the summer of 1944. The reference monuments on the canal were inspected from a sea-going tug. The boundary vista was recleared from Boundary Point 1, at the head of Portland Canal, to timber-line on Mount Dolly, then down the northern slope of Mount Welker (Boundary Point 8) and across Salmon River to Boundary Point 11. At the boundary crossing of the highway, which runs from Stewart, British Columbia, and Hyder, Alaska, to the Premier mine in British Columbia, hitherto marked by two blazed stumps, a new boundary point was established,

Hyder, Alaska, and Stewart, B.C., at the head of Portland Canal; Mount Dolly in centre background

No. 10-A, marked by an aluminium-bronze conical monument set in a concrete base on solid rock. The following is a summary of the work done during this season:

Water boundary line inspected	98 miles
Land boundary line inspected	10 miles
Vista recleared	7 miles
Reference monuments inspected	52
Boundary points inspected (Nos. 1 to 4 and 10 to 13)	8
Reference monuments repaired	3
Reference monuments cleared of obstructing brush	8
New boundary point established	1

Seasons of 1946-47-48—Tributaries of Chilkat River

Special arrangements were made with the United States Customs officials at Juneau to allow a party of the Canadian section of the Commission to be landed at Port Chilkoot, an unscheduled port of call for Canadian Pacific Company vessels, for maintenance work on the boundary line across Klehini, Kelsall, and Tahini Rivers, tributaries of Chilkat River, during the years 1946, 1947, and 1948. The village of Haines, about a mile distant from Port Chilkoot, was the headquarters of the party during the 3 years.

Work on Klehini River was done in 1946. Transportation to the boundary was by truck over the Haines Cut-off Highway, the construction of which had been completed in 1944. It extends 42 miles from Haines to Pleasant Camp at the boundary and a further distance of 117 miles to connect with the Alaska Highway at Haines Junction, Yukon Territory. At the boundary an aerial steel cable tramway was constructed to reach the south side of Klehini River, and a 6-mile foot trail was cut from the highway to the boundary crossing of Yokeak Creek, a tributary on the north side of the Klehini.

The part of the vista that had been cut near the shores of Klehini River in 1936 was well defined, but farther back from the river it was indistinguishable, being filled with new timber growth and overhung by the branches of large trees at the sides of the clearing. The vista was practically non-existent through the scrubby growth in the Yokeak Creek Valley. These vistas were recleared. In addition to the six monuments marking boundary points, a new monument was established by the party, numbered 145A, to mark the boundary crossing on the north side of the Haines Cut-off Highway at Pleasant Camp.

Monument at Boundary Point 145A, Klehini River.

A river boat was chartered in 1947 and 1948 for the work on the two other tributaries of Chilkat River, the Kelsall and the

River boats on Chilkat River, 1948.

Tahini. The boat was equipped with a 90-horsepower engine, a propeller that could be raised or lowered according to the depth of water, and rudders fore and aft for ease of steering in the swift current.

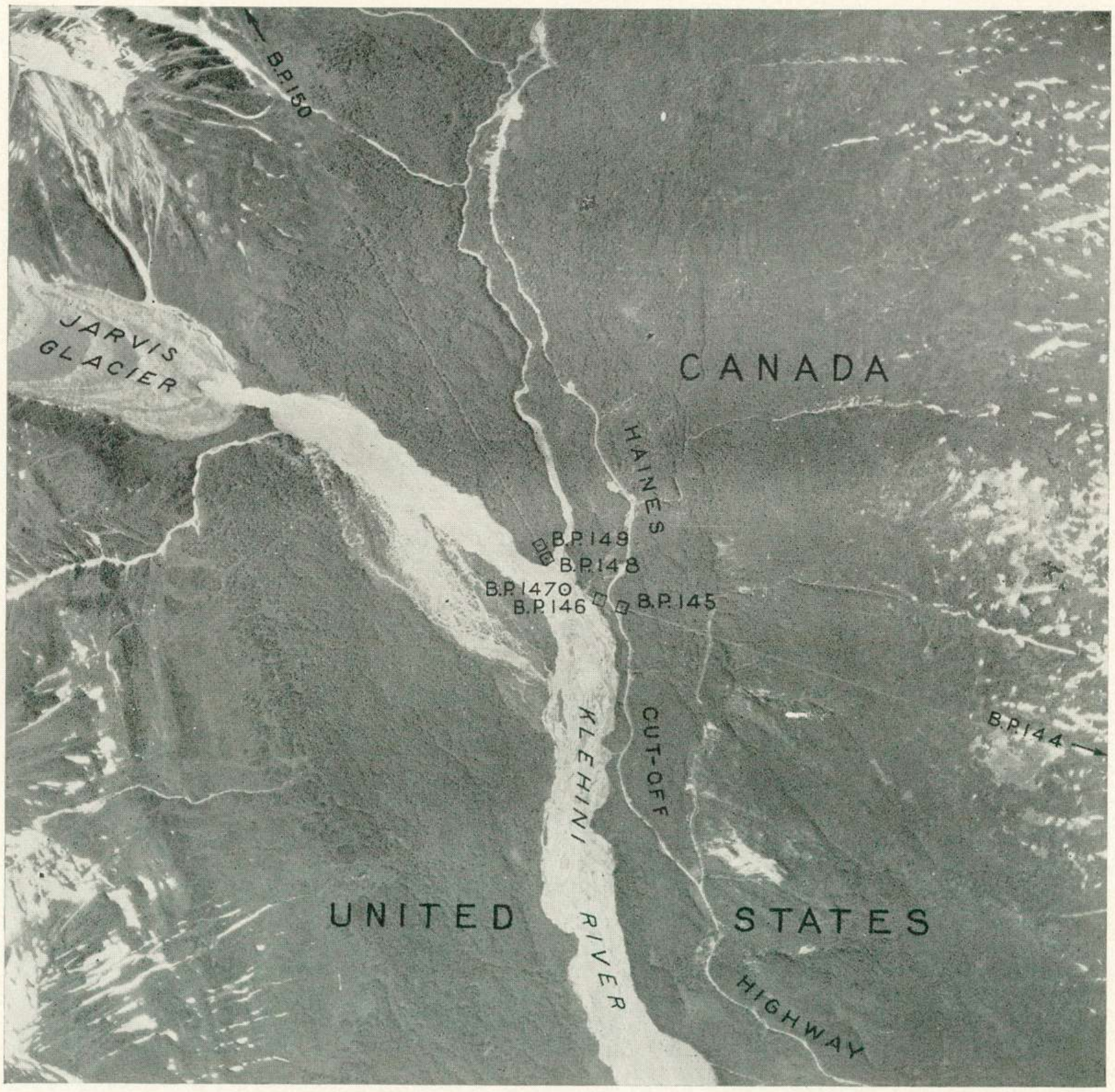
It had been planned to clear the vista and inspect the monuments at the boundary crossing of Kelsall River in 1947, but so many difficulties were encountered in constructing the trail up the valley of the river that the boundary area was not reached until the end of the season.

Kelsall River is an unnavigable stream about 30 miles long, having its source in Kelsall Lake. Eleven miles from its confluence with the Chilkat it crosses the boundary. It was found, however, that it would be necessary to cut considerably more than 11 miles of trail to reach the boundary crossing in order to skirt swamps, avoid canyons, and make switch-backs on the steep mountain sides. Several bridges were constructed over the larger creeks that flow into the Kelsall from the east side, and over the Kelsall itself a bridge 150 feet long with a 75-foot span was built. Extremely wet weather and labour troubles retarded the progress of the work during the summer and it was the end of September before the trail was completed to the boundary on the west side of the river.

Recleared vista, Klehini River.

Instead of returning immediately to Kelsall River in 1948 the Canadian party, in order to take advantage of the high water early in the summer, ascended Tahini River to the head of navigation, about a mile below the boundary. As the boundary vista crossing the Tahini had become completely filled with new growth, the monuments erected in 1905 were difficult to find. Most of the vista cutting was on the west side of the Tahini, as this river flows along the foot of the steep west slope of Raymond Peak (Boundary Point 128). In reclearing the vista westerly two natural features marking the approximate boundary crossing of Flemer River (formerly named the West Branch of the Tahini) were noted. The crest of a waterfall, visible from the head of navigation of the Tahini, was found to be on the south side of the vista cutting; and a roughly pyramidal rock about 15 feet high was in the vista cutting and just north of the boundary line on the west side of the river.

Upon the completion of the work in the Tahini River area the party moved to Kelsall River. Unfortunately the bridge across the Kelsall had been washed away during the winter. A new bridge was built and the party commenced work on the west side of the river, where a practically new vista had to be cut through dense alders. On the east side of the river the vista was clearly defined on the ground through tall spruce and hemlock growth at the sides of the old clearing. A good deal of cutting, nevertheless, was necessary to clear the vista of small



Aerial photograph of the boundary crossing of Klehini River, taken by U. S. Navy in 1948.

growth, and trees up to 3 or 4 feet in diameter on the stump were cut at the sides to ensure a 20-foot sky-line clearance.

The following is a summary of the maintenance work done on these three rivers during 1946 and 1948:

Klehini River	
Vista recleared	8 miles
Boundary Points inspected (Nos. 143 to 149)	7
Boundary Points established (No. 145A)	1
Monuments numbered (Nos. 143 and 144)	2
Miles of trail cleared	8
Kelsall River	
Vista recleared	3½ miles
Boundary Points inspected (Nos. 135 to 139)	5
Monuments numbered (Nos. 135 to 139)	5
Miles of trail cleared	16
Tahini River	
Vista recleared	3½ miles
Boundary Points inspected (Nos. 129 to 133)	5
Monuments numbered (Nos. 129 to 133)	5
Miles of trail cleared	4

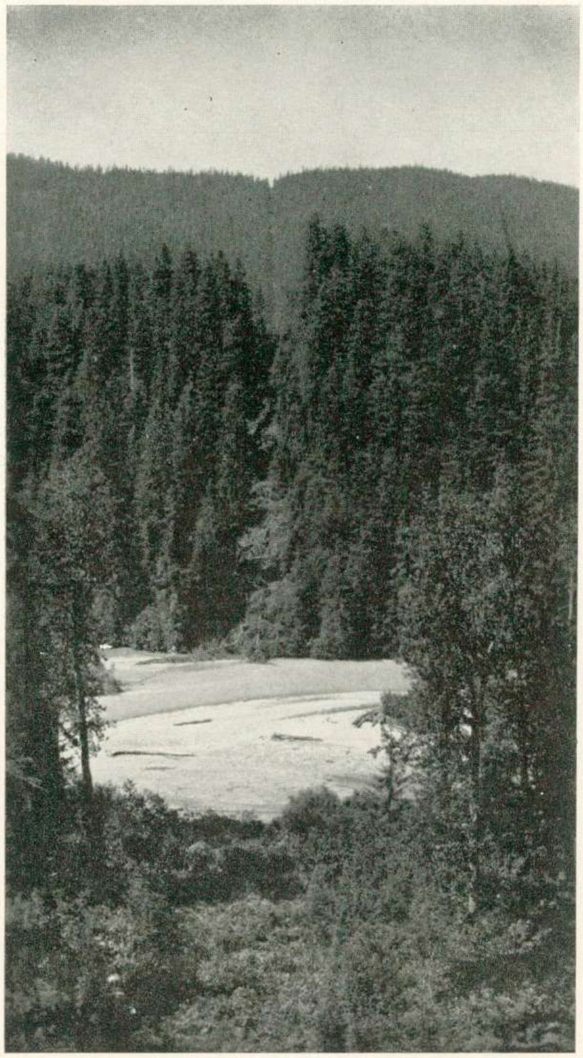
Season of 1948—Stikine and Katete Rivers

A maintenance party of the United States section of the Commission was detailed to work on the Stikine and Katete boundary areas in 1948. Travelling from Wrangell on a steamer of the Ritchie Transportation Company, they established their first camp of the season at the Canadian Customs House on Stikine River.

While the boundary vista was being cleared on the north side of Stikine River, camp equipment was taken up Katete River to a point on the East Fork about 2 miles below the boundary. A flat bottom, shallow draft, Diesel engined boat and two 18-foot, square stern sponson canoes with 5-horsepower engines were used for transportation. During this and other moves on the East and West Forks of Katete River, the boat and the two canoes were sunk several times in the treacherous waters of the two streams, and one of the canoes was so badly broken that it could not be recovered.

From the camp on the East Fork, and later from a camp on the West Fork about 1½ miles below the boundary, trails were cut to intersect the boundary line from Boundary Point 54 (Mount Whipple) to Boundary Point 62 (Mount Coté). The vista cutting on this section of the line was difficult and dangerous work. The cutting was through primeval forest eastward from the East Fork of the Katete as this part of the vista had not been cut, except on the crests of the ridges, by the survey parties of 1905 and 1912. The trees were from 2 to 4½ feet in diameter on the stump, some of them when cut falling 200 feet from the tops of the cliffs on which they had been standing. The markers at the boundary points, from No. 56 to No. 62 (Mount Coté), were found in good condition. Boundary Point 55, marked by a copper bolt, could not be found; it was probably buried under the thick-growing moss. To facilitate the future recovery of the bolt marking Boundary Point 61, a cairn was erected on the line 20 feet east of it.

Upon the completion of the work on the line easterly from Mount Coté, the party returned to the Customs House and completed the vista reclearing north of



Recleared vista, west branch of the east fork of Katete River.

Recleared vista, Stikine River Valley.

Stikine River and across the flats on the south side. The monuments marking Boundary Points 62-A, 64, and 65 were found in good condition, but at Boundary Point 63, which had been re-established in 1938 by the erection of a conical type monument, this monument in turn had been lost by further erosion of the river bank. During the period that camp was being moved back to Stikine River and at the commencement of the work there, early in September, rain fell continuously for 14 days.

The following is a summary of the maintenance work done on this section of the line in 1948:

Vista cut	9 miles
Vista recleared	6 miles
Boundary Points inspected (Nos. 54 to 65)	13
Monuments numbered (Nos. 56 to 61)	6
Miles of trail cleared	13

DESCRIPTION OF FIELD AND OFFICE METHODS

Horizontal Control

The geographic positions of the boundary points, triangulation stations, and the topographic surveys of the regions adjoining the boundary from Tongass Passage to Mount St. Elias are controlled by: (a) first- and second-order triangulation based on a first-order net of the Geodetic Survey of Canada at Dixon Entrance; (b) an arc of first-order triangulation of the United States Coast and Geodetic Survey that extends from Dixon Entrance northward to White Pass; (c) various nets of second- or third-order triangulation of the latter organization based on the first-order nets. All this triangulation has been based upon the 1927 North American datum.

The general plan of control is shown on the triangulation sketches at the end of the report.

The geographic positions and descriptions of the triangulation stations are listed in Appendix V, pages 266 to 349.

On Portland Canal a net of major or second-order triangulation, based on stations of the Geodetic Survey of Canada and of the United States Coast and Geodetic Survey near its outlet, was carried to the head of the canal. From this triangulation the positions of the boundary reference monuments along the shores of the canal were determined.

The extremely mountainous nature of the terrain through which the land part of the boundary passes precluded the extension of a continuous net of triangulation. Instead, the boundary in this area being roughly parallel with the coast and not more than 30 miles from it, schemes of major and minor, or second- and third-order triangulation based on stations of the United States Coast and Geodetic Survey were carried up the larger inlets and river valleys, and upon approaching the boundary line they were expanded along it.

From the head of Portland Canal a net of minor triangulation was carried along the boundary, from which the positions were determined of all the boundary points as far as Boundary Point 18 (Mount John Jay).

From Burroughs Bay a net of minor triangulation, based on United States Coast and Geodetic Survey second-order stations on the bay, was carried up Unuk River to the vicinity of the boundary, whence it was expanded to the east as far as Boundary Point 18 (Mount John Jay) and to the northwest to Boundary Point 47 (Mount Lewis Cass). The positions of all the intervening boundary points were determined from this triangulation.

From the head of Bradfield Canal a net of minor triangulation was carried up the North Fork of Bradfield River and over the divide to the head of Iskut River. Connections were made to Boundary Point 47 (Mount Lewis Cass), towards the east, and to Boundary Point 53 (Mount Fawcett), towards the northwest. The geographic positions of the former point having been determined from the Unuk

River net and that of the latter from the Stikine River net, it was possible by means of these connections and the Bradfield River triangulation to determine the geographical positions of Boundary Point 48 (Mount Pounder), and of the boundary points in the valley of Iskut River.

On Stikine River a net of minor triangulation was based on Boundary Points 62 (Mount Coté), 66 (Elbow Mountain), and 69 (Castle Mountain). These points mark the terminal stations of a net of second-order triangulation of the United States Coast and Geodetic Survey that extends from the mouth of Stikine River to the boundary. The minor net was carried to the southeast as far as Boundary Point 53 (Mount Fawcett), and northward along Stikine River to the mouth of the tributary, Scud River. From these triangulation nets, determinations were made of the boundary points from Boundary Point 53 (Mount Fawcett) to Boundary Point 72 (Mount T), inclusive.

From Endicott Arm a net of minor triangulation, based on the United States Coast and Geodetic Survey second-order stations at the mouth of the arm, was extended to the southeast as far as Boundary Point 73, and to the northwest as far as Boundary Point 78 (Hill Peak). From this triangulation the positions of the intervening boundary points also were determined.

From Stephens Passage near Port Snettisham a net of minor triangulation, based on United States Coast and Geodetic Survey second-order stations on that channel, was carried up Whiting River as far as the boundary, and from this triangulation the positions of Boundary Point 79 and Boundary Point 85 (Mount Fremont Morse), and of the intervening boundary points were determined.

On Taku River a net of minor triangulation, based on second-order stations of the United States Coast and Geodetic Survey near the mouth of the river, was carried up the river to the mouth of Tallsaykway River beyond the boundary, and thence up the latter river and the glacier at its head, parallel with the boundary for a distance of about 25 miles. From this triangulation the positions of Boundary Point 94 and Boundary Point 86 (Mount Ogden), and of the intervening boundary points were determined.

The positions of all the boundary points from Boundary Point 95 (Mount Ogilvie) to Boundary Point 108 were determined from stations of a net of major triangulation along Lynn Canal, which was based on first-order stations of the United States Coast and Geodetic Survey.

The positions of all the boundary points from Boundary Point 109 to Boundary Point 123 (Mount Foster) were determined from a net of minor triangulation based on a net of first-order triangulation of the United States Coast and Geodetic Survey along Skagway River, across White Pass, through the Yukon Territory, and across the 141st Meridian boundary into Alaska.

From the confluence of Chilkat and Klehini Rivers near Klukwan a net of minor triangulation, based on stations of a net of first-order triangulation of the United States Coast and Geodetic Survey, which extends along Chilkat River from Haines to Klukwan, was carried up the valleys of Chilkat and Klehini Rivers to the boundary, and expanded along the boundary to cover the area from the Chilkat Glacier southward and westward to Boundary Point 158. From this net the positions of all the boundary points from Boundary Point 124 to Boundary Point 158 were determined.

On Glacier Bay a net of major triangulation, based on United States Coast and Geodetic Survey second-order stations near its mouth, was carried up the bay past the boundary. From this triangulation a connection was made at Boundary Points 157 and 158 with the Klehini River net, and the positions were determined of all the intervening boundary points between Boundary Points 157 and 158 and Boundary Point 167 (Mount Hay).

A net of minor triangulation was laid down covering the area between the east side of Dry Bay and the west side of Yakutat Bay, and a connection was made between the eastern end of this net and the Glacier Bay triangulation at Boundary Point 164 (Mount Fairweather). As the position of this latter peak had been determined on the 1927 North American datum from the Glacier Bay triangulation net, this connection permitted the determination on the same datum of all the stations of the Yakutat Bay-Dry Bay net. From the latter net the positions of Boundary Point 172 (Mount Herbert), and of all the remaining boundary points to Boundary Point 186 (Mount St. Elias), were determined. The positions of Boundary Points 168 to 171, inclusive, in the valley of Alsek River, were determined from a net of minor triangulation carried up that river from Dry Bay.

In addition to the determination of the position of Boundary Point 186 (Mount St. Elias), in the manner mentioned above, the position of this point had also been determined from the International Boundary Commission triangulation of 1909-13 in the vicinity of the 141st Meridian. This triangulation was based upon the Yukon datum, defined on page 132 of the report of the International Boundary Commission upon the establishment of the boundary from the Arctic Ocean to Mount St. Elias. In 1943 the United States Coast and Geodetic Survey continued their net of first-order triangulation, terminated at White Pass in 1938, to Whitehorse, Yukon, and by way of the Alaska Highway to Fairbanks, Alaska. Several of the International Boundary Commission triangulation stations near the Alaska Highway were included in this net and their geographic positions were thus determined on the 1927 North American datum. The International Boundary Commission then recomputed on the 1927 basis the triangulation of 1909-13 from the Alaska Highway southward to Mount St. Elias.

The comparison in position of Boundary Point 186 (Mount St. Elias), so obtained, with the position obtained from the triangulation from the southeast is as follows:

From the north	Lat.	60° 17′ 38″.13	Long.	140° 55′ 45″.58
From the southeast		60° 17′ 37″.40		140° 55′ 41″.50

The difference is 0″.73 (22·6 metres) in latitude and 4″.08 (62·7 metres) in longitude, or a discrepancy between the two determinations of 66·5 metres. This discrepancy is owing to two indeterminate causes. It is more than probable that the party working from the north in 1913 and the party working from southeast in 1906, sighting from comparatively low elevations, did not observe the same point on the snow-covered dome of Mount St. Elias, and small accumulated errors are to be expected in the nets of triangulation approaching Mount St. Elias from the two directions. The geographic position of Boundary Point 186 given in this report is the mean of the two values.

The position of Boundary Point 187, a practically inaccessible point, has been fixed at the intersection of the line from Elbow triangulation station, on a northwesterly shoulder of Mount St. Elias, to the summit of Mount St. Elias, and the line projected southerly through monuments 189 and 191 of the 141st Meridian boundary.[1]

Vertical Control

The vertical control for the topographic maps consists almost entirely of the elevations of triangulation stations, camera stations, and boundary points determined by means of vertical angles, reciprocal where possible. The datum is mean sea-level. The elevations of the stations in each triangulation net depend on an independent determination of mean sea-level, usually approximate, at the point on the coast where the net originates. An exception is the vertical control in the vicinity of White Pass, where the elevations depend upon a line of precise levels carried along the White Pass and Yukon Railway from an accurate determination of mean sea-level by means of tidal gauges at Skagway.

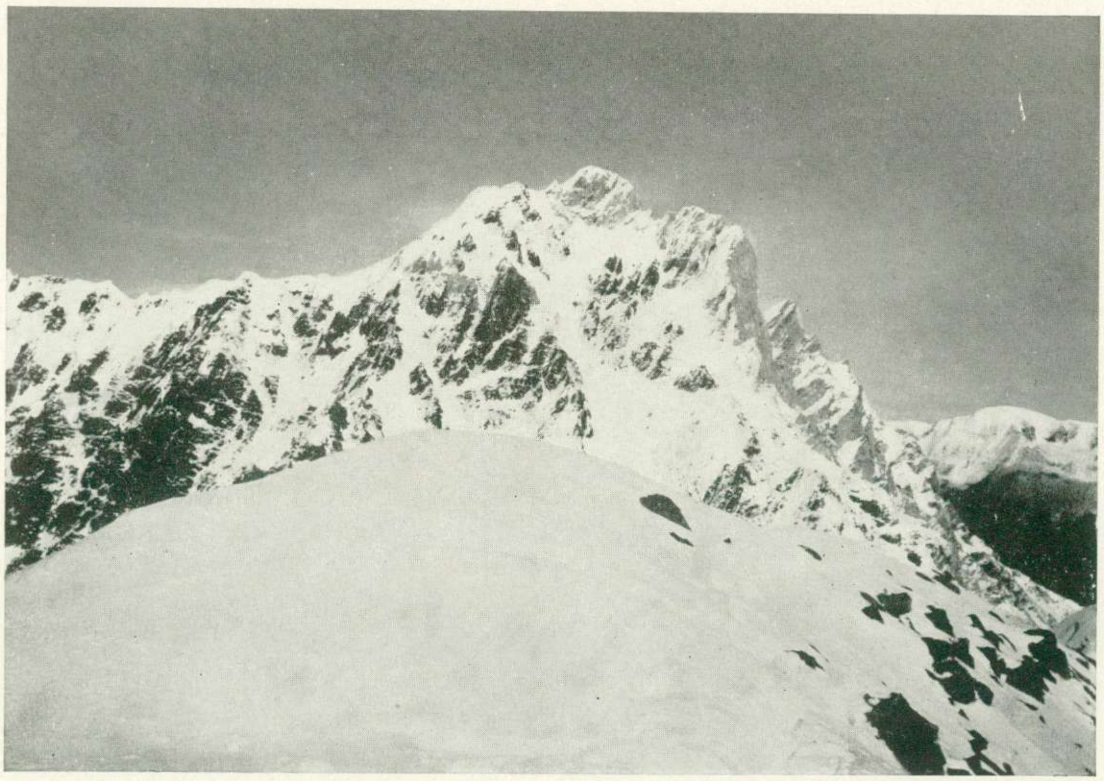
The elevation values given in this report and printed on the maps are thought to be reliable. The latest available values are given in the descriptions of boundary points and triangulation stations (*See* pp. 153 and 314). Checks on the original values obtained from vertical angles observed in recent years indicate that the elevations of the boundary points in the vicinity of Stikine River are correct to within about 40 feet. Some much larger differences, however, between the original and revised values of the elevations of some boundary points in the Taku River area have been found, and the revised values are given in the descriptions of boundary points. Definite checks have been obtained from the 1950 joint adjusted values of the precise levels of the United States Coast and Geodetic Survey and the Geodetic Survey of Canada along the White Pass and Yukon Railway and the Haines Cut-off Highway, respectively, from which a correction of about plus 4 feet has been applied to the 1910 value of Boundary Point 117 at White Pass and a correction of about minus 28 feet has been applied to the 1904 value of Boundary Point 146 on the Haines Cut-off Highway.

The Boundary Vista

Although the land part of the boundary, from the head of Portland Canal to Mount St. Elias, is approximately 710 miles in length, the mountains over which it passes are for the most part above timber-line; consequently, the vista, which supplements the monuments in the demarcation of the boundary line, is only about 50 miles in length.

[1] The position of Elbow triangulation station was determined from the 1909-13 triangulation referred to above.

Marked point. Boundary Point 144, Klehini River.



Unmarked point. Boundary Point 141, Chilkat River.

The instructions of the commissioners to the chiefs of the various field parties required that this vista should be cut to give a sky-line 10 feet in width on each side of the boundary. Although these instructions were followed wherever possible, on several occasions the line was not at first cut to this width. This was owing to the great size of much of the timber and the steepness of the mountain slopes, often snow covered, which made the line cutting slow, arduous, and dangerous work. But in later years, as opportunity offered, the vista was cleared to the required width.

Owing to the excessive rainfall in this area the growth in the valleys and on the lower parts of the mountains is extremely rapid. For this reason it has been found necessary to reclear the vista at various points from time to time. Such work has already been done, and will continue to be done, under the provisions of the Treaty of 1925. The vista in the valley of Stikine River was recleared in 1925; in the valley of Klehini River in 1936; in the valleys of Stikine, Taku, and Skagway Rivers in 1938; from the head of Portland Canal and across the valley of Salmon River in 1944; across Klehini River and Yokeak Creek in 1946; from Stikine River southward and eastward across the several branches of Katete River in 1948; and in the valleys of Tahini and Kelsall Rivers in 1948.

Monuments and Monumenting

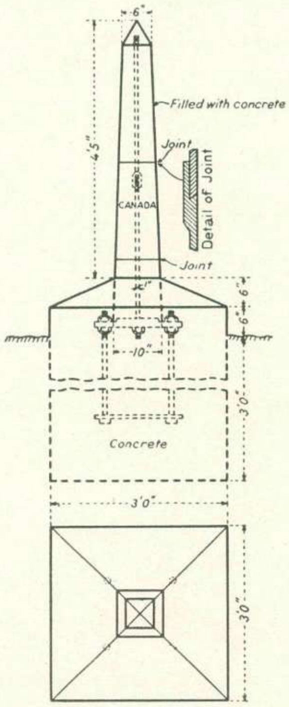
The International Boundary from Tongass Passage to Mount St. Elias is marked by 51 reference monuments on the shores of Portland Canal and 113 monuments on the land part of the boundary. In addition to the monumented points on the land section of the boundary there are 75 unmarked points, which are, with three exceptions, situated on mountain tops. The three exceptions are: Boundary Point 28, on the snow-covered slope of Mount Middleton; Boundary Point 147, on the shingle flat in the forks of Klehini River and Jarvis Creek; and Boundary Point 187, on the west shoulder of Mount St. Elias.

The reference monuments on the shores of Portland Canal are of concrete, built in the form of a frustum of a pyramid. They are of two types: 12 inches square at the base, 36 inches high, and 6 inches square at the top; and 14 inches square at the base, 18 inches high, and 4 inches square at the top. Of these two types of reference monuments, the second has been found to be the most durable.

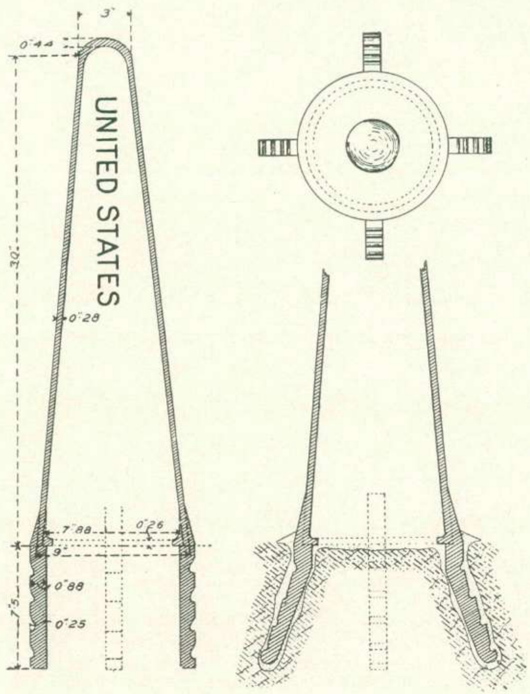
For some of the more important points on the land section of the boundary, 5-foot aluminium-bronze obelisks were used. Eleven monuments of this type are situated as follows:

Boundary Point 1 — at the head of Portland Canal.
Boundary Point 38 — on the north side of Unuk River.
Boundary Point 62A— on the south side of Stikine River.
Boundary Point 63 — on the south side of Stikine River.[1]
Boundary Point 65 — on the north side of Stikine River.
Boundary Point 113 — on the north side of Skagway River.
Boundary Point 116 — at White Pass, east side.
Boundary Point 117 — at White Pass.
Boundary Point 118 — at White Pass, west side.
Boundary Point 146 — on the east side of Klehini River.
Boundary Point 148 — between Klehini River and Jarvis Creek.

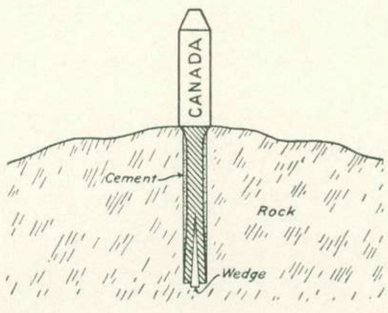
[1] This monument, set in 1913, was lost by the erosion of the river bank. It was replaced by a cone-type monument in 1938, which was again lost by erosion before 1948.



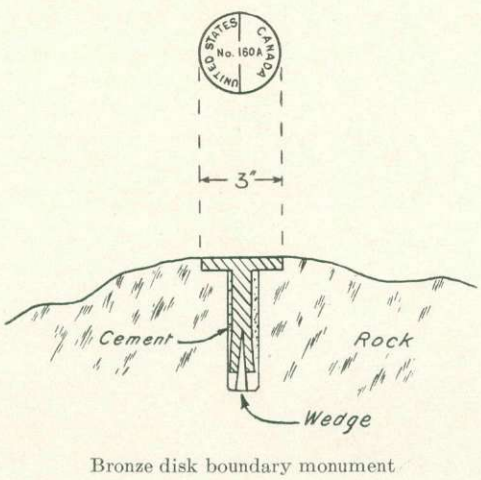
Aluminium-bronze obelisk boundary monument



Aluminium-bronze cone boundary monument



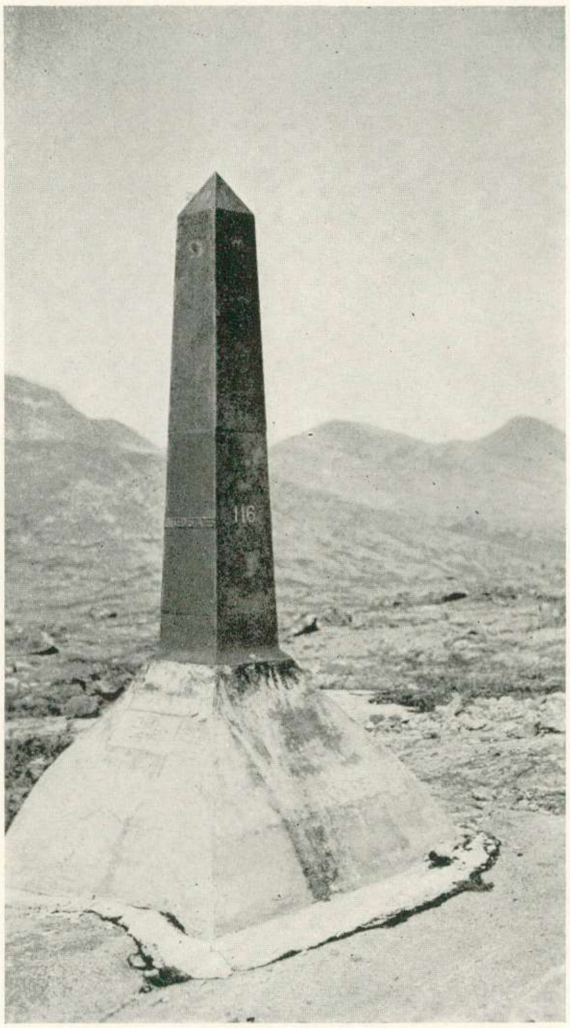
Manganese-bronze post boundary monument



Bronze disk boundary monument

For more general use aluminium-bronze cones 30 inches high were adopted; 64 of this type were placed at various boundary points prior to the year 1914. In 1920, when additional work was done between the head of Portland Canal and the west side of Blue River, 25 manganese-bronze posts, $7\frac{1}{4}$ inches high, were used as monuments.

Other monuments placed on the land section of the boundary include: 2 bronze disks, one east and one north of Boundary Point 1 at the head of Portland

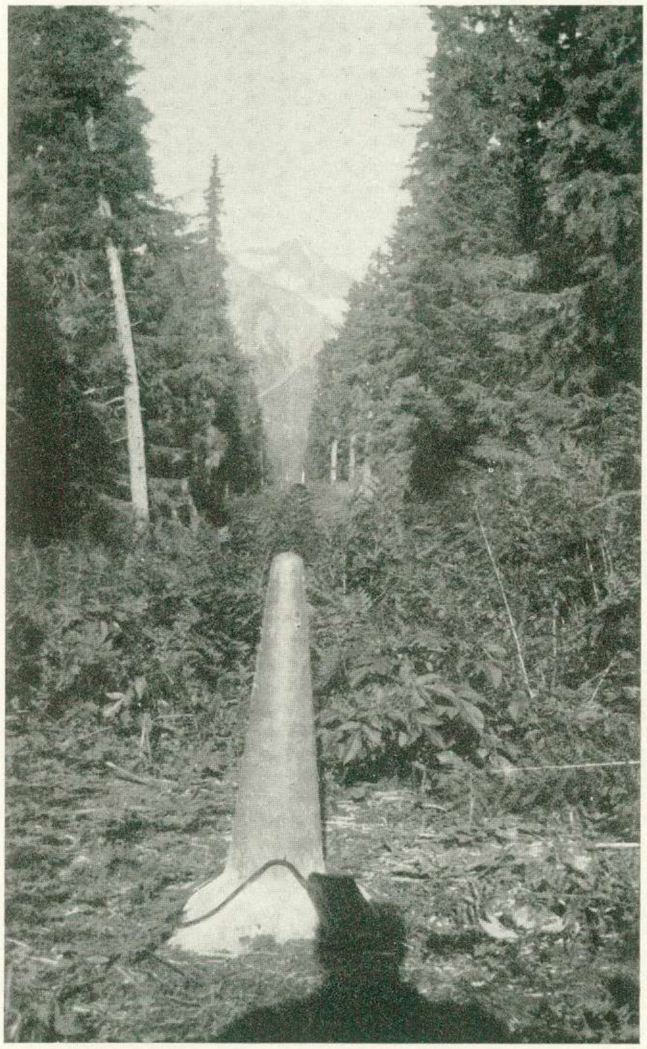


Obelisk type monument at Boundary Point 116, East White Pass.

Canal, and 10 copper bolts, 2 bronze bolts, 2 bronze disks, one on each side of Tarr Inlet, and one steel drill, placed at points to which the larger monuments could not be taken without prohibitive labour and cost.

The composition of the aluminium-bronze obelisks and cones is about 10 per cent aluminium and 90 per cent copper. On opposite sides of the posts the words "Canada" and "United States" are cast in raised letters.

The manganese-bronze posts contain 59 per cent copper, 38 per cent zinc, 2 per cent iron, and 1 per cent manganese. The number assigned to each monument is marked with drill holes on the smooth side of the post; and the words "Int. Bdry.", "Canada", and "United States" are cast in raised letters on the other three sides. The dimensions are shown on page 138.



Conical type monument at Boundary Point 149, Klehini River.

The obelisk type monuments were set in concrete bases about 3 feet square and from 2 to 3 feet high, made with cement, sand, and broken rock in the proportion of 1 : 2 : 4, the surface being finished smoothly with a rich mixture of sand and cement. The conical type monuments were set, as conditions required, in a smaller concrete base, or in solid rock by drilling four holes into which the legs could be placed and grouted with cement. The manganese-bronze posts and the bolts were in all cases placed and cemented in a drill hole in solid rock.

Topography

During the joint exploratory surveys of 1893-94-95, the United States parties in general extended along the principal watercourses to the boundary area nets of triangulation based on stations previously established on the coast by the United States Coast and Geodetic Survey, and the Canadian parties made phototopographic surveys of the mountainous areas between these watercourses. A surveying camera in conjunction with a plane table, however, was used by United States parties for the survey of the head of Lynn Canal in 1894 and for the survey of Portland Canal in 1895. From these surveys topographic reconnaissance maps were made to a scale of 1 : 160,000, indicating contours at each 250-foot interval. In 1903 these maps were used by the Alaska Boundary Tribunal to determine which mountain peaks should constitute boundary points, and subsequently were known as the Alaska Boundary Tribunal maps. Being produced in a limited time from more or less inadequate data, they were more in the nature of provisional maps than finished topographic maps, and left some of the boundary areas undefined. Additional field work was, therefore, necessary to correct inaccuracies and to extend the mapped areas easterly and northerly, and to enable the Boundary Commissioners to select boundary points in the sections of the line left undelimited by the Tribunal.

The phototopographic method, having proved to be the best means then existing for the execution of topographical surveys in such rugged terrain, was used almost exclusively by both the United States and the Canadian field parties on the surveys of the boundary area following the Award of the Alaska Boundary Tribunal. In the field most of the topographer's time was spent in travelling to and from his camera stations. His work at each station consisted of taking enough photographs to complete the circuit of the horizon, observing horizontal and vertical angles with the transit on at least one well-defined point that would be recognized in each photograph, and sketching these points as an aid to future identification on the photographs. In the course of the surveys of 1893-94-95, about 500 camera stations were occupied and 2,700 photographs were taken by the Canadian parties, and between 1904 and 1912 about 700 stations were occupied and 5,000 photographs were taken by the combined parties in the field. The use of the camera was supplemented by the plane-table method of topographic surveying in some of the river valleys.

The plotting of the topography from the photographs was done in the office during the winter months on a working scale of 1 : 80,000, indicating contours at each 250-foot interval. The methods used are outlined in E. Deville's "Photographic Surveying" and J. A. Flemer's "Phototopographic Methods".[1] The shoreline was taken almost entirely from charts of the United States Coast and Geodetic Survey. To supplement the topography, the areas about Atlin Lake and adjacent to the Dalton trail were transferred from maps of the Geological Survey of Canada.

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[1] Photographic Surveying, by E. Deville, Surveyor General of Dominion Lands, Ottawa, Government Printing Bureau, 1895.

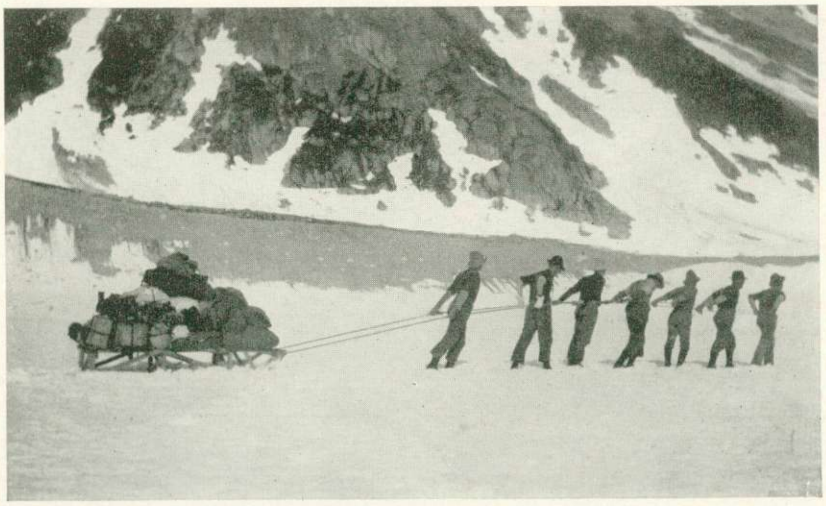
Phototopographic Methods and Instruments, by J. A. Flemer, Topographical Engineer, New York, John Wiley & Sons; London, Chapman & Hall, Ltd., 1906.

From Mount Fairweather to Mount St. Elias, the topography of areas more distant from the boundary than country covered by the field work of the Commission was compiled from photographs and maps furnished by various explorers.

Transportation

In general the survey parties of the International Boundary Commission were organized in Vancouver or Seattle and travelled by steamer to the coastal town most convenient to the base of each season's operations. From there the journey was continued in chartered vessels, boats, or canoes until the limit of navigation

Back-packing on Salmon Glacier.



Sledding supplies over Clarasmith Glacier.

was reached. When the base of operations was at some distance from a navigable stream the final stages were covered by back-packing or sledding. During the years in which the surveys were made, and in fact even at the present time, few points in the boundary area could be reached over easily travelled routes.

Yukon poling boat, top plan.

The head of Portland Canal could be easily reached by large vessels; but until a year or so before the survey of 1910, when wharfs had been built at Stewart, B.C., and Portland City (the present Hyder), Alaska, the vessels could not be unloaded at the shore. In 1919 a road was constructed up the valley of Salmon River from Hyder to the Premier mine, a few miles across the boundary on the Canadian side.

Navigation on Unuk River is normally difficult and the number of canyons through which it passes would make road construction there slow and costly work. In the year 1905, however, a road was constructed and a number of bridges were built by the Unuk River Mining and Transportation Company to their claims about 5 miles east of the boundary. This road was used by the survey parties of 1905, 1908, and 1909. In 1920, some years after the company had ceased operations and the road and its bridges had been destroyed by successive floods, the ascent of the river was made by laboriously lining a 30-foot Yukon poling boat along its banks.

Stikine and Taku Rivers presented no transportation difficulties, being navigable by shallow-draught river vessels up to and beyond the boundary.

Yukon poling boat, side plan.

The section of the boundary that swings around the head of Lynn Canal was most easily accessible from Skagway, Dyea, and Haines. In 1904, when the surveys were commenced, the White Pass and Yukon Railway had already been built from Skagway across White Pass to Whitehorse, in Yukon Territory. From Dyea, even then a ghost town, the Chilkoot trail crossed the boundary at Chilkoot Pass. From Haines, Chilkat River was navigable without much difficulty by boats or canoes to Klukwan, and from Klukwan the Dalton trail had been constructed, crossing the boundary at Pleasant Camp on Klehini River. By 1910 a road had been built to Klukwan, and later a good road had been completed from Haines to Pleasant Camp. At the present time this road is a part of the Haines Cut-off Highway, completed in 1944, from Haines to Haines Junction on the Yukon Territory section of the Alaska Highway.

In 1907 when the survey was made in Glacier Bay the Grand Pacific Glacier had receded almost to the boundary, but navigation was difficult early in the season owing to the large fields of ice in the bay. In 1912 the glacier front was nearly at the boundary. In 1924, on account of further recession of the glacier, the boundary extended across the open water of Tarr Inlet. In 1948 the glacier front had again advanced to the boundary line (*See* pages 122 and 249).

Alsek River was approached in 1906 and 1908 from Yakutat, a village on Yakutat Bay. In the former year a Canadian party alternately paddled and portaged their canoes through the series of creeks and inlets that form an inside passage to Dry Bay, a distance of about 60 miles. In the same year a United States party travelled from Yakutat in a gasoline launch, being piloted through the surf at Dry Bay by an Indian from a nearby village. The passage of the canyon where Alsek River enters Dry Bay was at that time a hazardous undertaking. The rock slide on top of the cliff on the westerly side of the canyon intermittently discharged boulders into the stream, and large masses of ice sporadically crashed from the face of the glacier on the easterly side. The remaining 26 miles of the journey to the boundary presented only the usual hazards of a glacial stream. In 1908, the United States party that completed the work on Alsek River took the inside passage from Yakutat to Dry Bay to avoid the rough seas along the coast. In that year the season was about a month behind the average, the rock slide was quiescent, and bergs did not fall while the canoes were being lined through the canyon. At the present time the boundary area of Alsek River might be approached from Stonehouse Creek on the Haines Cut-off Highway by crossing the divide to O'Connor River and descending that river to the Alsek, a distance of about 60 miles. Little is known, however, of this unmapped region.

In Yakutat Bay, as in Glacier Bay, navigation was difficult early in the season owing to the presence of ice fields, and these difficulties increased in Disenchantment Bay, where the launches had to be forced through the large masses of floating ice discharged from the active glaciers.

Elsewhere the boundary could be reached only by laboriously tracking canoes or poling boats up the dangerous glacial rivers and streams or on foot over rough trails that the surveyors themselves had to locate and construct. Whenever possible supplies and equipment were taken up stream, but beyond the rivers there was seldom other means of transportation than back-packing. Thus to move all the camp equipment, supplies, instruments, and materials for monument construction to the points where they were required was an arduous task, made


INDEX OF
THE BOUNDARY MAPS
PREPARED UNDER ARTICLE VI OF THE
CONVENTION OF 1903 AND ARTICLE IV
OF THE TREATY OF 1925
SCALE OF MAPS
1
250.000
Statute Miles
Marine Leagues
MALASPINA GLACIER
Yakutat Bay
Alsek River
Dyea
Skagway
White Pass
Cape Fairweather
Cape Spencer
Cross Sound
Cape Bingham
ICY STRAIT
CHICHAGOF ISLAND
ADMIRALTY
CHATHAM STRAIT
BARANOF ISLAND
FREDERICK SOUND
Juneau
Taku River
Inklin River
Teslin Lake
Stikine River
Iskoot River
Dease River
Cape Edgecumbe
Cape Ommaney
Christian Sound
IPHIGENIA BAY
KUPREANOF ISLAND
KUIU ISLAND
Wrangell
Sumner Strait
PRINCE OF WALES ISLAND
CLARENCE STRAIT
REVILLA-GIGEDO ISLAND
PORTLAND CANAL
Observatory Inlet
Nass River
Cape Muzon
Cape Chacon
C. Northumberland
Dundas
DIXON ENTRANCE

all the greater when these impedimenta had to be carried to altitudes of several thousand feet. On glaciers and snow fields sleds were sometimes used, but back-packing was still the usual means of transportation.

The Official Maps

The maps upon which the Commissioners have plotted the boundary line from Point B of the Award at the mouth of Tongass Passage to Mount St. Elias, as surveyed and marked under the provisions of Article VI of the Convention of 1903, are composite topographic maps prepared from surveys made by the field force of the Commission and supplemented by material taken from charts of the British Admiralty and the United States Coast and Geodetic Survey, from the Alaska Boundary Tribunal maps, from maps of the Geological Survey of Canada, and from maps and photographs furnished by various explorers. They consist of a series of 13 sheets, arranged and numbered as shown on the index map facing this page. On three of these sheets, Nos. 1, 4, and 10, no part of the boundary itself is shown; they were included in order that all the area between the coast line and the boundary might be shown. The area covered by the contoured parts of these 13 maps is about 32,000 square miles, nearly a third of which is perpetually covered by ice and snow fields.

The maps were engraved on copper plates and printed from lithographic stones, similarly to other boundary maps. The four official sets of maps, two for each Government, which bear the Commissioners' signatures, are transmitted in atlas form with this report. These atlases will be preserved by the Governments of the United States and Canada as permanent records.

The size of each map-sheet is 22 by 26½ inches inside the border. The sheets are printed in the conventional colours; the boundary line, monuments, culture, and lettering appear in black; elevations and contour lines other than those shown on glaciers are in brown; drainage is in blue, as are elevations and contours on glaciers; and timber is shown in green. Each sheet covers 1 degree of latitude and 2 degrees of longitude, the parts where no topographical detail was available being left blank. The sheets are constructed on polyconic projections on a scale of 1/250,000, or approximately 4 miles to the inch, with contour intervals of 250 feet. At the top of each sheet are the title, the number of the sheet, copies of the seals of the two countries, and the names of the Commissioners under whom the surveys were made. In the lower right corner is the certificate of the Commissioners.

The geographic positions of the triangulation stations that control the topography shown on the maps were originally computed on the Southeast Alaska datum (*See* page 246). Although at that time plans had been made by the Geodetic Survey of Canada and the United States Coast and Geodetic Survey to put the Southeast Alaska triangulation on a continental basis (and eventually on the 1927 North American datum) by extending a net of first-order triangulation northerly along the coast of British Columbia from the northwestern part of the state of Washington, the Commissioners agreed that rather than delay the printing of maps of the boundary area until the completion of this work, the maps should be printed with the triangulation stations, boundary points, and topography based on the existent Southeast Alaska datum. Consequently, it will be found that there are differences in the geographic positions of the triangulation stations and boundary points as plotted on the maps and as listed in this report on the 1927 North American datum. The average of these differences is of the order of about 700 feet on the ground, or about one-thirtieth inch as scaled on the maps.

To show these differences in another manner, the following table gives the latitude and longitude on the two datums of each of five stations picked at random from Dixon Entrance to Yakutat Bay, together with an azimuth line from each station:

Station	Latitude and longitude				Azimuth			
	Datum		Differences		To station	Datum		Diff. Secs.
	SE. Alaska	1927 N.A.	Seconds	Metres		SE. Alaska	1927 N.A.	
	° ′ ″	″				° ′ ″	″	
Muzon (Dixon Entrance)	54 40 46·951 132 41 55·308	51·428 50·204	+4·477 −5·104	138·4 91·5	Chacon	261 04 01·72	15·92	+14·20
B.P. 66 (Stikine River)	56 42 05·259 131 51 35·890	11·883 32·295	+6·624 −3·595	204·9 61·2	B.P. 62	352 19 28	31·5	+3·5
B.P. 118 (White Pass)	59 37 26·377 135 09 22·504	33·76 20·73	+7·383 −1·774	228·5 27·8	B.P. 116	277 28 84·7	33	−51·7
B.P. 164 (Glacier Bay)	58 54 15·534 137 31 29·654	24·27 27·20	+8·636 −2·454	267·2 39·3	Wells	257 53 27·5	94	+66·5
B.P. 178 (Yakutat Bay)	60 05 10·44 139 11 51·18	19·07 49·14	+8·63 −2·04	267·1 31·5	Mount Tebenkof	17 25 25	25	0

A limited edition of copies of the official maps has been printed for each Government for distribution to governmental agencies, to libraries, and to others interested in the location of the boundary line. These copies are identical reproductions of the maps of the official sets and differ from them only in that they bear the date of publication, which the official sets do not, the Commissioners' signatures are in facsimile, and they are designated as copies.

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 the provincial legislative assemblies, and in university and reference libraries throughout the country.

DESCRIPTION AND DEFINITION OF THE INTERNATIONAL BOUNDARY LINE FROM TONGASS PASSAGE TO MOUNT ST. ELIAS

The International Boundary line from the point "B" at the entrance of Tongass Passage to the southern terminus of the 141st Meridian boundary from the Arctic Ocean to Mount St. Elias consists of 28 "boundary turning points" on the water section of the line, which are referenced by 52 boundary reference monuments, and 194 "boundary points" on the land section. The total length of the line is 808·2 miles, 98·4 miles from the entrance of Tongass Passage to the head of Portland Canal and 709·8 miles from the head of Portland Canal to the west shoulder of Mount St. Elias.

The description of the course of the line as surveyed and monumented by the commissioners, and as marked by them on the 13 boundary maps that accompany this report, is set forth in tabular form. The tables give the geographic positions of all the boundary turning points and boundary points together with the lengths and azimuths of the boundary courses, and the geographic positions of the boundary reference monuments with the lengths and azimuths of the lines to the points they reference. The latitudes and longitudes are given on the 1927 North American geodetic datum, which is the standard datum used by the Geodetic Survey of Canada, the United States Coast and Geodetic Survey, and the Comisión Geodesica Mexicana.

The lengths of the courses and other tabulated distances are given in metres, and the azimuths are reckoned clockwise from the south. All distances have been reduced to mean sea-level. To obtain the actual horizontal distance between points of known elevation above sea-level, the distances given in the tables should be increased by an amount equal to 0·000,000,047,6 LE, in which L is the tabulated length of the course in metres and E is the mean elevation of the ends of the course in feet. The maximum increase for this section of the boundary, from Boundary Point 180 to Boundary Point 181, a distance of 34,186 metres and mean elevation of 15,100 feet, is about 24·6 metres or 1 part in 1,390.

To assist in their identification, graphic descriptions are also given of the boundary points from the head of Portland Canal to the west shoulder of Mount St. Elias. Within the parenthesis in each description immediately following the number of the boundary point is the name of the river or other well-defined geographical feature near which the point is situated, and the name of the government organization or the chief of the boundary survey party that established the point. The first date within the parenthesis is that of the establishment of the point; later dates are the years in which the point was subsequently occupied or inspected. Each description gives the general location of the point and the latest determination of its elevation; and for points selected by the members of the Alaska Boundary Tribunal or by the commissioners under the authority of the exchange of notes of March 25, 1905, the designations originally used are given. Where the point is marked, the type of boundary mark is described, or, if there is no such mark, the character of the point, whether a snow-capped or sharp mountain peak or some other point that could not be permanently marked, is noted.

91264—11½

Illustrations of the mountain peaks that constitute boundary points have been included with their descriptions. Where two or more boundary points or other mountain peaks are marked in an illustration they are named from left to right.

The following abbreviations have been used throughout the tables: "B.P." for boundary point; "T.P." for turning point; and "R.M." for reference monument.

BOUNDARY TURNING POINTS—TONGASS PASSAGE TO THE HEAD OF PORTLAND CANAL

Station	Latitude and longitude	Azimuth	To station	Distance (metres)
	° ′ ″	° ′		
Point B of the Award.	54 42 27·93	88 41	Point A of the Award.	133,510·6
	130 36 50·05	145 47	R.M. S-1 & 2	2,989·5
		156 24	T.P. 1	2,099·5
		180 00	R.M. C-1	1,375·7
T.P. 1	54 43 30·15	123 06	R.M. S-1 & 2	1,003·5
	130 37 37·01	187 13	T.P. 2	1,497·0
		303 06	R.M. C-1	1,003·5
		336 23	Point B of the Award.	2,099·5
T.P. 2	54 44 18·18	7 13	T.P. 1	1,497·0
	130 37 26·50	47 40	R.M. S-1 & 2	1,391·5
		142 22	T.P. 3	3,513·0
		227 40	R.M. C-2	520·1
T.P. 3	54 45 48·13	99 34	R.M. S-3	972·1
	130 39 26·45	218 03	T.P. 4	2,334·1
		279 34	R.M. C-3	972·2
		322 20	T.P. 2	3,513·0
T.P. 4	54 46 47·56	38 04	T.P. 3	2,334·1
	130 38 05·97	55 03	R.M. S-3	2,925·3
		235 03	R.M. S-4	2,022·8
		252 20	T.P. 5	4,623·2
		297 49	R.M. C-4	893·9
T.P. 5	54 47 32·88	72 23	T.P. 4	4,623·2
	130 33 59·44	178 00	R.M. S-5	647·8
		228 44	T.P. 6	7,518·5
		358 00	R.M. C-5	647·8
T.P. 6	54 50 13·12	48 48	T.P. 5	7,518·5
	130 28 42·81	151 08	R.M. S-6	157·5
		225 34	T.P. 7	2,326·6
		331 08	R.M. C-6	157·5
T.P. 7	54 51 05·78	45 35	T.P. 6	2,326·6
	130 27 09·69	147 12	R.M. S-7	408·9
		219 36	T.P. 8	3,190·3
		327 12	R.M. C-7	409·0
T.P. 8	54 52 25·27	39 37	T.P. 7	3,190·3
	130 25 15·67	155 24	R.M. S-8	350·6
		224 54	T.P. 9	6,974·6
		335 24	R.M. C-8	350·6
T.P. 9	54 55 04·93	44 58	T.P. 8	6·974·6
	130 20 39·25	146 34	R.M. S-9	718·0
		216 36	T.P. 10	7,799·7
		326 34	R.M. C-9	718·0
T.P. 10	54 58 27·34	36 40	T.P. 9	7,799·7
	130 16 17·83	116 47	R.M. S-10	784·5
		208 59	T.P. 11	11,312·3
		296 47	R.M. C-10	784·5
T.P. 11	55 03 47·25	29 03	T.P. 10	11,312·3
	130 11 09·04	90 31	R.M. S-11	1,907·6
		187 41	T.P. 12	3,191·4
		270 31	R.M. C-11	1,907·7
T.P. 12	55 05 29·52	7 41	T.P. 11	3,191·4
	130 10 45·00	77 17	R.M. S-12	1,334·6
		206 03	T.P. 13	4,134·2
		257 17	R.M. C-12	1,334·6
T.P. 13	55 07 29·62	26 04	T.P. 12	4,134·2
	130 09 02·55	68 05	R.M. S-13	1,202·4
		191 12	T.P. 14	2,068·5
		248 05	R.M. C-13	1,202·4
T.P. 14	55 08 35·23	11 13	T.P. 13	2,068·5
	130 08 39·85	125 42	R.M. S-14	1,020·6
		206 27	T.P. 15	6,188·0
		305 42	R.M. C-14	1,020·6
T.P. 15	55 11 34·35	26 29	T.P. 14	6,188·0
	130 06 04·02	150 04	R.M. S-15	998·1
		219 25	T.P. 16	12,879·0
		330 04	R.M. C-15	998·1
T.P. 16	55 16 55·85	39 31	T.P. 15	12,879·0
	129 58 20·76	127 32	R.M. S-16 & 17	1,626·2
		175 37	T.P. 17	2,060·4
		307 32	R.M. C-16	833·2
T.P. 17	55 18 02·28	46 47	R.M. S-16 & 17	1,553·2
	129 58 29·69	145 59	T.P. 18	5,043·7
		226 47	R.M. C-17	1,073·2
		355 37	T.P. 16	2,060·4
T.P. 18	55 20 17·45	71 18	R.M. S-18	1,054·5
	130 01 09·73	174 17	T.P. 19	12,733·5
		251 18	R.M. C-18	1,054·5
		325 57	T.P. 17	5,043·7
T.P. 19	55 27 07·14	35 18	R.M. S-19	1,391·3
	130 02 21·96	149 11	T.P. 20	5,997·4
		215 18	R.M. C-19	1,391·3
		354 16	T.P. 18	12,733·5
T.P. 20	55 29 53·65	63 12	R.M. S-20	1,093·0
	130 05 16·98	165 27	T.P. 21	9,553·7
		243 12	R.M. C-20	1,093·0
		329 09	T.P. 19	5,997·4
T.P. 21	55 34 52·65	87 58	R.M. S-21	1,092·1
	130 07 33·91	185 09	T.P. 22	11,387·4
		267 58	R.M. C-21	1,092·2
		345 25	T.P. 20	9,553·7
T.P. 22	55 40 59·36	5 10	T.P. 21	11,387·4
	130 06 35·38	115 36	R.M. S-22	1,423·1
		147 31	T.P. 23	4,224·8
		295 36	R.M. C-22	1,423·1
T.P. 23	55 42 54·57	107 38	R.M. S-23	1,415·4
	130 08 45·33	177 05	T.P. 24	5,728·2
		287 38	R.M. C-23	1,415·4
		327 29	T.P. 22	4,224·8
T.P. 24	55 45 59·55	80 44	R.M. S-24	1,312·7
	130 09 02·04	201 35	T.P. 25	4,712·5
		260 44	R.M. C-24	1,312·8
		357 05	T.P. 23	5,728·2
T.P. 25	55 48 21·22	21 36	T.P. 24	4,712·5
	130 07 22·52	131 38	R.M. S-25	1,330·6
		235 20	T.P. 26	3,145·5
		311 38	R.M. C-25	1,330·6
T.P. 26	55 49 19·05	55 22	T.P. 25	3,145·5
	130 04 53·94	134 15	R.M. S-26	877·1
		207 34	T.P. 27	10,771·3
		314 15	R.M. C-26	877·2
T.P. 27	55 54 27·68	27 38	T.P. 26	10,771·3
	130 00 06·98	119 57	B.P. 1	1,002·0
		180 00	T.P. 28	500·0
		238 08	East R.M.	946·8
T.P. 28	55 54 43·84	0 00	T.P. 27	500·0
	130 00 06·98	90 01	Boundary tablet No. 1.	797·4
		270 01	East R.M.	804·2

BOUNDARY POINTS—THE HEAD OF PORTLAND CANAL TO THE INTERSECTION OF THE 141ST MERIDIAN BOUNDARY WITH THE WEST SHOULDER OF MOUNT ST. ELIAS

Station	Latitude and longitude	Azimuth	To station	Distance (metres)
	° ′ ″	° ′ ″		
Boundary tablet No. 1.	55 54 43·85 130 00 52·88	270 00 22 90 00 22	T.P. 28 B.P. 1	797·4 70·87
B.P. 1	55 54 43·85 130 00 56·96	270 00 18 184 57 06	Boundary tablet No. 1. Boundary tablet No. 2.	70·87 28·09
Boundary tablet No. 2.	55 54 44·76 130 00 56·82	4 57 06 184 57 06	B.P. 1 B.P. 2	28·09 698·1
B.P. 2	55 55 07·24 130 00 53·35	4 57 09 184 53 09	Boundary tablet No. 2. B.P. 3	698·1 1,273·9
B.P. 3	55 55 48·28 130 00 47·10	4 53 14 184 54 42	B.P. 2 B.P. 4	1,273·9 1,892·8
B.P. 4	55 56 49·26 130 00 37·77	4 54 50 184 55 36	B.P. 3 B.P. 5	1,892·8 5,165·5
B.P. 5	55 59 35·65 130 00 12·18	4 55 57 184 55 31	B.P. 4 B.P. 6	5,165·5 883·3
B.P. 6	56 00 04·11 130 00 07·80	4 55 35 184 55 35	B.P. 5 B.P. 7	883·3 34·15
B.P. 7	56 00 05·21 130 00 07·63	4 55 35 182 14 57	B.P. 6 B.P. 8	34·15 766·3
B.P. 8	56 00 29·96 130 00 05·90	2 14 58 153 58 36	B.P. 7 B.P. 9	766·3 1,138·8
B.P. 9	56 01 03·05 130 00 34·74	333 58 12 153 58 12	B.P. 8 B.P. 10	1,138·8 3,320·5
B.P. 10	56 02 39·51 130 01 58·91	333 57 02 153 57 02	B.P. 9 B.P. 10A	3,320·5 278·0
B.P. 10A	56 02 47·58 130 02 05·96	333 56 56 153 56 56	B.P. 10 B.P. 11	278·0 2,471·8
B.P. 11	56 03 59·38 130 03 08·70	333 56 04 153 56 04	B.P. 10A B.P. 12	2,471·8 461·7
B.P. 12	56 04 12·79 130 03 20·42	333 55 54 153 55 54	B.P. 11 B.P. 13	461·7 1,016·8
B.P. 13	56 04 42·32 130 03 46·26	333 55 33 153 55 33	B.P. 12 B.P. 14	1,016·8 2,575·2
B.P. 14	56 05 57·10 130 04 51·73	333 54 38 153 54 38	B.P. 13 B.P. 15	2,575·2 2,957·4
B.P. 15	56 07 22·97 130 06 07·01	333 53 36 71 43 10	B.P. 14 B.P. 15A	2,957·4 8,270·7
B.P. 15A	56 05 58·86 130 13 41·29	251 36 53 71 36 53	B.P. 15 B.P. 16	8,270·7 1,064·3
B.P. 16	56 05 48·00 130 14 39·71	251 36 04 119 00 55	B.P. 15A B.P. 17	1,064·3 7,386·2
B.P. 17	56 07 43·68 130 20 53·63	298 55 44 107 06 33	B.P. 16 B.P. 18	7,386·2 4,937·9
B.P. 18	56 08 30·56 130 25 26·92	287 02 46 167 03 56 274 25 25	B.P. 17 B.P. 19 B.P. 18 R.M.	4,937·9 3,766·4 37·3
B.P. 19	56 10 29·24 130 26 15·78	347 03 15 167 03 15	B.P. 18 B.P. 20	3,766·4 2,748·1
B.P. 20	56 11 55·84 130 26 51·49	347 02 46 167 02 46	B.P. 19 B.P. 21	2,748·1 513·9
B.P. 21	56 12 12·03 130 26 58·17	347 02 40 167 02 40	B.P. 20 B.P. 22	513·9 1,369·4
B.P. 22	56 12 55·18 130 27 15·98	347 02 25 167 02 25	B.P. 21 B.P. 23	1,369·4 3,197·8
B.P. 23	56 14 35·93 130 27 57·62	347 01 51 96 14 13	B.P. 22 B.P. 24	3,197·8 4,531·5
B.P. 24	56 14 51·77 130 32 19·20	276 10 35 112 54 02	B.P. 23 B.P. 25	4,531·5 2,033·5
B.P. 25	56 15 17·34 130 34 08·00	292 52 31 112 52 31	B.P. 24 B.P. 26	2,033·5 783·4
B.P. 26	56 15 27·18 130 34 49·93	292 51 56 112 51 56	B.P. 25 B.P. 27	783·4 2,222·5
B.P. 27	56 15 55·09 130 36 48·90	292 50 17 112 50 17	B.P. 26 B.P. 28	2,222·5 528·4
B.P. 28	56 16 01·72 130 37 17·19	292 49 54 138 38 59	B.P. 27 B.P. 29	528·4 323·2
B.P. 29	56 16 09·56 130 37 29·60	318 38 49 138 38 49	B.P. 28 B.P. 30	323·2 1,758·7
B.P. 30	56 16 52·24 130 38 37·13	318 37 53 138 37 53	B.P. 29 B.P. 31	1,758·7 185·1
B.P. 31	56 16 56·73 130 38 44·24	318 37 47 138 37 47	B.P. 30 B.P. 32	185·1 1.890·3
B.P. 32	56 17 42·59 130 39 56·87	318 36 47 138 36 47	B.P. 31 B.P. 33	1,890·3 1,726·1
B.P. 33	56 18 24·45 130 41 03·25	318 35 52 138 35 52	B.P. 32 B.P. 34	1,726·1 2,236·3
B.P. 34	56 19 18·68 130 42 29·29	318 34 40 138 34 40	B.P. 33 B.P. 35	2,236·3 956·8
B.P. 35	56 19 41·87 130 43 06·13	318 34 09 138 34 09	B.P. 34 B.P. 36	956·8 1,029·6
B.P. 36	56 20 06·83 130 43 45·78	318 33 36 138 33 36	B.P. 35 B.P. 37	1,029·6 521·6
B.P. 37	56 20 19·47 130 44 05·88	318 33 19 138 33 19	B.P 36 B.P. 38	521·6 759·9
B.P. 38	56 20 37·88 130 44 35·16	318 32 55 138 32 55	B.P. 37 B.P. 39	759·9 1,197·5
B.P. 39	56 21 06·90 130 45 21·32	318 32 17 138 32 17	B.P. 38 B.P. 40	1,197·5 2,258·0
B.P. 40	56 22 01·60 130 46 48·40	318 31 04 103 08 45	B.P. 39 B.P. 41	2,258·0 4,927·9
B.P. 41	56 22 37·75 130 51 28·01	283 04 52 103 04 52	B.P. 40 B.P. 42	4.927·9 1,266·6
B.P. 42	56 22 47·01 130 52 39·90	283 03 52 103 03 52	B.P. 41 B.P. 43	1,266·6 2,234·1
B.P. 43	56 23 03·32 130 54 46·72	283 02 06 103 02 06	B.P. 42 B.P. 44	2,234·1 500·3
B.P. 44	56 23 06·96 130 55 15·13	283 01 42 103 01 42	B.P. 43 B.P. 45	500·3 1,229·8
B.P. 45	56 23 15·92 130 56 24·96	283 00 44 103 00 44	B.P. 44 B.P. 46	1,229·8 1,501·5
B.P. 46	56 23 26·85 130 57 50·23	282 59 33 102 59 33	B.P. 45 B.P. 47	1,501·5 7,700·6
B.P. 47	56 24 22·60 131 05 07·76	282 53 29 132 23 46	B.P. 46 B.P. 48	7,700·6 7,192·0
B.P. 48	56 26 59·27 131 10 17·81	312 19 28 122 06 45	B.P. 47 B.P. 49	7,192·0 8,859·0
B.P. 49	56 29 31·31 131 17 36·33	302 00 39 122 00 39	B.P. 48 B.P. 50	8,859·0 154·0
B.P. 50	56 29 33·95 131 17 43·97	302 00 33 122 00 33	B.P. 49 B.P. 51	154·0 991·9
B.P. 51	56 29 50·94 131 18 33·13	301 59 52 121 59 52	B.P. 50 B.P. 52	991·9 632·8
B.P. 52	56 30 01·78 131 19 04·50	301 59 26 121 59 26	B.P. 51 B.P. 53	632·8 11,043·9
B.P. 53	56 33 10·60 131 28 12·78	301 51 48 134 45 05	B.P. 52 B.P. 54	11,043·9 9,429·0
B.P. 54	56 36 45·04 131 34 45·37	314 39 37 84 48 53	B.P. 53 B.P. 55	9,429·0 3,184·8
B.P. 55	56 36 35·70 131 37 51·30	264 46 18 84 46 18	B.P. 54 B.P. 56	3,184·8 1,632·7
B.P. 56	56 36 30·88 131 39 26·62	264 44 58 84 44 58	B.P. 55 B.P. 57	1,632·7 2,892·6
B.P. 57	56 36 22·29 131 42 15·46	264 42 37 84 42 37	B.P. 56 B.P. 58	2,892·6 1,970·0
B.P. 58	56 36 16·40 131 44 10·44	264 41 01 84 41 01	B.P. 57 B.P. 59	1,970·0 825·2
B.P. 59	56 36 13·93 131 44 58·60	264 40 21 84 40 21	B.P. 58 B.P. 60	825·2 747·95
B.P. 60	56 36 11·68 131 45 42·25	264 39 45 84 39 45	B.P. 59 B.P. 61	747·95 2,361·7

BOUNDARY POINTS—THE HEAD OF PORTLAND CANAL TO THE INTERSECTION OF THE 141ST MERIDIAN BOUNDARY WITH THE WEST SHOULDER OF MOUNT ST. ELIAS—*Continued*

Station	Latitude and longitude	Azimuth	To station	Distance (metres)
	° ′ ″	° ′ ″		
B.P. 61	56 36 04·56 131 48 00·08	264 37 50 84 37 50	B.P. 60 B.P. 62	2,361·7 2,072·9
B.P. 62	56 35 58·27 131 50 01·03	264 36 09 172 20 48	B.P. 61 B.P. 62A	2,072·9 3,788·3
B.P. 62A	56 37 59·65 131 50 30·62	352 20 23 172 20 23	B.P. 62 B.P. 63	3,788·3 2,583·8
B.P. 63 (1938)	56 39 22·43 131 50 50·84	352 20 07 172 20 07	B.P. 62A B.P. 64	2,583·8 662·1
B.P. 64	56 39 43·65 131 50 56·02	352 20 02 172 20 02	B.P. 63 (1938) B.P. 65	662·1 1,014·2
B.P. 65	56 40 16·14 131 51 03·97	352 19 55 172 19 55	B.P. 64 B.P. 66	1,014·2 3,612·4
B.P. 66	56 42 11·88 131 51 32·30	352 19 31 156 21 38	B.P. 65 B.P. 67	3,612·4 6,162·4
B.P. 67	56 45 14·36 131 53 57·71	336 19 37 196 30 24	B.P. 66 B.P. 68	6,162·4 6,074·3
B.P. 68	56 48 22·63 131 52 16·00	16 31 49 116 19 22	B.P. 67 B.P. 69	6,074·3 17,056·8
B.P. 69	56 52 26·24 132 07 18·56	296 06 46 194 00 22	B.P. 68 B P. 70	17,056·8 19,672·5
B.P. 70	57 02 43·20 132 02 36·18	14 04 19 104 53 50	B.P. 69 B.P. 71	19,672·5 20,315·0
B.P. 71	57 05 30·53 132 22 01·98	284 37 31 208 45 20	B.P. 70 B.P. 72	20,315·0 15,213·8
B.P. 72	57 12 41·48 132 14 45·96	28 51 26 154 34 09	B.P. 71 B.P. 73	15,213·8 17,085·6
B.P. 73	57 21 00·05 132 22 04·69	334 28 00 146 01 11	B.P. 72 B.P. 74	17,085·6 19,728·7
B.P. 74	57 29 48·39 132 33 06·70	325 51 53 154 26 08	B.P. 73 B.P. 75	19,728·7 14,849·8
B.P. 75	57 37 01·25 132 39 32·69	334 20 42 148 38 50	B.P. 74 B.P. 76	14,849·8 10,338·2
B.P. 76	57 41 46·50 132 44 57·41	328 34 16 156 18 33	B.P. 75 B.P. 77	10,338·2 17,488·3
B.P. 77	57 50 23·94 132 52 03·29	336 12 32 146 27 46	B.P. 76 B.P. 78	17,488·3 21,486·0
B.P. 78	58 00 02·24 133 04 05·95	326 17 34 160 35 33	B.P. 77 B.P. 79	21,486·0 18,113·4
B.P. 79	58 09 14·28 133 10 13·94	340 30 21 144 57 31	B.P. 78 B.P. 80	18,113·4 2,845·5
B.P. 80	58 10 29·57 133 11 53·89	324 56 06 144 56 06	B.P. 79 B.P. 81	2,845·5 945·89
B.P. 81	58 10 54·59 133 12 27·14	324 55 38 144 55 38	B.P. 80 B.P. 82	945·89 1,182·02
B.P. 82	58 11 25·86 133 13 08·71	324 55 03 144 55 03	B.P. 81 B.P. 83	1,182·02 5,022·4
B.P. 83	58 13 38·66 133 16 05·57	324 52 32 141 05 44	B.P. 82 B.P. 84	5,022·4 7,050·1
B.P. 84	58 16 35·90 133 20 37·21	321 01 53 151 19 26	B.P. 83 B.P. 85	7,050·1 14,149·3
B.P. 85	58 23 16·93 133 27 35·07	331 13 30 225 51 58	B.P. 84 B.P. 86	14,149·3 6,854·4
B.P. 86	58 25 51·09 133 22 31·94	45 56 16 134 28 35	B.P. 85 B.P. 87	6,854·4 14,740·1
B.P. 87	58 31 24·40 133 33 21·74	314 19 21 138 52 33	B.P. 86 B.P. 88	14,740·1 4,177·1
B.P. 88	58 33 06·06 133 36 11·60	318 50 08 138 50 08	B.P. 87 B.P. 89	4,177·1 4,152·6
B.P. 89	58 34 47·07 133 39 00·74	318 47 44 138 47 44	B.P 88 B.P. 90	4,152·6 801·7
B.P. 90	58 35 06·56 133 39 33·43	318 47 16 138 47 16	B.P. 89 B.P. 91	801·7 1,202·5
B.P. 91	58 35 35·80 133 40 22·47	318 46 34 138 46 34	B.P. 90 B.P. 92	1,202·5 2,860·1

Station	Latitude and longitude	Azimuth	To station	Distance (metres)
	° ′ ″	° ′ ″		
B.P. 92	58 36 45·30 133 42 19·22	318 44 54 149 23 21	B.P. 91 B.P. 93	2,860·1 15,173·3
B.P. 93	58 43 47·10 133 50 19·38	329 16 31 118 58 59	B.P. 92 B.P. 94	15,173·3 8,721·5
B.P. 94	58 46 03·43 133 58 14·03	298 52 13 122 25 50	B.P. 93 B.P. 95	8,721·5 19,533·8
B.P. 95	58 51 40·84 134 15 22·56	302 11 10 147 07 51	B.P. 94 B.P. 96	19,533·8 5,331·7
B.P. 96	58 54 05·53 134 18 23·38	327 05 16 146 42 00	B.P. 95 B.P. 97	5,331·7 2,957·4
B.P. 97	58 55 25·40 134 20 04·75	326 40 34 197 01 20	B.P. 96 B.P. 98	2,957·4 4,516·5
B.P. 98	58 57 44·96 134 18 42·03	17 02 30 109 26 19	B.P. 97 B.P. 99	4,516·5 5,712·2
B.P. 99	58 58 46·27 134 24 19·21	289 21 30 192 20 24	B.P. 98 B.P. 100	5,712·2 6,790·9
B.P. 100	59 02 20·65 134 22 48·21	12 21 42 146 22 08	B.P. 99 B.P. 101	6,790·9 6,753·5
B.P. 101	59 05 22·31 134 26 43·09	326 18 46 156 15 29	B.P. 100 B.P. 102	6,753·5 5,158·4
B.P. 102	59 07 54·88 134 28 53·67	336 13 36 89 23 21	B.P. 101 B.P. 103	5,158·4 4,705·5
B.P. 103	59 07 53·17 134 33 49·50	269 19 07 136 24 44	B.P. 102 B.P. 104	4,705·5 9,413·5
B.P. 104	59 11 33·33 134 40 38·29	316 18 53 168 58 02	B.P. 103 B.P. 105	9,413·5 6,439·5
B.P. 105	59 14 57·58 134 41 56·04	348 56 55 103 38 20	B.P. 104 B.P. 106	6,439·5 15,204·5
B.P. 106	59 16 52·51 134 57 29·12	283 24 58 151 08 22	B.P. 105 B.P. 107	15,204·5 8,324·3
B.P. 107	59 20 48·03 135 01 43·34	331 04 44 207 01 24	B.P. 106 B.P. 108	8,324·3 5,100·6
B.P. 108	59 23 14·84 134 59 16·53	27 03 30 125 30 27	B.P. 107 B.P. 109	5,100·6 7,758·7
B.P. 109	59 25 40·29 135 05 57·10	305 24 42 206 30 03	B.P. 108 B.P. 110	7,758·7 3,017·5
B.P. 110	59 27 07·55 135 04 31·64	26 31 16 227 45 07	B.P. 109 B.P. 111	3,017·5 3,807·1
B.P. 111	59 28 30·23 135 01 32·66	47 47 41 179 33 46	B.P. 110 B.P. 112	3,807·1 7,185·5
B.P. 112	59 32 22·42 135 01 36·15	359 33 43 179 33 43	B.P. 111 B.P. 113	7,185·5 543·6
B.P. 113	59 32 39·98 135 01 36·41	359 33 43 179 33 43	B.P. 112 B.P. 114	543·6 2,177·4
B.P. 114	59 33 50·34 135 01 37·47	359 33 42 142 50 36	B.P. 113 B.P. 115	2,177·4 7,825·1
B.P. 115	59 37 11·77 135 06 38·93	322 46 16 142 46 16	B.P. 114 B.P. 116	7,825·1 484·1
B.P. 116	59 37 24·22 135 06 57·61	322 46 00 97 30 37	B.P. 115 B.P. 117	484·1 1,182·6
B.P. 117	59 37 29·21 135 08 12·40	277 29 32 97 29 32	B.P. 116 B.P. 118	1,182·6 1,080·3
B.P. 118	59 37 33·76 135 09 20·73	277 28 33 139 38 51	B.P. 117 B.P. 119	1,080·3 5,419·5
B.P. 119	59 39 47·16 135 13 04·84	319 35 37 168 10 26	B.P. 118 B.P. 120	5,419·5 3,797·9
B.P. 120	59 41 47·28 135 13 54·60	348 09 43 102 29 11	B.P. 119 B.P. 121	3,797·9 1,101·4
B.P. 121	59 41 54·97 135 15 03·35	282 28 12 126 00 20	B.P. 120 B.P. 122	1,101·4 7,462·9
B.P. 122	59 44 16·57 135 21 29·78	305 54 46 135 14 02	B.P. 121 B.P. 123	7,462·9 9,490·6
B.P. 123	59 47 54·11 135 28 38·34	315 07 52 60 35 38	B.P. 122 B.P. 124	9,490·6 15,752·5
B.P. 124	59 43 43·37 135 43 16·48	240 22 59 60 22 59	B.P. 123 B.P. 125	15,752·5 3,635·6

BOUNDARY POINTS—THE HEAD OF PORTLAND CANAL TO THE INTERSECTION OF THE 141ST MERIDIAN BOUNDARY WITH THE WEST SHOULDER OF MOUNT ST. ELIAS—*Concluded*

Station	Latitude and longitude	Azimuth	To station	Distance (metres)	Station	Latitude and longitude	Azimuth	To station	Distance (metres)
	° ′ ″	° ′ ″				° ′ ″	° ′ ″		
B.P. 125	59 42 45·27	240 20 04	B.P. 124	3,635·6	B.P. 157	59 09 58·37	207 18 28	B.P. 156	11,777·7
	135 46 38·64	60 20 04	B.P. 126	4,787·4		136 34 57·29	87 25 11	B.P. 158	13,988·8
B.P. 126	59 41 28·63	240 16 15	B.P. 125	4,787·4	B.P. 158	59 09 37·19	267 12 36	B.P. 157	13,988·8
	135 51 04·53	60 16 15	B.P. 127	1,238·0		136 49 36·66	46 02 12	B.P. 159	3,818·2
B.P. 127	59 41 08·79	240 15 16	B.P. 126	1,238·0	B.P. 159	59 08 11·50	225 59 44	B.P. 158	3,818·2
	135 52 13·24	60 15 16	B.P. 128	5,223·5		136 52 29·48	53 53 06	B.P. 160	6,593·0
B.P. 128	59 39 44·96	240 11 06	B.P. 127	5,223·5	B.P. 160	59 06 05·80	233 48 19	B.P. 159	6,593·0
	135 57 02·87	79 46 59	B.P. 129	3,126·4		136 58 04·05	57 00 36	B.P. 160A	4,601·4
B.P. 129	59 39 27·00	259 44 09	B.P. 128	3,126·4	B.P. 160A	59 04 44·77	236 57 08	B.P. 160	4,601·4
	136 00 19·34	79 44 09	B.P. 130	64·0		137 02 06·34	56 57 08	B.P. 160B	3,259·4
B P. 130	59 39 26·63	259 44 05	B.P. 129	64·0	B.P. 160B	59 03 47·30	236 54 41	B.P. 160A	3,259·4
	136 00 23·36	79 44 05	B.P. 131	1,311·0		137 04 57·77	56 54 41	B.P. 161	6,240·1
B.P 131	59 39 19·06	259 42 54	B.P. 130	1,314·0	B.P. 161	59 01 57·09	236 50 00	B.P. 160B	6,240·1
	136 01 45·92	79 42 54	B.P. 132	1 304·0		137 10 25·54	59 52 09	B.P. 162	7,124·1
B.P. 132	59 39 11·53	259 41 44	B.P. 131	1,304·0	B.P. 162	59 00 01·36	239 46 38	B.P. 161	7,124·1
	136 03 07·84	79 41 44	B.P. 133	1,831·0		137 16 51·46	43 39 47	B.P. 163	14,096·5
B.P. 133	59 39 00·93	259 40 05	B.P. 132	1,831·0	B.P. 163	58 54 31·40	223 31 06	B.P. 162	14,096·5
	136 05 02·85	79 40 05	B.P. 134	6,132·2		137 26 59·40	87 04 56	B.P. 164	4,292·7
B.P. 134	59 38 25·23	259 34 32	B.P. 133	6,132·2	B.P. 164	58 54 24·27	267 01 07	B.P. 163	4,292·7
	136 11 27·87	63 50 22	B.P. 135	2,883·0		137 31 27·20	189 40 31	B.P. 165	8,930·3
B.P. 135	59 37 44·13	243 48 00	B.P. 134	2,883·0	B.P. 165	58 59 08·75	9 41 51	B.P. 164	8,930·3
	136 14 12·96	63 48 00	B.P. 136	691·0		137 29 53·21	169 50 45	B.P. 166	13,697·3
B.P. 136	59 37 34·27	243 47 26	B.P. 135	691·0	B.P. 166	59 06 24·44	349 48 34	B.P. 165	13,697·3
	136 14 52·52	63 47 26	B.P. 137	982·0		137 32 24·93	166 19 40	B.P. 167	15,750·8
B.P. 137	59 37 20·25	243 46 38	B.P. 136	982·0	B.P. 167	59 14 38·96	346 16 19	B.P. 166	15,750·8
	136 15 48·72	63 46 38	B.P. 138	517·0		137 36 19·78	135 48 50	B.P. 168	28,515·0
B.P. 138	59 37 12·87	243 46 12	B.P. 137	517·0	B.P. 168	59 25 38·04	315 30 46	B.P. 167	28,515·0
	136 16 18·30	63 46 12	B.P. 139	1,085·0		137 57 20·25	135 30 46	B.P. 169	478·0
B.P. 139	59 36 57·37	243 45 18	B.P. 138	1,085·0	B.P. 169	59 25 49·05	315 30 27	B.P. 168	478·0
	136 17 20·37	63 45 18	B.P. 140	3,974·1		137 57 41·49	135 30 27	B.P. 170	4,802·2
B.P. 140	59 36 00·52	243 42 02	B.P. 139	3,974·1	B.P. 170	59 27 39·70	315 27 24	B.P. 169	4,802·2
	136 21 07·59	304 52 53	B.P. 141	7,864·1		138 01 15·15	135 27 24	B.P. 171	966·3
B.P. 141	59 33 35·02	124 58 46	B.P. 140	7,864·1	B.P. 171	59 28 01·96	315 26 46	B.P. 170	966·3
	136 14 16·83	358 54 11	B.P. 142	3,909·6		138 01 58·19	135 26 46	B.P. 172	47,375·9
B.P 142	59 31 28·71	178 54 15	B.P. 141	3,909·6	B.P. 172	59 46 08·08	314 56 09	B.P. 171	47,375·9
	136 14 12·07	29 31 14	B.P. 143	4,461·2		138 37 27·67	152 30 26	B.P. 173	5,160·3
B.P. 143	59 29 23·24	209 29 14	B.P. 142	4,461·2	B.P. 173	59 48 35·96	332 28 14	B.P. 172	5,160·3
	136 16 31·74	29 29 14	B.P. 144	3,193·2		138 40 00·48	171 20 26	B.P. 174	4,024·8
B.P. 144	59 27 53·41	209 27 48	B.P. 143	3,193·2	B.P. 174	59 50 44·53	351 19 52	B.P. 173	4,024·8
	136 18 11·54	64 13 49	B.P. 145	3,508·7		138 40 39·39	167 02 28	B.P. 175	6,968·7
B.P. 145	59 27 04·07	244 10 57	B.P. 144	3,508·7	B.P. 175	59 54 23·97	347 01 02	B.P. 174	6,968·7
	136 21 32·07	64 10 57	B.P. 145A	39·31		138 42 19·91	111 52 20	B.P. 176	5,491·6
B.P. 145A	59 27 03·52	244 10 55	B.P. 145	39·31	B.P. 176	59 55 29·94	291 47 36	B.P. 175	5,491·6
	136 21 34·32	64 10 55	B.P. 146	72·74		138 47 48·01	118 51 27	B.P. 177	16,259·4
B.P. 146	59 27 02·50	244 10 52	B.P. 145A	72·74	B.P. 177	59 59 42·63	298 38 12	B.P. 176	16,259·4
	136 21 38·48	64 10 52	B.P. 147	361·57		139 03 06·53	142 12 59	B.P. 178	13,186·4
B.P. 147	59 26 57·41	244 10 34	B.P. 146	361·57	B.P. 178	60 05 19·07	322 05 26	B.P. 177	13,186·4
	136 21 59·13	106 58 13	B.P. 148 (1936)	249·14		139 11 49·14	195 12 14	B.P. 179	26,692·7
B.P. 148 (1936)	59 26 59·76	286 58 00	B.P. 147	249·14	B.P. 179	60 19 11·13	15 18 50	B.P. 178	26,692·7
	136 22 14·25	106 58 00	B.P. 149	80·38		139 04 13·12	177 41 30	B.P. 180	3,688·3
B.P. 149	59 27 00·52	286 57 56	B.P. 148 (1936)	80·38	B.P. 180	60 21 10·20	357 41 22	B.P. 179	3,688·3
	136 22 19·13	106 57 56	B.P. 150	6,126·4		139 04 22·81	87 02 28	B.P. 181	34,185·7
B.P. 150	59 27 58·14	286 52 35	B.P. 149	6,126·4	B.P. 181	60 20 08·02	266 30 14	B.P. 180	34,185·7
	136 28 31·19	0 04 13	B.P. 151	9,980·1		139 41 27·92	43 10 34	B.P. 182	23,366·0
B.P. 151	59 22 35·63	180 04 12	B.P. 150	9,980·1	B.P. 182	60 10 56·32	222 55 33	B.P. 181	23,366·0
	136 28 31·97	357 28 04	B.P. 152	6,045·2		139 58 45·07	118 12 46	B.P. 183	29,929·1
B.P. 152	59 19 20·47	177 28 19	B.P. 151	6,045·2	B.P. 183	60 18 30·40	297 47 55	B.P. 182	29,929·1
	136 28 15·08	357 17 27	B.P. 153	445·2		140 27 22·54	19 19 40	B.P. 184	10,420·1
B.P. 153	59 19 06·10	177 17 28	B.P. 152	445·2	B.P. 184	60 13 12·65	199 16 26	B.P. 183	10,420·1
	136 28 13·75	357 20 24	B.P. 154	3,785·1		140 31 06·52	108 12 42	B.P. 185	14,474·6
B.P. 154	59 17 03·91	177 20 34	B.P. 153	3,785·1	B.P. 185	60 15 37·98	287 59 45	B.P. 184	14,474·6
	136 28 02·66	56 36 30	B.P. 155	1,810·3		140 46 00·60	112 32 54	B.P. 186	9,697·0
B.P. 155	59 16 31·71	236 35 08	B.P. 154	1,810·3	B.P. 186	60 17 37·76	292 24 27	B.P. 185	9,697·0
	136 29 38·09	348 35 11	B.P. 156	1,745·1		140 55 43·54	109 27 59	B.P. 187	4,168·6
B.P. 156	59 15 36·43	168 35 30	B.P. 155	1,745·1	B.P. 187	60 18 22·58	289 24 17	B.P. 186	4,168·6
	136 29 16·29	27 23 21	B.P. 157	11,777·7		140 59 59·47	---------	---------	---------

GEOGRAPHIC POSITIONS OF MONUMENTS REFERENCING THE TURNING POINTS OF THE INTERNATIONAL BOUNDARY FROM TONGASS PASSAGE TO THE HEAD OF PORTLAND CANAL

Station	Latitude and longitude	Azimuth	To station	Distance (metres)
	° ′ ″	° ′ ″		
R.M. S-1 & 2	54 43 47·87	227 39 30	R.M. C-2	1.911·6
	130 38 23·98	227 39 30	T.P. 2	1,391·5
		303 05 30	R.M. C-1	2,007·0
		303 05 30	T.P. 1	1,003·5
		325 46	Point B of the Award.	2,989·5
R.M. C-1	54 43 12·42	0 00 00	Point B of the Award.	1,375·7
	130 36 50·05			
		123 06 50	R.M. S-1 & 2	2,007·0
		123 06 50	T.P. 1	1,003·5
R.M. C-2	54 44 29·50	47 40 40	R.M. S-1 & 2	1,911·6
	130 37 05·00	47 40 40	T.P. 2	520·1
R.M. S-3	54 45 53·35	235 01 10	R.M. S-4	4,948·1
	130 40 20·07	235 01 10	T.P. 4	2,925·3
		279 33 30	R.M. C-3	1,944·3
		279 33 30	T.P. 3	972·1
R.M. C-3	54 45 42·90	99 35 00	R.M. S-3	1,944·3
	130 38 32·84	99 35 00	T.P. 3	972·2
R.M. S-4	54 47 25·03	55 04 20	R.M. S-3	4,948·1
	130 36 33·19	55 04 20	T.P. 4	2,022·8
R.M. C-4	54 46 34·07	117 50	T.P. 4	893·9
	130 37 21·75	208 50 20	R.M. S-4	1,799·0
R.M. S-5	54 47 53·82	358 00 00	R.M. C-5	1,295·6
	130 34 00·71	358 00 00	T.P. 5	647·8
R.M. C-5	54 47 11·95	178 00 00	R.M. S-5	1,295·6
	130 33 58·18	178 00 00	T.P. 5	647·8
R.M. S-6	54 50 17·58	331 07 50	R.M. C-6	315·0
	130 28 47·07	331 07 50	T.P. 6	157·5
R.M. C-6	54 50 08·66	151 08 00	R.M. S-6	315·0
	130 28 38·55	151 08 00	T.P. 6	157·5
R.M. S-7	54 51 16·90	327 12	R.M. C-7	817·9
	130 27 22·10	327 12	T.P. 7	408·9
R.M. C-7	54 50 54·67	147 12	R.M. S-7	817·9
	130 26 57·28	147 12	T.P. 7	409·0
R.M. S-8	54 52 35·58	335 24 10	R.M. C-8	701·2
	130 25 23·85	335 24 10	T.P. 8	350·6
R.M. C-8	54 52 14·96	155 24 20	R.M. S-8	701·2
	130 25 07·48	155 24 20	T.P. 8	350·6
R.M. S-9	54 55 24·30	326 34 00	R.M. C-9	1,436·0
	130 21 01·46	326 34 00	T.P. 9	718·0
R.M. C-9	54 54 45·55	146 34 40	R.M. S-9	1,436·0
	130 20 17·05	146 34 40	T.P. 9	718·0
R.M. S-10	54 58 38·77	296 46 30	R.M. C-10	1,569·0
	130 16 57·20	296 46 30	T.P. 10	784·5
R.M. C-10	54 58 15·91	116 47 40	R.M. S-10	1,569·0
	130 15 38·46	116 47 40	T.P. 10	784·5
R.M. S-11	55 03 47·79	270 29 30	R.M. C-11	3,815·3
	130 12 56·51	270 29 30	T.P. 11	1,907·6
R.M. C-11	55 03 46·68	90 32 20	R.M. S-11	3,815·3
	130 09 21·56	90 32 20	T.P. 11	1,907·7
R.M. S-12	55 05 20·02	257 15 50	R.M. C-12	2,669·2
	130 11 58·39	257 15 50	T.P. 12	1,334·6
R.M. C-12	55 05 39·02	77 17 50	R.M. S-12	2,669·2
	130 09 31·59	77 17 50	T.P. 12	1,334·6
R.M. S-13	55 07 15·11	248 04 30	R.M. C-13	2,404·8
	130 10 05·49	248 04 30	T.P. 13	1,202·4
R.M. C-13	55 07 44·12	68 06 10	R.M. S-13	2,404·8
	130 07 59·59	68 06 10	T.P. 13	1,202·4
R.M. S-14	55 08 54·49	305 41 20	R.M. C-14	2,041·2
	130 09 26·65	305 41 20	T.P. 14	1,020·6
R.M. C-14	55 08 15·97	125 42 40	R.M. S-14	2,041·2
	130 07 53·07	125 42 40	T.P. 14	1,020·6
R.M. S-15	55 12 02·32	330 04 10	R.M. C-15	1.996·2
	130 06 32·17	330 04 10	T.P. 15	998·1
R.M. C-15	55 11 06·38	150 05 00	R.M. S-15	1,996·2
	130 05 35·88	150 05 00	T.P. 15	998·1
R.M. S-16 & 17	55 17 27·88	226 46 00	R.M. C-17	2,626·4
	129 59 33·83	226 46 00	T.P. 17	1,553·2
		307 31 10	R.M. C-16	2,459·4
		307 31 10	T.P. 16	1,626·2
R.M. C-16	55 16 39·43	127 32 40	R.M. S-16 & 17	2,459·4
	129 57 43·33	127 32 40	T.P. 16	833·2
R.M. C-17	55 18 26·04	46 47 30	R.M. S-16 & 17	2,626·4
	129 57 45·35	46 47 30	T.P. 17	1,073·2
R.M. S-18	55 20 06·51	251 17 20	R.M. C-18	2,109·0
	130 02 06·39	251 17 20	T.P. 18	1,054·5
R.M. C-18	55 20 28·38	71 18 50	R.M. S-18	2,109·0
	130 00 13·06	71 18 50	T.P. 18	1,054·5
R.M. S-19	55 26 30·42	215 17 40	R.M. C-19	2,782·6
	130 03 07·70	215 17 40	T.P. 19	1,391·3
R.M. C-19	55 27 43·85	35 18 50	R.M. S-19	2,782·6
	130 01 36·21	35 18 50	T.P. 19	1,391·3
R.M. S-20	55 29 37·71	243 11 20	R.M. C-20	2,186·0
	130 06 12·54	243 11 20	T.P. 20	1,093·0
R.M. C-20	55 30 09·58	63 12 50	R.M. S-20	2,186·0
	130 04 21·40	63 12 50	T.P. 20	1,093·0
R.M. S-21	55 34 51·40	267 57 40	R.M. C-21	2,184·3
	130 08 36·21	267 57 40	T.P. 21	1,092·1
R.M. C-21	55 34 53·89	87 59 20	R.M. S-21	2,184·3
	130 06 31·60	87 59 20	T.P. 21	1,092·2
R.M. S-22	55 41 19·24	295 35	R.M. C-22	2,846·2
	130 07 48·84	295 35	T.P. 22	1,423·1
R.M. C-22	55 40 39·47	115 37	R.M. S-22	2,846·2
	130 05 21·94	115 37	T.P. 22	1,423·1
R.M. S-23	55 43 08·43	287 36 40	R.M. C-23	2,830·8
	130 10 02·60	287 36 40	T.P. 23	1,415·4
R.M. C-23	55 42 40·70	107 38 50	R.M. S-23	2,830·8
	130 07 28·08	107 38 50	T.P. 23	1,415·4
R.M. S-24	55 45 52·71	260 43 30	R.M. C-24	2,625·5
	130 10 16·34	260 43 30	T.P. 24	1,312·7
R.M. C-24	55 46 06·37	80 45 30	R.M. S-24	2,625·5
	130 07 47·73	80 45 30	T.P. 24	1,312·8
R.M. S-25	55 48 49·81	311 37 40	R.M. C-25	2,661·2
	130 08 19·62	311 37 40	T.P. 25	1,330·6
R.M. C-25	55 47 52·63	131 39 10	R.M. S-25	2,661·2
	130 06 25·45	131 39 10	T.P. 25	1,330·6
R.M. S-26	55 49 38·84	314 14 50	R.M. C-26	1,754·3
	130 05 30·03	314 14 50	T.P. 26	877·1
R.M. C-26	55 48 59·26	134 15 50	R.M. S-26	1,754·3
	130 04 17·86	134 15 50	T.P. 26	877·2
East R.M.	55 54 43·84	58 09	T.P. 27	946·8
	129 59 20·69	90 01 40	B.P. 1	1,672·4
		90 01 40	T.P. 28	804·2
B.P. 1	55 54 43·85	270 00 20	East R.M.	1,672·4
	130 00 56·96	270 00 20	T.P. 28	868·2
		299 56	T.P. 27	1,002·0

GEOGRAPHIC POSITION OF REFERENCE MONUMENT 18 REFERENCING BOUNDARY POINT 18 —SALMON RIVER SECTION

Station	Latitude and longitude	Azimuth	To station	Distance (metres)
	° ′ ″	° ′ ″		
B.P. 18 R.M.	56 08 30·47	94 25 27	B.P. 18	37·3
	130 25 24·77			

DESCRIPTIONS OF BOUNDARY POINTS FROM THE HEAD OF PORTLAND CANAL TO MOUNT ST. ELIAS

British Columbia—Alaska

Boundary Tablet No. 1 (Portland Canal; J. D. Craig, 1920). At Hyder, Alaska, on the boundary line, 70·87 metres east of Boundary Point 1, on a large rock on the tide land.

Station mark: a bronze tablet set in the rock.

Boundary Point 1 (Portland Canal; O. H. Tittmann and Dr. W. F. King, 1904, 1910, 1911, 1920, 1944). At the south end of Eagle Point at Hyder, Alaska, a few feet south of the stone storehouse built by the United States Government in 1896, on a rock outcrop about 18 feet above mean high water. The monument marks the point "C" of the Award of the Alaska Boundary Tribunal.

Station mark: an aluminium-bronze obelisk, about 4½ feet high, set in a concrete base.

Monument at Boundary Point 1.

Boundary Tablet No. 2 (Portland Canal; J. D. Craig, 1920). At Hyder, Alaska, on the boundary line 28·09 metres north of Boundary Point 1, in a vertical rock face.

Station mark: a bronze tablet set in the rock.

Boundary Point 2 (Salmon River; G. White-Fraser, 1905, 1910, 1920, 1944). On the slope of Mount Dolly, about ½ mile north of Hyder, Alaska; elevation 897 feet.

Station mark: an aluminium-bronze cone about 2½ feet high, set in the solid rock.

Boundary Point 3 (Salmon River; J. D. Craig, 1920, 1944). On the slope of Mount Dolly, about 1¼ miles north of Boundary Point 1; elevation 1,442 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock.

Boundary Point 4 (Salmon River; G. White-Fraser, 1905, 1910, 1920, 1944). On the slope of Mount Dolly, just below timber-line, about 2½ miles north of Boundary Point 1; elevation 2,770 feet.

Station mark: a conical aluminium-bronze monument about 2½ feet high set in the rock.

Boundary Point 5 (Salmon River; J. D. Craig, 1920). About ¾ mile south of the summit of Mount Welker, Boundary Point 8, on one of the most southerly of a succession of rocky knobs north of the shallow valley north of the snow-covered summit of Mount Dolly; elevation 4,640 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn 19·20 metres southerly on the top of the most southerly of the rock knobs.

Boundary Point 6 (Salmon River; J. D. Craig, 1920). On the south side of a ravine and 112 feet from Boundary Point 7; elevation 4,792 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn 8 feet to the south.

Boundary Point 7 (Salmon River; G. White-Fraser, 1905, 1910, 1920). About ½ mile south of the summit of Mount Welker, Boundary Point 8, on the south side of a small ravine that is probably always partly filled with snow. The monument that marks the point is 16 metres (slope distance) northeast of a boulder about 2½ feet in diameter and 15 feet higher than the monument, and comes out of the snow a month earlier than the monument; elevation 4,781 feet. This monument marks the point "D" of the Award of the Alaska Boundary Tribunal, defined as "the highest point on the 56th parallel of latitude between the waters flowing into Bear River on one side, and Salmon River on the other".

Station mark: an aluminium-bronze cone about 2½ feet high set in the solid rock.

Mount Dolly, B.P.s 7 and 8 from camera sta. Johnson Peak, northeast of confluence of American Creek and Bear River.

British Columbia—Alaska—*Continued*

Boundary Point 8 (Salmon River; G. White-Fraser, 1905; monument set by F. H. Mackie, 1910, 1920). On the summit of Mount Welker, beside a shaft of rock projecting a few inches higher than the monument; elevation 5,155 feet. This monument marks the point S 5117 of the Award of the Alaska Boundary Tribunal.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock. Two cairns were built in 1920; one in azimuth 2° 15′, distant 30 feet, and one in azimuth 154°, distant 76 feet.

Boundary Point 9 (Salmon River; J. D. Craig, 1920). On the rocky ridge, about ¾ mile northwesterly from the summit of Mount Welker, Boundary Point 8; elevation 4,356 feet.

Station mark: a manganese-bronze post 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn 15·24 metres northwesterly.

Boundary Point 10 (Salmon River; F. H. Mackie, 1910, 1920, 1944). About 2 miles northeasterly above the forks of Salmon River and Texas Creek; about ¼ mile southeasterly from the river, on a knoll at the foot of Mount Welker, Boundary Point 8; elevation 1,032 feet.

Station mark: an aluminium-bronze cone about 2½ feet high, set in the rock.

Boundary Point 10A (Salmon River; H. S. Mussell, 1944). About 10 miles from Hyder, Alaska, on the south and upper side of the road beside Salmon River. It is 278 metres northwesterly from Boundary Point 10.

Station mark: a bronze cone about 2½ feet high set in a concrete base 3 feet square, built on solid rock, with the words United States and Canada cast on the appropriate sides of the monument and the year 1944 stamped in the concrete; numbered 10A.

Boundary Point 11 (Salmon River; F. H. Mackie, 1910, 1920, 1944). On the hill east of the stream issuing from Salmon Glacier, near the steep westerly slope of the hill; elevation 1,665 feet.

Station mark: an aluminium-bronze cone about 2½ feet high, set in the rock.

Boundary Point 12 (Salmon River; J. D. Craig, 1920). On the easterly side of the face of Salmon Glacier, just below the steep hillside about ¼ mile northwesterly from Boundary Point 11; elevation 1,690 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn nearby.

Boundary Point 13 (Salmon River; J. D. Craig, 1920, 1944). On the westerly side of the face of Salmon Glacier, about 700 feet in elevation above the glacier on a small shelf on the steep rocky mountain side above a rock slide; elevation 1,282 feet.

Station mark: a manganese-bronze post 8 inches high and 2 inches square, set in the rock.

B.P. 15 from camera sta. 10, on north slope of Slate Mountain, west of Mount Bunting and east of Salmon Glacier.

Boundary Point 14 (Salmon River; J. D. Craig, 1920). On the easterly slope of the mountain south of the small glacier tributary to Salmon Glacier, south of Mount Bayard, Boundary Point 15; elevation 3,911 feet.

Station mark: a manganese-bronze post 8 inches high and 2 inches square, set in the rock.

Boundary Point 15 (Salmon River; G. White-Fraser, 1905; monument set by J. D. Craig, 1920). On the summit of Mount Bayard, in a slight hollow near the precipice at the westerly end of the ridge; elevation 6,547 feet. This monument marks the point S 6535 of the Award of the Alaska Boundary Tribunal.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock.

Boundary Point 15A (Salmon River; J. D. Craig, 1920). In azimuth 169° 41′ 50″, distant 12·28 metres from the station "White-Fraser", just above a steep snow slope; elevation 7,073 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock.

B.P.s 15A and 16 from B.P. 17.

British Columbia—Alaska—*Continued*

Boundary Point 16 (Salmon River; J. D. Craig, 1920). Mount Jefferson Coolidge, the snow-covered peak northwest of the divide between Texas Glacier and a glacier tributary to Chickamin River; elevation 6,560 feet. This snow peak marks the point S 6600 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1920.

Boundary Point 17 (Chickamin River; G. White-Fraser, 1905; monument set by J. D. Craig, 1920). On the summit of Mount Upshur, the rocky summit rising above the snow fields, about 6 miles northeast of the head of Chickamin River; elevation 6,701 feet. This peak marks the point S 6800 of the Award of the Alaska Boundary Tribunal.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. The station is referenced by two cairns 3 feet high; one distant 2·13 metres on line to Boundary Point 18, and the other distant 7·32 metres on line to Boundary Point 16.

Boundary Point 18 (Chickamin River; G. White-Fraser, 1905, 1920). The summit of Mount John Jay, which is about 4 miles south of the head of Leduc River. The sharp peak, which is separated from the bulk of the mountain to the east by a narrow cleft, drops almost perpendicularly on every side but the east; elevation 7,500 feet. This peak marks the point S 7780 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1920. It is referenced by a manganese-bronze post, about 8 inches high and 2 inches square, set in the flat surface east of the cleft in the mountain top about 5 feet lower than the summit, distant 37·3 metres in azimuth 274°25′25″ from the boundary point

B.P.s 18 and 17 from B.P. 16.

B.P. 18 from B.P. 17.

Boundary Point 19 (Leduc River; Jesse Hill, 1920). About 2 miles south of the head of Leduc River; on the west slope of the ridge that extends northerly from Mount John Jay, Boundary Point 18; on a small rock dome on the north side of a hanging glacier; elevation 4,225 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn 9½ feet southerly.

Boundary Point 20 (Leduc River; Jesse Hill, 1920). About 30 metres south of Leduc River and 80 feet above the river level; about 24 metres from the low bluff at the foot of the slope; elevation 1,691 feet.

Station mark: a manganese-bronze post 8 inches high and 2 inches square, set in the rock. There is a copper bolt set in the rock (Leduc south bolt) 0·212 metre southerly.

Boundary Point 21 (Leduc River; O. M. Leland, 1909, 1920). About 440 metres north of Leduc River, on a large flat rock that is slightly inclined downward to the east; elevation 1,721 feet.

Station mark: an aluminium-bronze cone about 2½ feet high, set in the rock.

Boundary Point 22 (Leduc River; O. M. Leland, 1909, 1920). About 1 mile north of Leduc River on the lower part of the southwestern slope of Mount Willibert, Boundary Point 23; about 100 metres north of the small stream that crosses the line; on a large bedrock that slopes downward to the southwest; elevation 2,532 feet.

Station mark: an aluminium-bronze cone about 2½ feet high, set in the rock. Leduc north bolt, 1909, is on the boundary 105 metres from Boundary Point 22 in azimuth 347°02′05″; elevation 2,352 feet.

Boundary Point 23 (Leduc River; O. M. Leland, 1909; monument set by Jesse Hill, 1920). On the summit of Mount Willibert, 3 miles north of Leduc River; on the west end of the long mountain top, in a field of loose rock; elevation 6,782 feet. The monument marks the point S 6650 of the Award of the Alaska Boundary Tribunal.

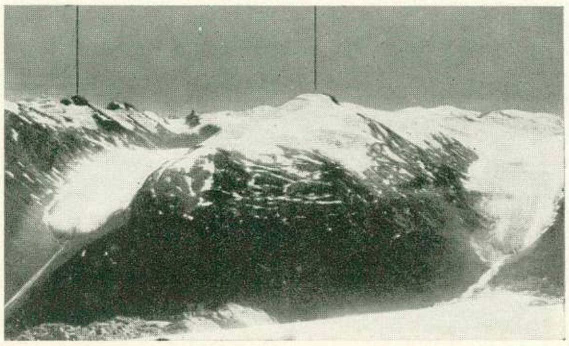
Station mark: a manganese-bronze monument, 8 inches high and 2 inches square, set in the rock.

British Columbia—Alaska—*Continued*

Boundary Point 24 (Unuk River; O. M. Leland, 1909; monument set by Jesse Hill, 1920). On the summit of Mount Blaine, about 1½ miles southeasterly from the head of Gracey Creek. The peak is a large rock exposure near the northern end of a long snow ridge; elevation 6,346 feet. The monument marks the point S 6450 of the Award of the Alaska Boundary Tribunal.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. The station is referenced by a cairn 0·58 metre distant, on line to Boundary Point 28, and by a copper bolt 0·064 metre northerly.

B.P. 23 from camera sta. Mount 8, on west side of Leduc River, northeast of junction of first western tributary.



B.P.s 23 and 24 from camera sta. E, near head of Boulder Creek, between Gracey Creek and Unuk River.

Boundary Point 25 (Unuk River; Jesse Hill, 1920). On the east side of the glacier at the head of Gracey Creek at a point about 400 metres southeast of the nose of the glacier. The monument is on a bare granite ledge about 15 metres above the edge of the glacier; the ledge rises steeply to the east for a distance of 30 metres to the edge of vegetation; elevation 2,963 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a small cairn on the line of the boundary distant 2·56 metres westerly from the monument. The cone type monument set in 1909 and called "Gracey Creek Monument" was removed from its site by cutting off the lugs that anchored it in place. The conical body of the monument was built into the centre of the cairn.

Boundary Point 26 (Unuk River; Jesse Hill, 1920). On the ridge between Gracey Creek and Smith Lake, about 0·6 metre from the perpendicular drop northeasterly toward Gracey Creek; elevation 3,412 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a 3-foot cairn on the boundary line southeasterly from the monument. Gracey Creek bolt, 1909, is distant 100 metres in azimuth 23° 21′; elevation 3,543 feet.

Boundary Point 27 (Unuk River; Jesse Hill, 1920). On the highest rock exposure southeast of the flat snow-covered summit of Mount Middleton. Below it the ridge is very steep, descending to an ice-covered lake; elevation 5,086 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn on the line of the boundary distant about 1·2 metres westerly from the monument. The cone type monument set in 1909 and called "Boundary Turn 5800" was removed from its site by cutting off the lugs that anchored it in place. The conical body of the monument was built into the centre of the cairn.

B.P. 28, also from camera sta. E.

Boundary Point 28 (Unuk River; Jesse Hill, 1920). On the summit of the ridge ⅓ mile southwest of the highest point of the mountain that rises rather abruptly at first between the two forks of Lake Creek and then extends more gradually northward to the almost flat snow-covered summit; elevation 5,266 feet. It is officially named Mount Middleton and is the point S 5800 of the Award of the Alaska Boundary Tribunal. Boundary Point 28 is located on the straight line course between Boundary Points 18 and 40 (See pp. 53 and 118).

Being on a snow field, there is no station mark. Boundary Point 28 is 528·4 metres from Boundary Point 27 in azimuth 112° 50′ 17″ and 323·2 metres from Boundary Point 29 in azimuth 318° 38′ 49″. The site

British Columbia—Alaska—*Continued*

of the monument set to mark the point S 5800 in 1909, called "Boundary Turn 5800", and removed in 1920 is on the boundary 425 metres from Boundary Point 28 in azimuth 318° 29′; elevation 4,940 feet.

Boundary Point 29 (Unuk River; Jesse Hill, 1920). About 350 feet in elevation below the flat snow-covered summit of Mount Middleton; on the western slope of the mountain; on a rock ledge about 100 feet wide, about 25 feet from the south side of the ledge; elevation 4,912 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn 5 metres northwesterly.

Boundary Point 30 (Unuk River; O. M. Leland, 1905; monument set by Jesse Hill, 1920). On the southeast side of Lake Creek, 100 metres from the creek and 50 metres from the foot of the mountain; elevation 1,910 feet. The monument replaces "Lake Creek east bolt 1909"; elevation 1,910 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn 2·4 metres southeasterly.

Boundary Point 31 (Unuk River; Jesse Hill, 1920). About 85 metres west of the main channel of the west fork of Lake Creek and 40 feet above it; elevation 1,946 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is 0·051 metre southeasterly from Lake Creek west bolt (a copper bolt set by O. M. Leland in 1909). It is referenced by a cairn on the boundary line 1·37 metres northwesterly from the monument.

Boundary Point 32 (Unuk River; Jesse Hill, 1920). On the southeast side of the ridge west of Lake Creek and south of the southern branch of Boulder Creek, on the edge of the highest solid rock ledge, below several detached slabs of rock; elevation 5,233 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. The station is referenced by a 6-foot cairn, distant 1·40 metres northwesterly.

Boundary Point 33 (Unuk River; Jesse Hill, 1920). On the northwest side of the ridge south of the southern branch of Boulder Creek, on a small shelf on the highest solid rock ledge crossed by the boundary on the ridge below a rock slide; about 8 metres from the edge of the glacier; elevation 4,080 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a cairn 15 feet southeasterly, which, however, may be destroyed by the rock slide.

Boundary Point 34 (Unuk River; Jesse Hill, 1920). On the ridge between the forks of the south branch of Boulder Creek and about midway between the forks; in the centre of the shelf on the north face of an outcropping ledge; elevation 2,392 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock. It is referenced by a hemlock stump 30 inches in diameter 6 metres northerly, with an arrow cut in the top pointing to the monument.

Boundary Point 35 (Unuk River; Fremont Morse, 1905, 1920). On the crest of a ridge about 1,550 metres southeast along the boundary from Unuk River, and between the first and second streams that cross the boundary after leaving the river. These streams run north and are, respectively, the first fork of Boulder Creek, and the western branch of the second or Glacier Fork of Boulder Creek. The top of the ridge is flat for about 12 metres along the boundary and the monument is near the north edge of this flat top. The ridge is timbered; elevation 1,373 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 36 (Unuk River; Fremont Morse, 1905, 1920). Near the summit of a small peak on the south side of Unuk River about ¾ mile below the mouth of Boulder Creek; about 30 feet from the summit on the northern slope; elevation 1,583 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base.

Boundary Point 37 (Unuk River; Fremont Morse, 1905, 1920). On the south side of Unuk River about ¾ mile below the mouth of Boulder Creek, about 20 feet from the high water mark, at the foot of a small steep peak; elevation 324 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base.

Boundary Point 38 (Unuk River; Fremont Morse, 1905, 1920). On the north side of Unuk River about ¾ mile below the mouth of Boulder Creek, and about 150 feet upstream from the old boundary cabin; about 120 feet from the river; a few inches on the south side of a large boulder, which protects it from a rock slide; elevation 336 feet.

Station mark: an aluminium-bronze obelisk about 4½ feet high set in a concrete base.

Boundary Point 39 (Unuk River; Fremont Morse, 1905, 1920). About 1 mile from Unuk River, on the southern slope of Mount Stoeckl; on a nearly level shoulder of the mountain, on the top of a bluff; elevation 3,402 feet.

British Columbia—Alaska—*Continued*

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock. It is referenced by two arrows cut in the rock on the boundary pointing towards it, each 10 feet distant.

Boundary Point 40 (Unuk River; Fremont Morse, 1905, 1920). On the summit of Mount Stoeckl, on a granite ledge on the northwest side of the top of the snow-covered peak; elevation 6,014 feet. This peak is the point S 6200 of the Award of the Alaska Boundary Tribunal.

Station mark: an aluminium-bronze cone about 2½ feet high, set in the rock on the summit. It is referenced by two arrows cut in the rock pointing towards it; the first is 10·7 metres in a southerly direction, and the second 6·4 metres westerly.

B.P. 40 from camera sta. D, on hill northwest of head of third canyon, Unuk River.

Boundary Point 41 (Unuk River; O. M. Leland, 1909; monument set by Jesse Hill, 1920). About 1 mile easterly from the Lava Fork of Blue River, about 3 miles from the confluence with Blue River; a little north of the face of a projection of a hanging glacier; elevation 3,059 feet.

Station mark: a manganese-bronze post, about 8 inches high and 2 inches square, set in the rock between two copper bolts set at right angles to the boundary line. It is witnessed by a cairn 4·5 metres easterly.

Boundary Point 42 (Unuk River; O. M. Leland, 1909, 1920). On the east side of the Lava Fork of Blue River about 3 miles from the confluence with Blue River; on a very large boulder near the lower end of the vista; elevation 1,138 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base.

Boundary Point 43 (Unuk River; O. M. Leland, 1909, 1920). About 1 mile west of the Lava Fork of Blue River about 3 miles from the confluence with Blue River; on the east slope of the mountain above timber-line; elevation 4,502 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 44 (Unuk River; O. M. Leland, 1909; monument set by Jesse Hill, 1920). On the crest of the ridge between the Lava Fork of Blue River and the next northern branch of Blue River to the west; elevation 5,168 feet.

Station mark: a manganese-bronze post, 8 inches high and 2 inches square, set in the rock 0·686 metre west of a copper bolt. It is referenced by a cairn 0·6 metre on the south side of the bolt.

Boundary Point 45 (Unuk River; O. M. Leland, 1909; monument set by Jesse Hill, 1920). About 1 mile east of the next northern branch of Blue River westward from the Lava Fork, and 1 mile from its confluence with Blue River; it is on the first rock ledge on the bluff above timber-line; elevation 3,641 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 46 (Unuk River; O. M. Leland, 1909, 1920). About 200 metres west of the next northern branch of Blue River westward from the Lava Fork, and a mile from its confluence with Blue River; on a rock ledge; elevation 1,457 feet.

Station mark: an aluminium-bronze cone, 2½ feet high, set in the rock.

B.P. 47 from B.P. 48.

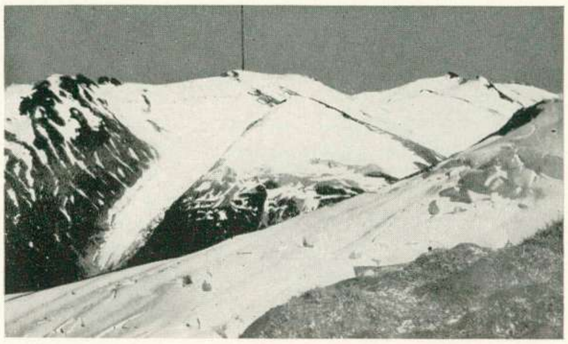
Boundary Point 47 (Bradfield River; J. D. Craig, 1907). Mount Lewis Cass, a very sharp peak about 20 miles northeasterly from the confluence of the north and east forks of Bradfield River; it was not climbed; elevation 6,864 feet. This peak is the point S 6500 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907 and 1909.

BRITISH COLUMBIA—ALASKA—*Continued*

Boundary Point 48 (Bradfield River; J. D. Craig, 1907). Mount Pounder, a long ridge with a snow dome about 20 miles northeast from the confluence of the north and east forks of Bradfield River; 4½ miles northwesterly from Mount Lewis Cass, and 6 miles southeast from the intersection of the boundary with the westerly branch of the South Fork of Iskut River; elevation 6,514 feet. This peak is the point S 6400 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow dome as it was in 1907.



B.P. 48 from triangulation sta. Bob, west of B.P. 48, about southeast of B.P. 52.

Boundary Point 49 (Stikine River; J. D. Craig, 1908). About 1 mile southeasterly from the intersection of the boundary line with the South Fork of Iskut River, on the east side of the creek descending from the west side of Mount Pounder; elevation 765 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 50 (Stikine River; J. D. Craig, 1908). About 1 mile southeasterly from the intersection of the boundary line with the South Fork of Iskut River; on the west side of the creek descending from the west side of Mount Pounder; elevation 640 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 51 (Stikine River; J. D. Craig, 1908). On the southeast side of the South Fork of Iskut River; elevation 585 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 52 (Stikine River; J. D. Craig, 1908). On the northwest side of the South Fork of Iskut River; elevation 595 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 53 (Stikine River; J. D. Craig, 1907, 1908). Mount Fawcett, about 15 miles southeasterly from the confluence of Stikine and Katete Rivers; it rises gradually from the southeast to a steep summit at the northwestern end of the ridge; elevation 6,213 feet. This peak is the point S 6765 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the small sharp prominence on the summit.

Boundary Point 54 (Stikine River; A. J. Brabazon, 1905, 1912, 1948). The southerly and highest of the twin peaks of Mount Whipple, about 10 miles southeasterly from the confluence of Stikine and Katete Rivers and 2 miles north of Katete River; it is about 1 mile southeast of Mount Geoffrion, which is a higher and sharper peak; elevation 5,745 feet. This peak is the point S 6000 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the rock peak.

B.P.s 54 and 53 from B.P. 62.

Boundary Point 55 (Stikine River; A .J. Brabazon, 1905, 1912, 1948). About 8 miles southeasterly from the confluence of Stikine and Katete Rivers and 1 mile from Katete River; on a rocky ledge near a 40-foot precipice, ¼ mile above timber-line; elevation 2,065 feet.

Station mark: a copper bolt set in the rock.

Boundary Point 56 (Stikine River; A. J. Brabazon, 1905, 1912, 1948). About 7 miles from the confluence of Stikine and Katete Rivers, on the bench about 275 metres east of Katete River; elevation 314 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 56.

Boundary Point 57 (Stikine River; A. J. Brabazon, 1905, 1912, 1948). About 6 miles southeasterly from the confluence of Stikine and Katete Rivers, on the top of the slope about 2 miles west along the boundary from Katete River; elevation 1,950 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 57.

British Columbia—Alaska—*Continued*

Boundary Point 58 (Stikine River; A. J. Brabazon, 1905, 1912, 1948). About 5 miles southeasterly from the confluence of Stikine and Katete Rivers, and nearly 1 mile east of the west branch of Katete River 2 miles from its mouth; on the top of the slope on the east side of the valley. It is about the centre of a small knoll 2 feet high and 50 feet east of a similar knoll, in an open park; elevation 2,082 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 58.

Boundary Point 59 (Katete River; A. J. Brabazon, 1905, 1912, 1948). About 5 miles southeasterly from the confluence of Stikine and Katete Rivers and about ¼ mile east of the West Fork of the Katete, on a narrow ledge about 3 feet wide along the boundary line about three-quarters of the way up the steep slope; elevation 410 feet.

Station mark: a copper post 2 inches square and 1 foot high set in the rock; numbered 59.

Boundary Point 60 (Katete River; A. J. Brabazon, 1905, 1912, 1948). About 5 miles southeasterly from the confluence of Stikine and Katete Rivers and 119 metres west of the West Fork of the Katete, about 10 feet west of the top of the cut bank on the first shelf above the river; elevation 170 feet.

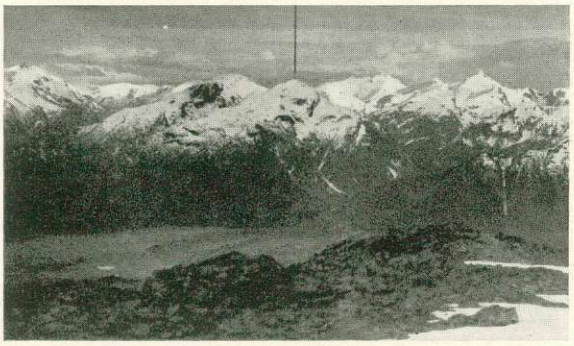
Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 60.

Boundary Point 61 (Katete River; A. J. Brabazon, 1905, 1912, 1948). About 5 miles southeasterly from the confluence of Stikine and Katete Rivers and 2 miles west of the West Fork of the Katete, on the highest point of the ridge 1 mile east of Mount Coté, among shale rock; elevation 2,685 feet.

Station mark: a copper bolt 1 inch in diameter and 4 inches high, referenced by a cairn 20 feet easterly; numbered 61.

Boundary Point 62 (Stikine River; G. White-Fraser, 1904, 1905; U.S. Coast and Geodetic Survey, 1929). Mount Coté, about 4 miles southerly from the confluence of Stikine and Katete Rivers. This peak is the point S 4308 of the Award of the Alaska Boundary Tribunal. Elevation 4,378 feet (U.S.C. and G.S., 1929).

Station mark: an aluminium-bronze cone about 2½ feet high set in rock.



B.P. 62 from B.P. 66.

Boundary Point 62A (Stikine River; G. White-Fraser, 1904, 1938, 1948). About 2 miles below the confluence of Stikine and Katete Rivers and ⅓ mile south of the south backwater of Stikine River; a little over 100 feet up the slope from the base of Mount Coté; about 45 feet above the surface of the valley; elevation 119 feet.

Station mark: an aluminium-bronze obelisk about 4½ feet high set in a concrete base; numbered 62A.

Boundary Point 63 (Stikine River; N. J. Ogilvie, 1913, 1938, 1948). About 1 mile below the confluence of Stikine and Katete Rivers, on the south side of the northern channel of Stikine River; elevation 59 feet.

Station mark: the original mark set in 1913 was an aluminium-bronze obelisk set in a concrete base. It was carried away and lost by erosion of the bank. In 1938 it was replaced with an aluminium-bronze cone about 2½ feet high set in a concrete base 165·9 metres south along the boundary from the site of the original monument and 118 metres south from the river bank; numbered 63. In 1948 this second monument was found to have been carried away by erosion.

Boundary Point 64 (Stikine River; Fremont Morse, 1904, 1920, 1938, 1948). About 1 mile below the confluence of Stikine and Katete Rivers; about 75 metres north of the north channel of Stikine River; elevation 60 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base; numbered 64.

Boundary Point 65 (Stikine River; Fremont Morse, 1904, 1938). About 1 mile below the confluence of Stikine and Katete Rivers, on high ground about 1,000 metres north of the north channel of Stikine River, and 100 metres south of the foot of a cliff several hundred feet high; elevation 115 feet.

Station mark: an aluminium-bronze obelisk about 4½ feet high set in a concrete base; numbered 65.

Boundary Point 66 (Stikine River; Fremont Morse, 1904; U.S. Coast and Geodetic Survey, 1929). Elbow Mountain, about 3 miles northwesterly from the confluence of Stikine and Katete Rivers; elevation 4,207 feet (U.S.C. and G.S., 1929, 4,249 feet). This peak is the point S 4235 of the Award of the Alaska Boundary Tribunal.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock on the summit.

BRITISH COLUMBIA—ALASKA—*Continued*

B.P. 66 from camera sta. Kelly, on hill on south side of Stikine River, south of mouth of Shuktusa Creek.

B.P. 67 from triangulation sta. 4770 on Glacier Mountain, west of Stikine River and northwest of mouth of Iskut River.

Boundary Point 67 (Stikine River; Fremont Morse, 1904). Mount Gallatin, a snow-covered mountain, about 4 miles west of the confluence of Stikine and Iskut Rivers; elevation 5,098 feet. This peak is the point S 5060 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow dome as it was in 1904.

Glacier Mountain and B.P. 68 from triangulation sta. Ice, elev. 5035, on west side of Stikine River, north of Ice Capped Mountain.

Boundary Point 68 (Stikine River; Fremont Morse, 1904). Mount Talbot, about 5 miles northwest of the confluence of Stikine and Iskut Rivers, and south of Great Glacier; elevation 4,461 feet. This peak is the point S 4200 of the Award of the Alaska Boundary Tribunal.

Station mark: an aluminium-bronze cone about 2½ feet high set in rock on the summit.

Boundary Point 69 (Stikine River; Fremont Morse, 1904; U.S. Coast and Geodetic Survey, 1929). Castle Mountain, a mountain with three peaks at the southwest end of Great Glacier, which discharges into Stikine River; elevation 7,326 feet. This peak is the point S 7342 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the southwestern peak as it was in 1904.

B.P. 69 from triangulation sta. Knob, elev. 4270, on east side of Stikine River, east of foot of Great Glacier.

B.P. 70, also from triangulation sta. Knob.

Boundary Point 70 (Stikine River; W. F. Ratz, 1907; U.S. Coast and Geodetic Survey, 1929). Kates Needle, the snow-covered mountain with three prominent peaks, about 9 miles west of Stikine River at a point 20 miles above the mouth of Iskut River; elevation 10,002 feet. The middle and highest peak is the point S 9955 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the middle and highest snow-covered peak as it was in 1907.

British Columbia—Alaska—*Continued*

Boundary Point 71 (Baird Glacier; W. F. Ratz, 1907). Devils Thumb, the high sugarloaf peak between the two arms of the first glacier from the south discharging into Baird Glacier; about 18 miles from the face of Baird Glacier; elevation 9,077 feet. This peak is the point S 9105 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the rock summit as it was in 1907.

Boundary Point 72 (Baird Glacier; W. F. Ratz, 1907). Mount "T", the peak at the northeastern end of the mountain mass on the south side of the head of Baird Glacier; about 24 miles from the face of Baird Glacier; elevation 8,001 feet. This peak is the point S 7950 and "T" of the Award of the Alaska Boundary Tribunal. (*See* illustration, page 177.)

Station mark: the highest part of the peak as it was in 1907.

Boundary Point 73 (Endicott Arm; W. F. Ratz, 1908). The peak about 4 miles southwest of the mountain mass that rises to an elevation of over 10,000 feet between the north end of the snow field north of Baird Glacier and the snow field at the head of Dawes Glacier; about 25 miles from the face of Dawes Glacier; elevation 8,526 feet. This is Boundary Peak 8660 under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

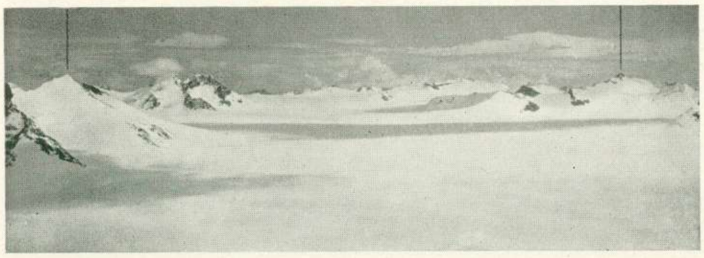
Station mark: the highest part of the peak as it was in 1908.

B.P.s 73 and 71 from camera sta. Hall, elev. 7310, on rock outcrop south of Dawes Glacier; southwest of B.P. 74 and about west of Mount Noel.

B.P. 74, also from camera sta. Hall.

Boundary Point 74 (Endicott Arm; W. F. Ratz, 1908). The peak at the rock exposed west side of the snow-covered mountain mass north of the east end of Dawes Glacier, and east of the second snow field extending northerly from the glacier; a higher peak lies 2 miles northeasterly; about 17 miles from the face of Dawes Glacier; elevation 7,358 feet. This is Boundary Peak 8 under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the peak as it was in 1908.



B.P.s 76 and 75 from camera sta. Nieve, elev. 6760, on first outcrop west of B.P. 76.

Boundary Point 75 (Endicott Arm; W. F. Ratz, 1908). On the mountain lying in a north and south direction east of the snow field that is east of the mountain range on the south side of North Dawes Glacier, and southeast of the junction of the North Dawes and South Sawyer Glaciers; on the lower of the two peaks, at the southern end of the mountain; elevation 7,776 feet. Under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the peak as it was in 1908.

Boundary Point 76 (Endicott Arm; W. F. Ratz, 1908). The most southerly of a number of peaks lying in a north and south direction on the east side of South Sawyer Glacier, at the junction of the North Dawes and South Sawyer Glaciers; elevation 7,442 feet. Under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the peak as it was in 1908.

British Columbia—Alaska—*Continued*

Boundary Point 77 (Tracy Arm; W. F. Ratz, 1908). The highest peak between South Sawyer Glacier and Sawyer Glacier, about 12 miles from the face of South Sawyer Glacier; elevation 7,176 feet. Under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the peak as it was in 1908.

B.P. 77 from camera sta. Glacier, elev. 6330, west of Mount Owens and southeast of foot of South Sawyer Glacier.

B.P. 78 from camera sta. Luck, north of foot of South Sawyer Glacier, on highest point of ridge running southwest from B.P. 78.

Boundary Point 78 (Tracy Arm; W. F. Ratz, 1908). Hill Peak, about 9 miles northeast of the point at the end of Tracy Arm between the valleys of Sawyer and South Sawyer Glaciers; elevation 7,177 feet. Under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the peak as it was in 1908.

Boundary Point 79 (Whiting River; J. D. Craig, 1906). The conical peak about 2 miles south of Whiting River 6 miles east of its confluence with the Crescent Lake stream; about 25 miles from the mouth of Whiting River; elevation 5,821 feet. This is Boundary Peak 7 under authority of the "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the peak as it was in 1906.

B.P.s 79 and 78 from triangulation sta. Tower, elev. 6330, on highest point of hill northeast of junction of Whiting River and outlet of Crescent Lake.

Boundary Point 80 (Whiting River; W. F. Ratz, 1907). About ¼ mile south of Whiting River, 5 miles east of its confluence with the Crescent Lake stream; about 25 miles from the mouth of Whiting River; elevation 1,240 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 81 (Whiting River; W. F. Ratz, 1907). On the southwesterly bank of Whiting River 4½ miles east of its confluence with the Crescent Lake stream; about 25 miles from the mouth of Whiting River; elevation 185 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

B.P. 83 from camera sta. Dell, on side of hill on south side of Whiting River, east of south from station Tower.

Boundary Point 82 (Whiting River; W. F. Ratz, 1907). On the north bank of Whiting River 4 miles east of its confluence with the Crescent Lake stream; about 25 miles from the mouth of Whiting River; elevation 190 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 83 (Whiting River; J. D. Craig, 1906). The peak 3 miles northeast of the mouth of the creek 1 mile east of the confluence of Whiting River and the Crescent Lake stream; about 25 miles from the mouth of Whiting River; there are slightly higher peaks

British Columbia—Alaska—*Continued*

1½ miles northerly and southeasterly, and 2 miles easterly; elevation 5,425 feet. This is Boundary Peak 6 under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the snow summit as it was in 1906.

Boundary Point 84 (Whiting River; J. D. Craig, 1906). Mount Brundage, the snow-covered ridge with a steep rocky easterly face about 5 miles north of the easterly end of Crescent Lake; about 30 miles from the mouth of Whiting River; elevation 6,464 feet. This is Boundary Peak 5 under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the snow summit as it was in 1906.

B.P. 84 from camera sta. B 3, elev. 2430, southwest of B.P. 83, on side of hill east of creek with source near B.P. 84.

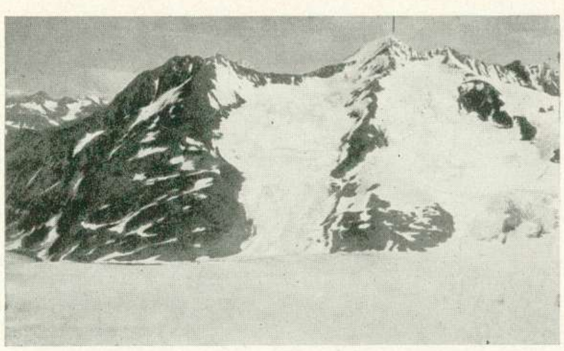
Boundary Point 85 (Taku River; W. F. Ratz, 1906). Mount Fremont Morse, the mountain at the southwesterly end of Wright Glacier; about 15 miles from the confluence of the stream from the glacier and Taku River, which is about 6 miles from the mouth of the river; elevation 6,732 feet. This is Boundary Peak 4 under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the highest and most northerly of several peaks as it was in 1906.

B.P. 85 from triangulation sta. Queen, elev. 5655, on west side of Wright Glacier and east of B.P. 85.

Boundary Point 86 (Taku River; W. F. Ratz, 1906). Mount Ogden, the mountain on the easterly side of Wright Glacier; about 15 miles from the confluence of the stream from the glacier and Taku River, which is about 6 miles from the mouth of the river; elevation 7,441 feet. This is Boundary Peak 3 under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: the highest part of the peak as it was in 1906.



B.P. 86, also from triangulation sta. Queen.

B.P. 87 from camera sta. Kull, to right of boundary line from B.P. 91 to B.P. 92; on northwest side of Taku River and southeast of B.P. 92.

Boundary Point 87 (Taku River; W. F. Ratz, 1906). About 5 miles southeast of the confluence of Sittakanay and Taku Rivers, which is about 9 miles from the mouth of Taku River; it is the small peak at the west end of the ridge with a snow field on the north side, which is separated from the more prominent Wright Peaks to the west by a steep draw; elevation 6,001 feet. This is Boundary Peak 2 under authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: a cairn over a wooden hub.

Boundary Point 88 (Taku River; W. F. Ratz, 1907, 1938). About 1 mile southerly from Sittakanay River 2 miles from its confluence with Taku River; elevation of top of monument 1,340 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base; numbered 88.

BRITISH COLUMBIA—ALASKA—*Continued*

Boundary Point 89 (Taku River; W. F. Ratz, 1907, 1920, 1938). On the south side of Taku River about 2 miles above its confluence with Sittakanay River, and about 10 miles above the mouth of Taku River; elevation of top of monument (1938) 50 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base; numbered 89.

Boundary Point 90 (Taku River; W. F. Ratz, 1907, 1920, 1938). On the north side of Taku River about 2 miles above its confluence with Sittakanay River, and about 10 miles above the mouth of Taku River; elevation of top of monument (1938) 74 feet.

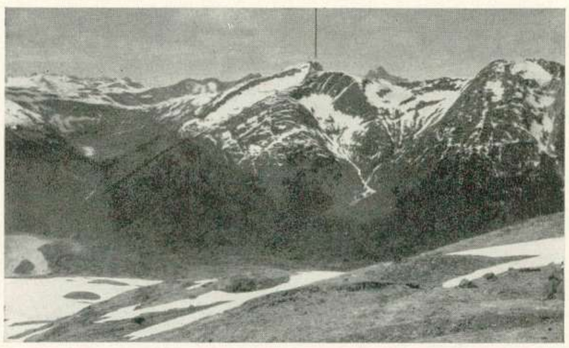
Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base; numbered 90.

Boundary Point 91 (Taku River; W. F. Ratz, 1907, 1938). About 1 mile northwesterly from Taku River 2 miles above the mouth of Sittakanay River; elevation of top of monument (1938) 2,160 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base; numbered 91.

Boundary Point 92 (Taku River; W. F. Ratz, 1905). About 2½ miles northwest of Taku River 2 miles above the mouth of Sittakanay River, elevation 5,455 feet. This is Boundary Peak 1 under the authority of "Exchange of Notes", March 25, 1905 (*See* p. 9).

Station mark: a copper bolt set in the rock on the dome-shaped summit.



B.P. 92 from triangulation sta. Carter, elev. 4120, on southeast side of Taku River and north of Sittakanay River.

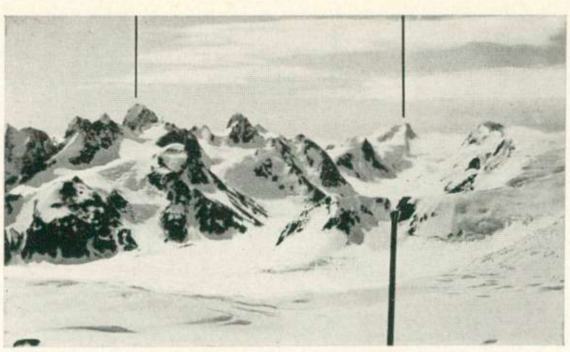
B.P. 93 from triangulation sta. Cache, elev. 6585, north of B.P. 93 and east of B.P. 95.

Boundary Point 93 (Taku River; W. F. Ratz, 1906). The middle and highest peak of Devils Paw, a prominent mountain with three sharp peaks about 13 miles northwest of the confluence of Taku and Tallsaykway Rivers; elevation 8,584 feet. This peak is the point S 8000 and "P" of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 94 (Tallsaykway River; H. S. Mussell, 1910). The highest peak on the mountain about 5 miles northwest of Devils Paw and 3 miles southwesterly from Mount Nelles (a sugarloaf peak with an elevation of over 8,000 feet); on the east side of the narrow divide between the head of the main stream of the glacier flowing into Tallsaykway River and the snow fields to the south; elevation 7,532 feet. This peak is the point S 7850 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1910.



Mount Nelles and B.P. 94 from triangulation sta. Pussy, elev. 7120, west of north from B.P. 94 and east of B.P. 96.

Boundary Point 95 (Atlin Lake; O. M. Leland, 1907). Mount Ogilvie, a sharp and well-defined peak about 25 miles southwesterly from the south end of Atlin Lake, and 4 miles southwesterly from the snow divide at the west of the south end of Llewellyn Glacier; elevation 7,700 feet. This peak is the point S 7800 of the Award of the Alaska Boundary Tribunal.

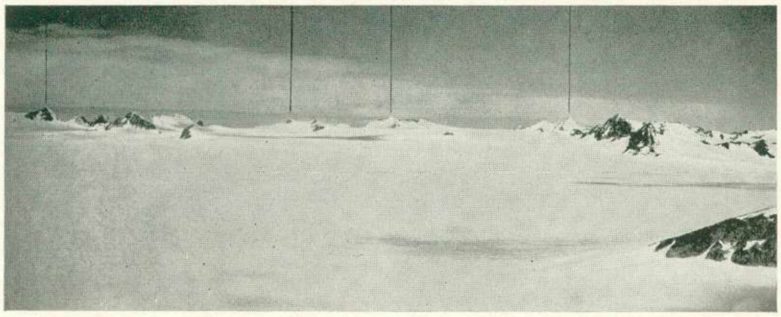
Station mark: the highest part of the peak as it was in 1907.

Boundary Point 96 (Atlin Lake; O. M. Leland, 1907). A sharp peak covered with snow, except on partly bare west side, about 25 miles southwesterly from the south end of Atlin Lake, and 5 miles westerly from the snow

British Columbia—Alaska—*Continued*

divide at the west of the south end of Llewellyn Glacier; elevation 7,406 feet. This peak is the point S 7300 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1907.



B.P.s 95, 96, 97, and 98, also from triangulation sta. Pussy.

Boundary Point 97 (Atlin Lake; O. M. Leland, 1907). The higher of a pair of snow domes on the mountain about 25 miles southwesterly from the south end of Atlin Lake, and 5 miles northwesterly from the snow divide at the west of the south end of Llewellyn Glacier; elevation 7,850 feet. This peak is the point S 7000 of the Award of the Alaska Boundary Tribunal.

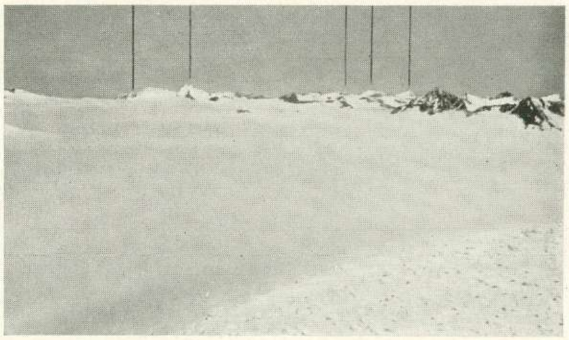
Station mark: the highest part of the highest snow dome as it was in 1907.

Boundary Point 98 (Atlin Lake; O. M. Leland, 1907). Mount Nesslerode, a prominent peak that rises from a large snow field near the divide about 20 miles southwesterly from the south end of Atlin Lake, and 5 miles west of the Llewellyn Glacier; elevation 8,105 feet. This peak is the point S 6925 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

Boundary Point 99 (Atlin Lake; O. M. Leland, 1907). About 22 miles southwesterly from the south end of Atlin Lake and 10 miles west of the Llewellyn Glacier. The mountain upon which this peak is situated extends in a north and south direction and the peak is near the southern end. It is rocky and well defined; elevation 7,446 feet. This peak is the point S 5760 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.



B.P.s 99, 98, 100, 101, and 102 from triangulation sta. 7800, on first mountain east of B.P. 95.

Boundary Point 100 (Atlin Lake; O. M. Leland, 1907). About 17 miles southwesterly from the south end of Glacier Inlet, Atlin Lake; it is the rocky summit of a peak near the southern part of a large curved mountain ridge that has at least two other peaks; elevation 7,550 feet. This peak is the point S 6750 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

B.P.s 102, 101, and 100 from triangulation sta. Selby sub, elev. 6435, on east side of Lynn Canal, east of Kataguna Island.

Boundary Point 101 (Atlin Lake; O. M. Leland, 1907). About 17 miles west-southwesterly from the south end of Glacier Inlet, Atlin Lake; it is a very large prominent peak covered with snow and has large ridges leading up to the summit; the north side seems very steep; elevation 7,847 feet. This peak is the point S 7995 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow peak as it was in 1907.

Boundary Point 102 (Atlin Lake; O. M. Leland, 1907). Mount Poletica, a large symmetrical snow dome about 17 miles westerly from the south end of Glacier Inlet, Atlin Lake; elevation 7,620 feet. This

British Columbia—Alaska—*Continued*

peak is the point S 7720 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow dome as it was in 1907.

Boundary Point 103 (Atlin Lake; O. M. Leland, 1907). About 20 miles westerly from the south end of Glacier Inlet, Atlin Lake. This peak is sharp and rocky. The mountain is characterized by prominent rocky ridges leading up to the peak and by the large snow field on its northern side. The southern branch of the Meade Glacier passes this peak on the west, and a feeder of it runs from east to west on the north side of the peak; elevation 7,164 feet. This peak is the point S 7175 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

B.P.s 105, 104, 102, and 103 from triangulation sta. Garrett, elev. 6495, south of Meade Glacier and west of B.P. 104.

Boundary Point 104 (Atlin Lake; O. M. Leland, 1907). About 19 miles west-southwest from West Bay, Atlin Lake; on the east side of the Meade Glacier and opposite the large mountain (elevation 8,660 feet) on the west side of the glacier. The mountain is quite snowy although the peak is rocky and bare; elevation 6,816 feet. This peak is the point S 6465 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

Boundary Point 105 (Atlin Lake; O. M. Leland, 1907). Mount Canning, a mountain about 19 miles westerly from West Bay, Atlin Lake, opposite the point where the main stream of the Meade Glacier turns westward in its flow; about 6 miles east of the confluence with its northern main branch and where a smaller glacier from the eastward abuts against the side of the Meade Glacier; the smaller glacier flows down from the divide which is approximately at the boundary line. The peak is on the south side of the divide; elevation 6,927 feet. This peak is the point S 6600 of the Award of the Alaska Boundary Tribunal.

Station mark: a copper bolt cemented into the rock on the western summit of two peaklets of equal elevation. The whole top of the mountain is much shattered, but the bolt is in a large rock containing perhaps 10 cubic yards of granite.

Boundary Point 106 (Katzehin River; O. M. Leland, 1907). About 13 miles easterly from the mouth of Katzehin River, Chilkoot Inlet, and 3 miles northerly from the confluence of the northerly and southerly branches of the Meade Glacier. This is a peak in the same great mass as Boundary Point 107, lying west of the northerly branch of the Meade Glacier; it is covered by a huge snow cap, nearly flat at the highest point; elevation 6,576 feet. This peak is the point S 6550 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap.

B.P.s 106 and 107 from B.P. 105.

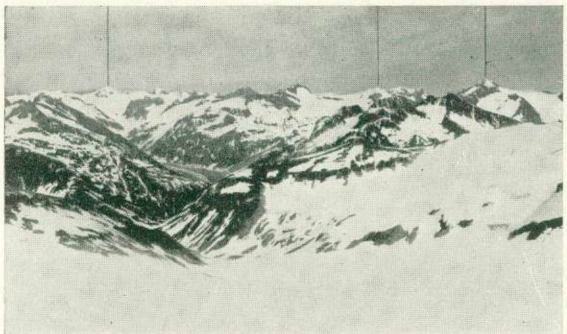
Boundary Point 107 (Katzehin River; O. M. Leland, 1907). Mount Bagot, a prominent mountain about 13 miles northeasterly from the mouth of Katzehin River, Chilkoot Inlet, and about 8 miles northerly from the confluence of the northerly and southerly branches of the Meade Glacier. The mountain lies west of the northerly branch of the Meade Glacier; it has three rocky summits or peaks. The west and middle peaks are slightly higher than the east peak, and the west one is divided into two peaklets, of which the eastern one is the boundary peak; elevation 7,155 feet. This peak is the point S 7050 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the eastern peaklet of the western peak as it was in 1907.

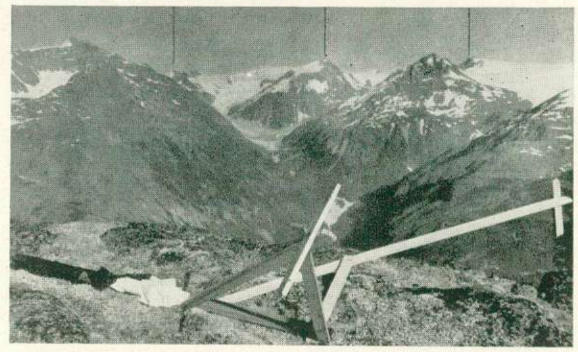
Boundary Point 108 (Katzehin River; O. M. Leland, 1907). About 15 miles northeasterly from the mouth of Katzehin River, Chilkoot Inlet, and 10 miles northerly from the confluence of the northerly and southerly branches of the Meade Glacier; just east of the north end of the northerly branch of the glacier. It is a snow-topped peak with a rocky face on its western side; a small rocky point shows through the snow at the summit; elevation 6,826 feet. This peak is the point S 6700 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

British Columbia—Alaska—*Continued*



B.P.s 109, 108, and 107 from camera sta. Flemer near the peak of Mount Villard, east of Haines, Alaska.



B.P.s 111, 110, and 109 from triangulation sta. Hump, elev. 4720, on ridge between the mouths of Taiya and Skagway Rivers.

Boundary Point 109 (Skagway River; O. M. Leland, 1905). About 8 miles southeasterly from Skagway, and 2 miles south and a little west of Hefty Peak. It is the highest point of a snow cornice on the peak that lies at the northeastern side of a large snow field above the Denver Glacier; from this summit of snow there is a precipitous drop of several thousand feet, on the northeast side, to a stream glacier; elevation 6,934 feet. This peak is the point S 6800 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest point of the snow cornice as it was in 1905.

Boundary Point 110 (Skagway River; O. M. Leland, 1905). Hefty Peak, the mountain with a lance-like peak projecting from the glacier at its summit about 8 miles easterly from Skagway; elevation 7,047 feet. This peak is the point S 7270 of the Award of the Alaska Boundary Tribunal.

Station mark: the tip of the peak as it was in 1905.

Boundary Point 111 (Skagway River; O. M. Leland, 1905). The mountain with a sharp, well-defined peak about 8 miles easterly from the mouth of the southerly branch of Skagway River about 4 miles above Skagway; elevation 6,386 feet. This peak is the point S 6600 of the Award of the Alaska Boundary Tribunal.

Station mark: the tip of the peak as it was in 1905.

B.P. 110 from Skagway River Valley, about 4 miles from Skagway.

Boundary Point 112 (Skagway River; O. M. Leland, 1905, 1938). About 5 miles upstream from the mouth of the southeasterly branch of Skagway River 10 miles northeast of Skagway, and 3 miles above the White Pass and Yukon Railway bridge; on a high bluff about 244 metres south of the river; elevation 3,600 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 112.

Boundary Point 113 (Skagway River; O. M. Leland, 1905, 1938). About 5 miles from the mouth of the southeasterly branch of Skagway River 10 miles above Skagway, and 3 miles above the White Pass and Yukon Railway bridge; about 160 feet north of the river; elevation 2,813 feet.

Station mark: an aluminium-bronze obelisk about 4½ feet high set in a concrete base; numbered 113.

Boundary Point 114 (Skagway River; O. M. Leland, 1905). The highest point of a very sharp thin ridge having a northeasterly direction about 2 miles north of Monument 113. This ridge has two exposed rock summits, the southwesterly one being slightly the higher and containing the boundary point. The summit is 4 feet wide. On the southeast the mountain side is bare and drops away from the peak with extreme abruptness; on the northwest there is a large glacier bowl, lined with snow, with a lake in it. Elevation 6,788 feet. This peak is the point S 6750 of the Award of the Alaska Boundary Tribunal.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base, about 14 inches square and 3 inches deep, on a rock about 2 feet by 3 feet embedded in loose rocks.

British Columbia—Alaska—*Continued*

Boundary Point 115 (Skagway River; O. M. Leland, 1905, 1936). About southeast of Boundary Point 116, distant 1,588 feet, on a ridge extending southward partly across the entrance to Green Valley. This ridge separates the two streams that unite near its southerly end. A large rock lies just south of the monument. Elevation 3,532 feet.

Station mark: an aluminium-bronze cone about $2\frac{1}{2}$ feet high; numbered 115. There is a small cairn about 8 metres to the north.

B.P. 114 from camera sta. Taiya, on southwest slope of Mount Clifford, between Skagway River and Taiya River.

Boundary Point 116 "East White Pass" (Skagway River; O. M. Leland, 1905, 1936). On the east side of White Pass, 1,182·32 metres about east of the summit; elevation 3,453 feet.

Station mark: an aluminium-bronze obelisk about $4\frac{1}{2}$ feet high set in a concrete pyramidal base about 3 feet square and 2 feet high; numbered 116.

Boundary Point 117 "White Pass Monument" (Skagway River; O. M. Leland, 1905, 1920, 1936). At the south end of Summit Lake, on a small rocky knoll about 13 metres west of the railroad and 80 metres south of the railroad station. It is on the site of Provisional Boundary Monument No. 2, which was when erected considered to mark the exact summit of White Pass.

Station mark: an aluminium-bronze obelisk about $4\frac{1}{2}$ feet high set in concrete filling a cavity in the rock about 5 feet across and 3 feet deep; numbered 117. A bench mark in the form of a cross, chiselled on the west side of the monument, is $3\frac{3}{4}$ inches above the base. Elevation 2,916·576 feet (U.S.C. and G.S., 1950 value).

Boundary Point 118 "West White Pass" (Skagway River; O. M. Leland, 1905, 1936). On the extreme westerly ridge of White Pass just east of the canyon through which the stream from Blue Lake flows southward to join the main Skagway River a little below White Pass City. It is in a very prominent position, 1,080·4 metres west of the summit, and is on line with East White Pass and White Pass; elevation 3,601 feet.

Station mark: an aluminium-bronze obelisk about $4\frac{1}{2}$ feet high set in a concrete pyramidal base about 3 feet square and 2 feet high, anchored to the bedrock with drift bolts; numbered 118.

Boundary Point 119 (Taiya River; O. M. Leland, 1905; U.S.C. and G.S., 1936). On the flat-topped mountain about 2 miles southerly from Chilkoot Pass. The highest part of the mountain is a thin spur, seldom bare of snow. The point selected for the boundary point is on a mass of rock about 35 feet long, extending northeast and southwest, one of the first rocks to appear when the snow melts; elevation 5,931 feet. This peak is the point S 5550 of the Award of the Alaska Boundary Tribunal.

Station mark: an aluminium-bronze cone about $2\frac{1}{2}$ feet high set in the rock a few feet from a northerly precipice.

B.P. 119 from camera sta. Forks, on south slope of Mount Hoffmann, north of head of Taiya River.

Boundary Point 120 (Taiya River; O. M. Leland, 1906). About 7 miles northeasterly from the north forks of Taiya River; on the east side of Chilkoot Pass and about $\frac{1}{4}$ mile southerly from Crater Lake; elevation 3,739 feet.

Station mark: an aluminium-bronze cone about $2\frac{1}{2}$ feet high set in a concrete base.

Boundary Point 121 (Taiya River; O. M. Leland, 1906). About 7 miles northeasterly from the north forks of Taiya River; on the west side of Chilkoot Pass and about $\frac{1}{2}$ mile southwesterly from Crater Lake; elevation 4,114 feet.

Station mark: an aluminium-bronze cone about $2\frac{1}{2}$ feet high set in a concrete base.

Boundary Point 122 (Taiya River; O. M. Leland, 1906). Mount Van Wagenen, the conspicuous mountain about 10 miles north of the north forks of Taiya River and about 5 miles northwesterly from Chilkoot Pass; elevation 7,038 feet. This monument marks the point S 6500 of the Award of the Alaska Boundary Tribunal.

Station mark: a copper bolt covered by a cairn about 3 feet high. There is a small hole drilled in the rock 1·4 metres south-southeasterly from the bolt.

BRITISH COLUMBIA—ALASKA—*Continued*

B.P. 122 from B.P. 119.

B.P.s 123 and 122 from triangulation sta. Hoff, on Mount Hoffmann.

Boundary Point 123 (Taiya River; O. M. Leland, 1906). Mount Foster, about 15 miles from the north forks of Taiya River; on the east side of the divide of the glacier from the north flowing into the west fork; the farthest west of the three peaks of the mountain; elevation 7,127 feet. This peak marks the point S 6000 of the Award of the Alaska Boundary Tribunal.

Station mark: a steel drill set in a drill-hole in the rock, projecting about 3 inches above the rock.

Boundary Point 124 (Chilkat River; N. J. Ogilvie, 1910). On the nose projecting from the mountain on the east side of Chilkat Glacier, about 3 miles southeasterly from the head of Chilkat River and 1,800 feet above the level of the glacier; elevation 3,716 feet.

Station mark: a bronze bolt set in the rock.

Boundary Point 125 (Chilkat River; N. J. Ogilvie, 1910). On the west side of the ridge about 1 mile west of Chilkat Glacier, about 2½ miles south of the head of Chilkat River; elevation 5,881 feet.

Station mark: a bronze bolt set in the rock.

Boundary Point 126 (Chilkat River; D. W. Eaton, 1906). On the east side of Chilkat River about 7 miles above its confluence with Tahini River; on the first rock bench about 400 metres from the main channel of the river and 100 feet above the river bottom; elevation 590 feet.

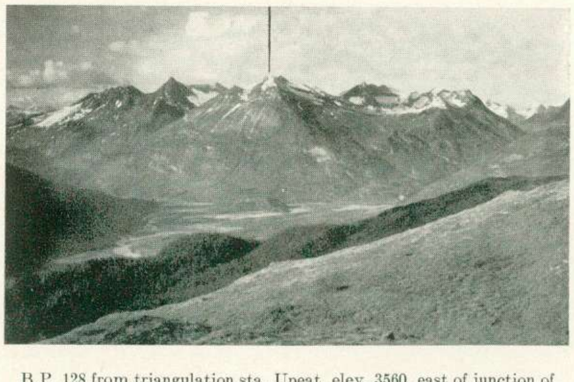
Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 127 (Chilkat River; D. W. Eaton, 1906). On the west side of Chilkat River about 7 miles from its confluence with Tahini River; about 850 metres from the main channel of the river, at the foot of a cliff, about 700 feet above the river bottom; elevation 1,150 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock.

Boundary Point 128 (Chilkat River; D. W. Eaton, 1906). Raymond Peak, the mountain with a thumb-like peak between the forks of Chilkat and Tahini Rivers. There is a large cave at timber-line on the southwesterly side of the mountain, visible from the mouth of Tahini River. Elevation 6,620 feet. This peak is the point S 6850 of the Award of the Alaska Boundary Tribunal.

Station mark: the top of the peak as it was in 1906.



B.P. 128 from triangulation sta. Upeat, elev. 3560, east of junction of the Kelsall with Chilkat River.

Boundary Point 129 (Chilkat River; J. A. Flemer, 1905, 1948). At the east verge of Tahini River at the foot of the steep mountainside, about 3 miles above the confluence of the Tahini with Chilkat River; about 5 feet above water level, close to a perpendicular rock face; elevation 424 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 129.

Boundary Point 130 (Chilkat River; J. A. Flemer, 1905, 1948). On the crest of a knoll about 50 feet west of Tahini River about 3 miles above its confluence with Chilkat River; about 20 feet above water level; elevation 440 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 130.

British Columbia—Alaska—*Continued*

Boundary Point 131 (Chilkat River; J. A. Flemer, 1905, 1948). About ½ mile west of Flemer River (the west fork of the Tahini), on the crest of a steep ridge; elevation 1,305 feet.
Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 131.

Boundary Point 132 (Chilkat River; J. A. Flemer, 1905, 1948). About 1¼ miles west of Flemer River; just above timber-line on the crest of the ridge beyond a large creek; elevation 2,530 feet.
Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 132.

Boundary Point 133 (Chilkat River; J. A. Flemer, 1905, 1948). About 2½ miles west of Flemer River; on an outcrop of rock in the snow field on the eastern side of Mount Ashmun; elevation 4,020 feet.
Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 133.

Boundary Point 134 (Chilkat River; J. A. Flemer, 1904). Mount Ashmun, the dome-shaped mountain about 3 miles east of Kelsall River 10 miles above its confluence with Chilkat River; elevation 6,450 feet. This peak is the point S 6700 of the Award of the Alaska Boundary Tribunal (*See* illustration, p. 37).
Station mark: a cairn.

Boundary Point 135 (Chilkat River; J. A. Flemer, 1904, 1948). About ⅔ mile east of Kelsall River; near the upper edge of big timber; about 500 feet west of alder growth; elevation 1,425 feet.
Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 135.

Boundary Point 136 (Chilkat River; J. A. Flemer, 1904, 1948). About ¼ mile east of the canyon on Kelsall River, 11 miles above its confluence with Chilkat River; 250 feet above a narrow rock fissure that crosses the boundary; elevation 1,350 feet.
Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 136.

Boundary Point 137 (Chilkat River; J. A. Flemer, 1904, 1948). About ¼ mile west of the canyon on Kelsall River, 11 miles above its confluence with Chilkat River; on the slope of a wooded ridge; elevation 1,480 feet.
Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 137.

Boundary Point 138 (Chilkat River; J. A. Flemer, 1904, 1948). About ½ mile west of Kelsall River, in a heavy growth of alders; elevation 1,950 feet.
Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 138.

Boundary Point 139 (Chilkat River; J. A. Flemer, 1904, 1948). About 1¼ miles west of Kelsall River; on the crest of one of the rolling grassy ridges on the east slope of Mount Seltat; elevation 3,260 feet.
Station mark: an aluminium-bronze cone about 2½ feet high set in solid rock; numbered 139.

Boundary Point 140 (Chilkat River; C. A. Bigger, 1904). Mount Seltat, the snow-capped mountain about 12 miles northwesterly from the confluence of Chilkat and Kelsall Rivers; elevation 6,632 feet. This peak is the point S 6150 of the Award of the Alaska Boundary Tribunal.
Station mark: the highest part of the snow cap as it was in 1904.

B.P. 140 from B.P. 150.

B.P.s 141 and 142 from camera sta. E sub, west of B.P. 144 and on ridge between Yokeak Creek and Klehini River.

Boundary Point 141 (Chilkat River; C. A. Bigger, 1904). The snow-capped mountain, between Nataga and Rosaunt Creeks, about 7 miles northwesterly from the confluence of Chilkat and Kelsall Rivers; elevation 6,480

British Columbia—Alaska—*Continued*

feet. This peak is the point S 6325 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1904.

Boundary Point 142 (Chilkat River; C. A. Bigger, 1904). Mount Prinsep, the snow-capped mountain south of Rosaunt Creek, about 7 miles westerly from the confluence of Chilkat and Kelsall Rivers; elevation 6,342 feet. This peak is the point S 6100 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1904.

B.P. 144 from Klehini River flats near B.P. 147.

Boundary Point 143 (Klehini River; C. A. Bigger, 1904 1946). In the valley of Yokeak Creek, about 6 miles above its confluence with Klehini River and 15 miles from Chilkat River; elevation 1,802 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 143.

Boundary Point 144 (Klehini River; C. A. Bigger, 1904, 1946). Surgeon Mountain, the southeasterly peak of the mountain between Klehini River and Yokeak Creek, 15 miles from Chilkat River; elevation 4,423 feet. This peak is the point S 4525 of the Award of the Alaska Boundary Tribunal.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 144.

Boundary Point 145 (Klehini River; C. A. Bigger, 1904, 1946). On the northeast side of Klehini River about 15 miles above its confluence with Chilkat River; on top of the bluff on the northeast side of the Haines Cut-off Highway; elevation 915 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 145.

Boundary Point 145A (Klehini River; H. S. Mussell, 1946). On the northeast side of Klehini River about 15 miles above its confluence with Chilkat River; on the northeast side of the Haines Cut-off Highway.

Station mark: a concrete monument with a shaft 10 inches square and 1 foot 4 inches high set in a concrete base 3 feet square. On the base is stamped the year 1946 and the number 145A.

Boundary Point 146 (Klehini River; C. A. Bigger, 1904, 1946). On the northeast side of Klehini River about 15 miles above its confluence with Chilkat River; at mileage 42·0 from Haines, 100 feet from the Canadian Customs office, 72 feet southwest of centre line of Haines Cut-off Highway and about 5 feet below road level. A bench mark was recessed in the top of the concrete base of the monument by the Geodetic Survey of Canada in 1948. Elevation 812·092 feet.

Station mark: an aluminium-bronze obelisk about 4½ feet high set in a concrete base; numbered 146.

Boundary Point 147 (Klehini River; C. A. Bigger, 1904, 1946). An unmarked boundary point on the shingle flat in the forks of Klehini River and Jarvis Creek, about 15 miles above the confluence of Klehini and Chilkat Rivers. This is the point "S" (without an approximate elevation) of the Award of the Alaska Boundary Tribunal. It was temporarily marked in 1946.

Boundary Point 148 (Klehini River; C. A. Bigger, 1904; Jesse Hill, 1936, 1946). About 100 feet westward from the point of land at the confluence of Klehini River and Jarvis Creek. The monument had been washed out by the cutting away of the river bank and was moved in 1936 from the position in which it had been erected in 1904 to a point 59·27 metres westward along the boundary line; elevation 867 feet.

Station mark: an aluminium-bronze obelisk about 4½ feet high set in a concrete base; numbered 148.

Boundary Point 149 (Klehini River; C. A. Bigger, 1904, 1946). On the ridge between Klehini River and Jarvis Creek, about 1,600 feet above the forks; elevation 915 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in the rock; numbered 149.

Boundary Point 150 (Klehini River; C. A. Bigger, 1904). Mount McDonell, the snow-capped mountain between Klehini River and Jarvis Glacier about 4 miles westerly from the forks, and 20 miles above the confluence of Chilkat and Klehini Rivers; elevation 5,509 feet. This peak is the point S 5800 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1904.

British Columbia—Alaska—*Continued*

B.P. 150 from Klehini River flats near B.P. 147.

B.P. 151 from B.P. 154.

Boundary Point 151 (Klehini River; C. A. Bigger, 1904, 1910). Mount Henry Clay[1], the ragged-topped mountain of several summits about 6 miles southwesterly from the forks of Klehini River and Jarvis Creek. The highest peak is chisel-shaped and is on the south side of the cluster; elevation 7,434 feet. This peak is the point S 7500 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the highest peak as it was in 1904 and 1910.

Boundary Point 152 (Tsirku River; W. F. Ratz, 1905, 1910). On the nose of the ridge between the Tsirku and Boundary Glaciers about 25 miles above the confluence of Chilkat and Tsirku Rivers; 445·2 metres northerly from Boundary Monument 153; elevation 3,593 feet.

Station mark: a conical aluminium-bronze post about 2½ feet high set in rock.

Boundary Point 153 (Tsirku River; W. F. Ratz, 1905, 1910). On a flat bench, high up on the north side of Tsirku Valley, on the ridge between the Tsirku and Boundary Glaciers about 25 miles above the confluence of Chilkat and Salmon Rivers; elevation 2,971 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in cement in the rock.

Boundary Point 154 (Tsirku River; W. F. Ratz, 1905; bolt set by O. M. Leland, 1910). On the south side of the head of Tsirku River about 25 miles above the confluence of Chilkat and Tsirku Rivers. The peak is relatively insignificant beside the mountain group just west of it; its top has the form of a ridge extending about north and south; elevation 5,787 feet. This peak is the point S 6000 of the Award of the Alaska Boundary Tribunal.

Station mark: a copper bolt 1 inch in diameter set in the southerly of two small peaks.

B.P. 154, looking south from B.P. 153.

Boundary Point 155 (Tsirku River; W. F. Ratz, 1905; bolt set by O. M. Leland, 1910). On the northeast peaklet of a mountain with several prominent peaklets extending in a northwest and southeast direction, about 1 mile southwest of Boundary Point 154; elevation 6,206 feet. This peak is the point S 6600 of the Award of the Alaska Boundary Tribunal.

Station mark: a copper bolt 1 inch in diameter set in the top of the peaklet.

Boundary Point 156 (Tsirku River; W. F. Ratz, 1905, 1907; bolt set by O. M. Leland, 1910). Mount Harris, at the northwesterly end of a high irregular ridge with avalanche slopes between two long snow fields; about 1 mile southerly from Boundary Point 155; elevation 6,392 feet. This peak is the point S 6900 of the Award of the Alaska Boundary Tribunal.

Station mark: a copper bolt set in the rock over which a cairn was erected.

[1] This mountain was named Mount Leland on the Commission maps. Later it was named Mount Henry Clay; Geographic Board of Canada, Nineteenth Report.

British Columbia—Alaska—*Continued*

B.P.s 156 and 155 from B.P. 154.

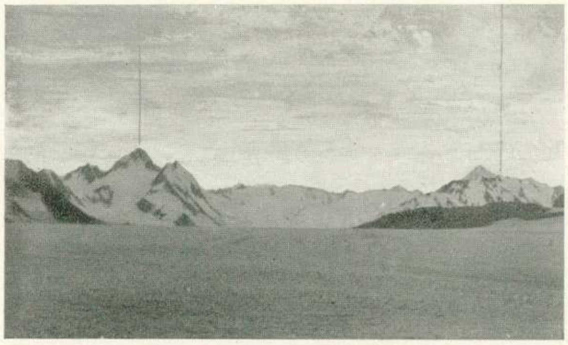
B.P. 157 from triangulation sta. Camp, elev. 1590, on southwest side of Glacier Bay, south of mouth of Hugh Miller Inlet and west of Lone Island.

Boundary Point 157 (Tsirku River; Fremont Morse, 1907; bolt set by O. M. Leland, 1910). About 11 miles southwesterly from the head of Tsirku River; it is a snowy mountain with a few patches of bare rock on the thin summit ridge extending northwest and southeast with steep rocky sides on the south and west; elevation 5,917 feet. This peak is the point S 5300 of the Award of the Alaska Boundary Tribunal.

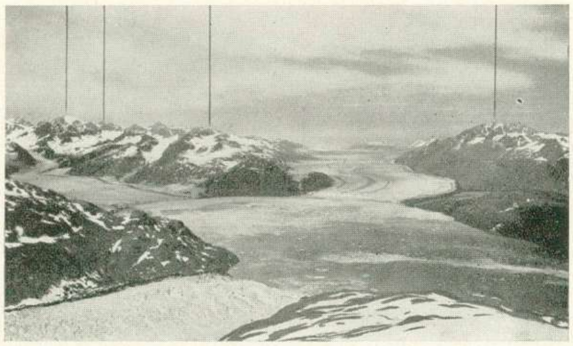
Station mark: a length of galvanized iron stove-pipe with a cairn built around it on top of a rock 3 feet in diameter and 4 feet high. It is referenced by a copper bolt 27·05 metres distant in azimuth 163° 38′.

Boundary Point 158 (Glacier Bay; Fremont Morse, 1907, 1910). The southerly of two small peaks on the mountain near the middle of a long rock and snow ridge west of the snow field at the head of Carroll Glacier; about 2½ miles eastward of the mountain range on which Boundary Point 159 is located and about 10 miles northerly from the head of Rendu Inlet; elevation 5,714 feet. This peak is the point S (without an approximate elevation) of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907 and 1910.



B.P.s 159 and 158 from camera sta. Late, on rock outcrop on east side of Muir Inlet between Casement and Adams Glaciers and southwest of Snow Dome.



B.P.s 162, 166, 161, and 160 from camera sta. King, elev. 3545, on hill on south side of Reid Inlet and east of Reid Glacier. The fronts of Reid, John Hopkins, and Grand Pacific Glaciers shown in 1894 positions.

Boundary Point 159 (Glacier Bay; Fremont Morse, 1907). The mountain in the range on the east side of Rendu Glacier about 10 miles northerly from Rendu Inlet; just west of the snow field at the head of Carroll Glacier; elevation 6,470 feet. This peak is the point S 6300 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

Boundary Point 160 (Glacier Bay; Fremont Morse, 1907). Mount Barnard, a bold, prominent peak in the range on the west side of Rendu Glacier, and east of Tarr Inlet, about 10 miles northwesterly from Rendu Inlet; it is about 4 miles southwesterly from Boundary Peak 159; elevation 8,214 feet. This peak is the point S 8050 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

Boundary Point 160A (Glacier Bay; Jesse Hill, 1936). About 920 feet above and about ⅔ mile from high-water mark on the mountain side east of Tarr Inlet, ⅛ mile north of a glacial stream that empties onto a large alluvial fan; on the straight line course between Boundary Point 160 (Mount Barnard) and Boundary Point 161.

Station mark: a small bronze boundary disk stamped 160A, set in the vertical face of a rock ledge.

British Columbia—Alaska—*Continued*

Boundary Point 160B (Glacier Bay; Jesse Hill, 1936). About 323 feet above and about ⅛ mile from high water on the west side of Tarr Inlet, on the straight line course between Boundary Point 160 (Mount Barnard) and Boundary Point 161.

Station mark: a small bronze boundary disk stamped 160B set in the nearly flat surface of the rock ledge just south of a small dry stream bed on the bare rocky mountain side.

Boundary Point 161 (Glacier Bay; Fremont Morse, 1907). The first prominent peak southwesterly from the junction of the Grand Pacific and Ferris Glaciers at the head of Tarr Inlet, about 4 miles west of the inlet; elevation 6,880 feet. This peak is the point S 6880 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

Boundary Point 162 (Glacier Bay; Fremont Morse, 1907). Mount Turner, the mountain with a snow-covered top south of Ferris Glacier, about 11 miles northeasterly from Mount Fairweather on the same range as, and about 5 miles southwesterly from, Boundary Point 161; elevation 8,730 feet. This peak is the point S 8740 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1907.

Boundary Point 163 (Glacier Bay; Fremont Morse, 1907). Mount Quincy Adams, the round-topped, snow-covered mountain south of the snow field at the west end of Margerie Glacier; about 3 miles easterly from Mount Fairweather; elevation 13,560 feet. This peak is the point S 12750 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1907.

B.P.s 164 and 163 from camera sta. B, on southeast side of Lituya Bay, south of the foot of Crillon Glacier.

B.P.s 164 and 165 from camera sta. Carlyon, elev. 2750, on ridge between Rendu Inlet and Reid Inlet, northwest of Composite Island.

Boundary Point 164 (Glacier Bay; Fremont Morse, 1907). Mount Fairweather, the highest peak between Glacier Bay and Alsek River; the peak has a round, snow-covered top; it is about 4 miles southwesterly from the snow field at the west end of Margerie Glacier, and about 18 miles northeasterly from Cape Fairweather on the Pacific Coast; elevation 15,300 feet. This peak is the point S 15287 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1907.

Boundary Point 165 (Glacier Bay; Fremont Morse, 1907). Mount Root, a sharp, well-defined peak about 3 miles northwesterly from the snow field at the west end of Margerie Glacier; about 6 miles northerly from Mount Fairweather; elevation 12,860 feet. This peak is the point S 12430 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1907.

Boundary Point 166 (Glacier Bay; Fremont Morse, 1907). Mount Lodge, a prominent mountain south of the Grand Pacific Glacier, about 10 miles southwesterly from the junction of the Grand Pacific and Melbern Glaciers on the south side of a small glacier tributary to the Grand Pacific; elevation 10,530 feet. This peak is the point S 9500 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1907.

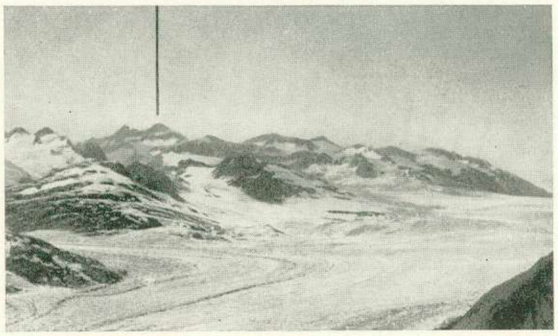
Boundary Point 167 (Glacier Bay; Fremont Morse, 1907). Mount Hay, the easterly of the two highest peaks on the mountain north of the Grand Pacific Glacier about 10 miles from the junction of the Grand Pacific and Melbern

British Columbia—Alaska—*Continued*

Glaciers, on the north side of a large glacier tributary to the Grand Pacific; elevation 8,870 feet. This peak is the point S 7450 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow cap as it was in 1907.

B.P.s 166 and 161 from camera sta. North, elev. about 3200, on ridge between Rendu Inlet and Reid Inlet, northwest of Composite Island.



B.P. 167 from camera sta. West Glacier, elev. 4105, on northeast side of Tarr Inlet, north of large island between Tarr and Reid Inlets.

Boundary Point 168 (Alsek River; Fremont Morse, 1908). About 25 miles northeasterly from the mouth of Alsek River, and 4 miles above the second easterly bend of the river; 480 metres back from the edge of timber and 100 metres south of the creek that drains the moraine of the glacier south of the river; elevation 287 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base.

Boundary Point 169 (Alsek River; Fremont Morse, 1908). About 25 miles northeasterly from the mouth of Alsek River, and 4 miles above the second easterly bend of the river; on the south side of the river just within the edge of timber; elevation 280 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base.

Boundary Point 170 (Alsek River; Fremont Morse, 1908). About 25 miles northeasterly from the mouth of Alsek River, and 4 miles above the second easterly bend of the river; about 100 feet above the river on the prominent point on the north shore; elevation 365 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base.

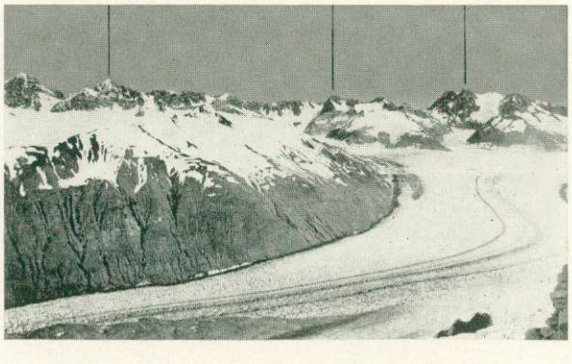
Boundary Point 171 (Alsek River; Fremont Morse, 1908). About 25 miles northeasterly from the mouth of Alsek River, and 4 miles above the second easterly bend of the river; on the south bank of the first prominent gulch north of the river; elevation 475 feet.

Station mark: an aluminium-bronze cone about 2½ feet high set in a concrete base.

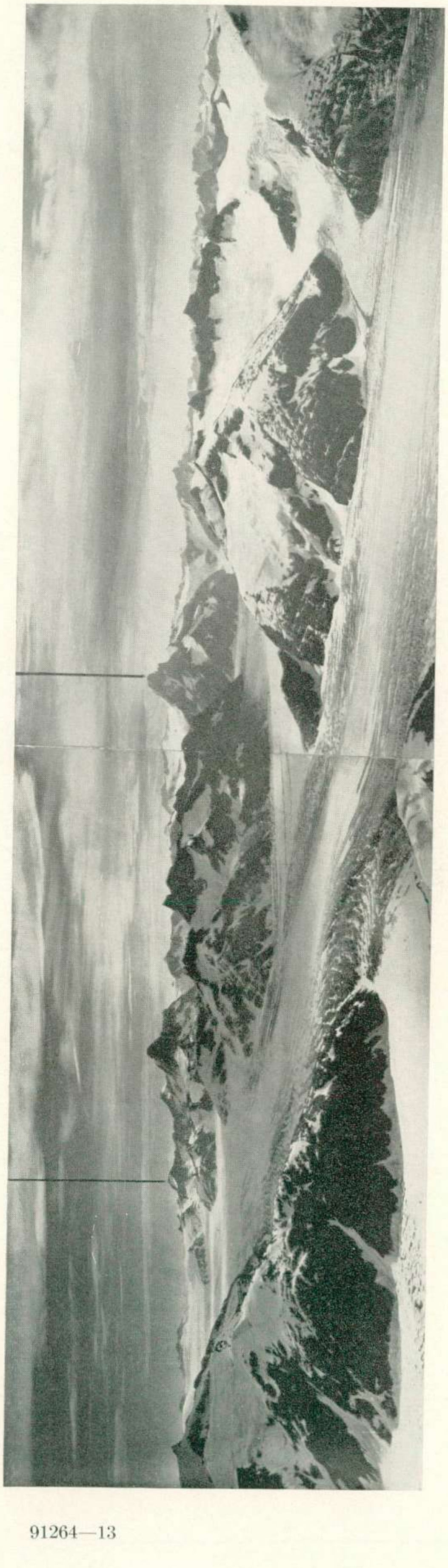
Boundary Point 172 (Nunatak Fiord; Fremont Morse, 1906). Mount Herbert, about 10 miles southeasterly from the narrow part of the Nunatak Glacier on the west side of the junction with its tributary glacier, the Artlewis; elevation 6,090 feet. This peak is the point S 5800 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

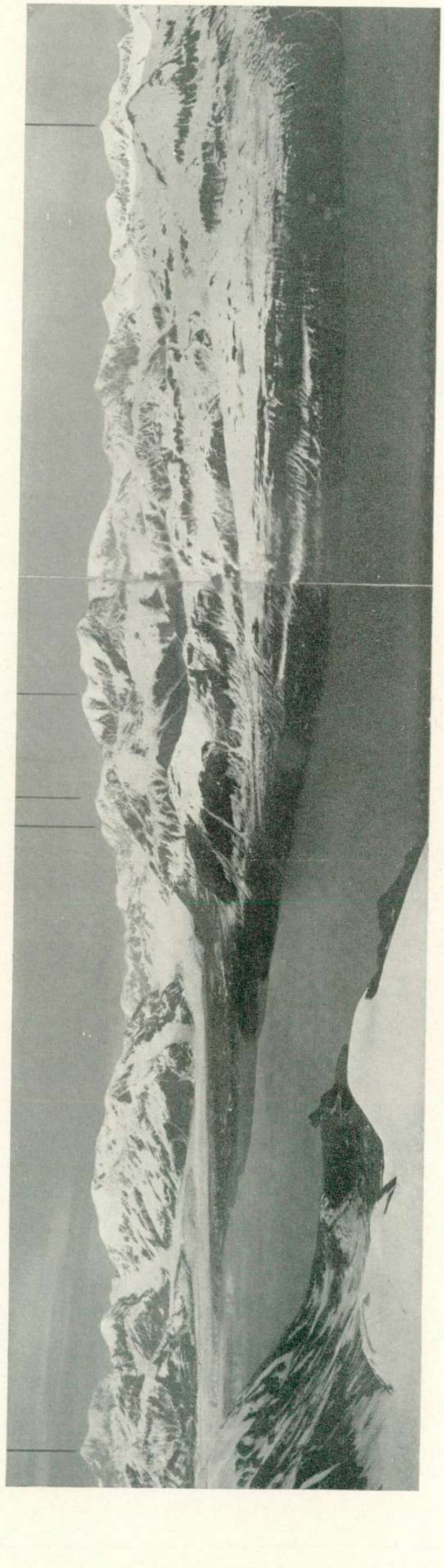
B P.s 173 and 172 from triangulation sta. Long, elev. 3530, on southwest side of Russell Fiord and northwest of Cape Enchantment.



B.P.s 175, 174, and 173 from triangulation sta. Draper, elev. 5670, on Mount Draper, south of Nunatak Fiord and northeast of Hidden Glacier.



B.P.s 72 and 71 from camera sta. Angle, northeast of foot of Baird Glacier, on ridge between that glacier and North Baird Glacier.



B.P.s 181, 180, 179, 178, and 177 from triangulation sta. Long, elev. 3530, on southwest side of Russell Fiord and northwest of Cape Enchantment.

British Columbia—Alaska—*Concluded*

Boundary Point 173 (Nunatak Fiord; Fremont Morse, 1906). Mount Wade, about 8 miles easterly from the narrow part of the Nunatak Glacier where it joins the Artlewis Glacier flowing from the north; elevation 7,960 feet. This peak is the point S 7500 of the Award of the Alaska Boundary Tribunal.

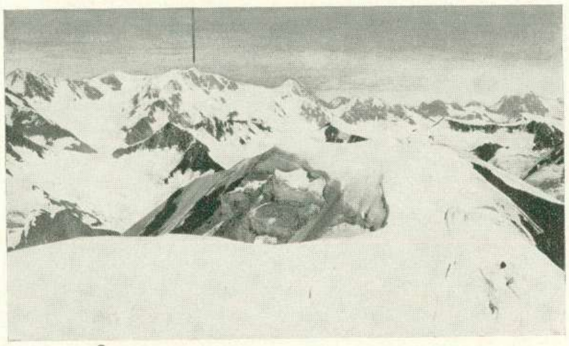
Station mark: the highest part of the peak as it was in 1906.

Boundary Point 174 (Nunatak Fiord; Fremont Morse, 1906). Mount Duff, about 8 miles east-northeast from the narrow part of the Nunatak Glacier where it joins the Artlewis Glacier flowing from the north; elevation 7,170 feet. This peak is the point S 6825 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 175 (Nunatak Fiord; Fremont Morse, 1906). Mount Armour, about 10 miles northeasterly from the narrow part of the Nunatak Glacier where it joins the Artlewis Glacier flowing from the north; elevation 8,770 feet. This peak is the point S 8600 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.



B.P. 176 from triangulation sta. Hope, elev. 5940, east of highest part of Orange Glacier and south of B.P. 177.

Boundary Point 176 (Nunatak Fiord; Fremont Morse, 1906). Mount Aylesworth, about 10 miles north-northeast from the narrow part of the Nunatak Glacier where it joins the Artlewis Glacier flowing from the north; elevation 9,310 feet. This peak is the point S 8900 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 177 (Russell Fiord; Fremont Morse, 1906). Mount Jette, about 15 miles east from the entrance of Russell Fiord; east of the east end of the Variegated Glacier; elevation 8,460 feet. This peak is the point S 8000 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Yukon—Alaska

Boundary Point 178 (Disenchantment Bay; Fremont Morse, 1906). Mount Seattle, about 11 miles northeasterly from the junction of Disenchantment Bay and Russell Fiord; on the east side of the narrow part of Hubbard Glacier; elevation 10,070 feet. This peak is the point S 10000 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 179 (Disenchantment Bay; Fremont Morse, 1906). Mount Hubbard, about 23 miles northeasterly from the northeast end of Disenchantment Bay; on the east side of Hubbard Glacier; elevation 14,950 feet. This peak is the point S 16400 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 180 (Disenchantment Bay; Fremont Morse, 1906). Mount Alverstone, about 25 miles northeasterly from the northeast end of Disenchantment Bay, and 3 miles northerly from Mount Hubbard; elevation 14,500 feet. This peak is the point S 12400 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 181 (Disenchantment Bay; Fremont Morse, 1906). Mount Vancouver, about 20 miles north of Disenchantment Bay; north of the snow field between the Seward and Hubbard Glaciers; elevation 15,700 feet. This peak is the point S 15617 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 182 (Disenchantment Bay; Fremont Morse, 1906). Mount Cook, about 18 miles northwesterly from Disenchantment Bay, northwest of the head of Turner Glacier and 3 miles east of the head of Marvin Glacier; elevation 13,760 feet. This peak is the point S 14700 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 183 (Disenchantment Bay; Fremont Morse, 1906). Mount Augusta, about 37 miles northwesterly from Disenchantment Bay, and about 7 miles westerly from the forks of the Seward Glacier; elevation

B.P.s 186, 183, 182, and 181 from camera sta. Second, on south side of Disenchantment Bay, south of mouth of Calahonda Creek.

B.P.s 186, 185, and 184 from triangulation sta. She, elev. 5720, on northeast slope of Samovar Hills, between Seward and Agassiz Glaciers.

YUKON—ALASKA—*Concluded*

14,070 feet. This peak is the point S (without an approximate elevation) of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 184 (Disenchantment Bay; H. S. Mussell, 1911). A snow-covered dome about 1,000 feet above the surrounding snow fields, about 35 miles northwesterly from the face of Galiano Glacier, Disenchantment Bay; about 1 mile northeasterly from Dome Pass between the Seward and Agassiz Glaciers; elevation 4,830 feet. This peak is the point S (without an approximate elevation) of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the snow dome as it was in 1911.

Boundary Point 185 (Yakutat Bay; Fremont Morse, 1906). About 42 miles northwesterly from Yakutat Bay; about 9 miles southeast of Mount St. Elias; it is the peak of the southeasterly ridge from Mount St. Elias between the Agassiz and Newton Glaciers; elevation 10,190 feet. This peak is the point S 9050 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 186 (Yakutat Bay; Fremont Morse, 1906). Mount St. Elias, about 50 miles northwesterly from Yakutat Bay, and about 10 miles northwesterly from the forks of the Agassiz and Newton Glaciers; elevation 18,008 feet. This peak is the point S 17978 of the Award of the Alaska Boundary Tribunal.

Station mark: the highest part of the peak as it was in 1906.

Boundary Point 187 (Yakutat Bay). On a small spur of Mount St. Elias about $2\frac{1}{2}$ miles westerly from the summit, and above the saddle to the northwest; elevation between 13,000 and 14,000 feet. This point is the southerly terminus of the 141st Meridian boundary between Yukon and Alaska, in latitude 60° 18′ 21″.99 north and longitude 140° 59′ 56″.15 west of Greenwich.

There is no station mark.

We certify that the foregoing is a true and accurate description and definition of the section of the International Boundary line between Canada and the United States from the Point "B" at the entrance of Tongass Passage to the intersection of the 141st Meridian boundary line with the western shoulder of Mount St. Elias as established by the commissioners and as marked by them on the quadruplicate sets of thirteen accurate modern maps submitted with this report, in accordance with the Award of the Alaska Boundary Tribunal, signed at London, October 20, 1903; the agreement effected by the exchange of notes signed at Washington, March 25, 1905, between the British and United States Governments, relative to the acceptance of the report of the commissioners to complete the Award; and Article IV of the treaty signed at Washington, February 24, 1925.

J. Leslie Rannie

His Britannic Majesty's Commissioner.

OTTAWA, CANADA
November 26, 1951

John A. Ulinski

United States Commissioner.

CONCLUSION

The field work of delimiting and marking the section of the International Boundary line defined and described in this report, and of making phototopographic surveys of the boundary area, was commenced in 1904 under the direction of the original commissioners, Dr. W. F. King for Canada and Mr. O. H. Tittmann for the United States, and completed in 1920 under the direction of their successors, Mr. J. J. McArthur for Canada and Mr. E. C. Barnard for the United States.

The thirteen topographical maps that accompany the report were signed by successive commissioners in the following order:

Sheets Nos. 6, 7, 8, 9, 10, and 12, J. J. McArthur, His Britannic Majesty's Commissioner, and E. Lester Jones, United States Commissioner, June 9, 1923.

Sheets Nos. 3, 4, and 5, J. D. Craig, His Britannic Majesty's Commissioner, and E. Lester Jones, United States Commissioner, December 7, 1927.

Sheets Nos. 11 and 13, J. D. Craig, His Britannic Majesty's Commissioner, and E. Lester Jones, United States Commissioner, March 9, 1928.

Sheets Nos. 1 and 2, J. Leslie Rannie, His Britannic Majesty's Commissioner, and John A. Ulinski, United States Commissioner, November 26, 1951.

The geographic positions of the triangulation stations and boundary points were originally computed on the basis of the Southeast Alaska datum, the datum then in use by the United States Coast and Geodetic Survey in Southeast Alaska. Subsequently, however, by an arrangement between the officials of the United States Coast and Geodetic Survey and the Geodetic Survey of Canada, the latter agreed to extend a net of first-order triangulation from Point Roberts, in the northwest part of the state of Washington, along the west coast of British Columbia to Dixon Entrance. In January 1928 the Geodetic Survey of Canada furnished the United States Coast and Geodetic Survey with the azimuth and length and the geographic positions of the ends of the line Chacon-Dundas on the 1927 North American datum, and that organization recomputed the geographic positions of all the stations along the coast of Southeast Alaska.

In 1931 the work of recomputing the geographic positions of the boundary triangulation stations and boundary points was started under the direction of Mr. Noel J. Ogilvie, His Britannic Majesty's Commissioner, and Mr. James H. Van Wagenen, United States Commissioner. As additional data were supplied by the United States Coast and Geodetic Survey, the work was continued under the direction of Mr. J. M. Wardle, His Britannic Majesty's Commissioner, and Mr. Thomas Riggs, United States Commissioner, and concluded in 1951 under the direction of Mr. J. Leslie Rannie, His Britannic Majesty's Commissioner, and Mr. John A. Ulinski, United States Commissioner.

Credit is due to the members of the field parties of the United States and Canadian sections of the Commission who through all the years of actual survey worked in closest harmony. They were carefully picked men on both sides—men who accepted hardship as a matter of course and who did not complain when the day's work extended far into the night. Credit is also due to the various steamship companies who at times landed the survey parties at unscheduled ports, and to the customs and immigration officials of both countries for their unfailing assistance and courtesies during the progress of the field work.

In accomplishing the results set forth in this report, the Commissioners have had the close co-operation of other departments and agencies of the two Governments and of other organizations. They refer particularly to the United States Coast and Geodetic Survey and the Geodetic Survey of Canada in establishing first-order control for the boundary triangulation; to the excellent work of the Canadian Government Printing Bureau and of Williams-Webb Co., Inc., of Washington, D.C., in engraving, and of the United States Geological Survey in printing the maps.

The Commissioners also desire to express their appreciation of the efficient and conscientious services of all 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., Mr. G. H. McCallum, D.L.S., and Mr. G. T. Prinsep, D.L.S., successively Engineers to the Canadian Section of the Commission; to Mr. R. N. Ashmun, Mr. N. W. Smith, and Mr. Raymond Ross of the United States Section of the Commission; and to Mr. D. F. Chisholm, Mr. H. S. Mussell, and Mr. A. F. Lambert of the Canadian Section of the Commission, for their diligent and painstaking work in the preparation of this report.

APPENDIX I

HISTORICAL SKETCH OF THE INTERNATIONAL BOUNDARY FROM TONGASS PASSAGE TO MOUNT ST. ELIAS

Although it is possible that the region now known as Alaska was first sighted by some Russian seamen in 1730, or perhaps 2 years later, the right of discovery to that territory was secured to Russia by the discoveries of Vitus Bering and Alexis Chirikof, who sighted the American continent in the vicinities of Mount St. Elias and Dall Island in 1741. Furthermore, the Russian claim was strengthened by the operations of the half-piratical fur traders who followed these discoveries and the subsequent more orderly administration of the Russian American Company, which, in 1799, was granted by Imperial ukase "full privileges, for a period of 20 years, on the coast of northwestern America, beginning from latitude 55° north, and including the chain of islands extending from Kamchatka northward to America and southward to Japan".

But from the year 1493 the Spaniards had claimed jurisdiction of the whole Pacific coast of America by virtue of the Bull of Pope Alexander VI; they did not, however, push their explorations much beyond California until the year 1774, when, alarmed by reports of the Russian activities, they sent the first of three expeditions to secure the extension of their own coast northward by right of discovery. In that year Juan Perez, accompanied by Estevan Martinez, sailed to latitude 54°, and on his return journey anchored off the coast of Vancouver Island, in latitude 49° 30′. The following day being the festival of San Lorenzo, the anchorage was named after that saint; a point to the southwestward was named Point Estevan. There, without landing, he took possession in the name of the Viceroy of Mexico. In the following year Bodega y Quadra and Antonio Maurelle sailed along the coast of southeastern Alaska, landed and took possession of the land adjacent to Mount Edgecumbe, sailed northward to latitude 58°, and returning entered Bucareli Bay. In 1779 Quadra, accompanying Ignacio Arteaga, again visited Bucareli Bay, and sailing northward to Prince William Sound landed and took possession of a harbour on the west side of Montague Island.

The earliest British claim to the coast of what is now the province of British Columbia was made in 1778 by Captain James Cook, who, in the course of his exploration of the northwest coast, landed in Nootka Sound, on Vancouver Island. Seven years later the English trader James Hanna collected furs at Nootka, which he sold at a great profit in Macao, a Portuguese colony in China. In the following years a number of other British traders made voyages to the northwest coast, using Nootka as a base.

Eventually the Spaniards clashed with the British at Nootka. In 1788 Commander John Meares built a house there, over which he raised the British flag, and constructed a small vessel for coastwise trade. During the same year Estevan Martinez and Gonzalo Lopez de Haro, having investigated the Russian establishments at Kodiak and Unalaska, returned to Mexico with the information that the Russians had sent two vessels to Nootka. But in the following year when Martinez sailed into Nootka Sound he found not Russian but Meares' British, and some American, vessels at anchor there. He immediately notified the British and American commanders that he intended to maintain Nootka as a Spanish port and demanded that they should show their papers. Later, after a dispute with the British commanders, he seized their vessels and destroyed Meares' building; he did not, however, interfere with the American vessels. In view of the controversy that followed this incident, it is worth while mentioning here that although Martinez claimed Nootka Sound was Perez' San Lorenzo, the evidence of the chroniclers of Perez' voyage and Indian tradition both indicate that Perez' anchorage was 9 miles to the south; and, moreover, Martinez did not navigate into the sound with the knowledge acquired from his voyage with Perez in 1774, but with the aid of a chart obtained from Cook's recently published voyages. An outbreak of war between Great Britain and Spain concerning the affair was averted by the signing of the Nootka Convention of 1790, which provided among other matters that Great Britain should have equal rights with Spain to carry on trade or colonization north of the 38th degree of north latitude.

Great Britain and Spain, respectively, appointed Captain George Vancouver and Bodega y Quadra, then commandant at San Blas in Mexico, as commissioners to carry out the article of the Nootka Convention dealing with reparations. But as they failed to reach an agreement, their two governments entered into two more conventions, which provided for the amount of compensation to be paid to Meares, and stipulated that the British flag should be unfurled over the land restored "as a sign of possession". In the course of his voyages along the northwest coast in the years 1792-93-94, Captain Vancouver observed the customary forms of "taking possession" of the territories he explored. His explorations are outlined in Appendix III of this report.

Although Captain James Cook bears the distinction of being the first white man to set foot on the coast of British Columbia, the first to reach that coast overland was Alexander Mackenzie, a partner of the Northwest Company of Montreal, and the discoverer of the river named after him. In 1793 he ascended Peace River to its source, and crossing the watershed of the Fraser reached salt water at the mouth of Bella Coola River, on Burke Channel. Arriving at Dean Channel only about 6 weeks after Vancouver had been there, he inscribed on a rock on the shore: "Alexander Mackenzie, from Canada, by Land, the Twenty-Second of July, One Thousand Seven Hundred and Ninety-Three".

Following Mackenzie's exploration, the Northwest Company decided to establish fur-trading posts in the region west of the Rocky Mountains, and in that way take possession of it. In 1805 Simon Fraser, a partner in the company, followed Mackenzie's route up Peace and Parsnip Rivers to Pack River, which he ascended to a small lake he named McLeod, after a friend in the service. There he established the first permanent post to be built west of the Rockies. During the next 2 years he built three additional posts in the region to which he gave the name "New Caledonia". Then, in 1808, he descended Fraser River to the site of the present city of New Westminster; there he was turned back by hostile Indians. Up to this time the partners of the Northwest Company thought that the great river they had discovered was the Columbia; realizing their error in 1808 they named it the Fraser.

In the following years other traders and explorers of the Northwest Company crossed the mountains, notable among whom was David Thompson, the company's surveyor and astronomer, who descended Columbia River and came within sight of the sea on July 15, 1811, 2 months after Astoria, the trading post of John Jacob Astor, of New York, had been established there. During the war of 1812-14 the Northwest Company traders bought Astoria from its American owners and changed the name to Fort George. However, in virture of an article of the Treaty of Ghent, which provided that all territory, places, and possessions taken by either party from the other during the war should be restored, Astoria (or Fort George as it continued to be called) was nominally returned to the jurisdiction of the United States, but actually it remained in the possession of the Canadian Company.

When, in 1818, the two nations agreed upon the boundary from the Lake of the Woods to the Stoney (Rocky) Mountains, the country to the westward was left "without prejudice to the claims of either party, or the claims of any other power or state"; and in the same *modus vivendi* the citizens of both nations were left free to trade or establish settlements for a period of 10 years in the disputed territory. In the following year Spain ceded to the United States all her rights, claims, and pretensions to any territory north of the 42nd Parallel. But Spain had also, by the Nootka Convention, agreed to Britain's assertion of equal rights to commerce and settlement. There was, however, some doubt as to the validity of the Spanish claim because occupation had failed to follow discovery within a reasonable time. In this respect the priority of the establishment of Astoria in 1811 by the American Fur Company strengthened the case of the United States in the region bordering the lower part of Columbia River. In 1821 a further complication arose, when Alexander II of Russia claimed by ukase the whole of the west coast of North America from the Aleutian Islands to the 51st parallel, and prohibited foreigners from approaching within 100 miles of the coast except when in distress.

A few days after Alexander II issued his ukase he renewed the charter of the Russian American Company for a further period of 20 years. At this time New Archangel, in Russian America, had become the most important port on the northwest coast, and Baranof's men had hunted as far north as Yukon River and south to Lower California. But notwithstanding the establishment of an agricultural colony near Bodega Bay in California, in 1812, the colonists had frequently been relieved from want of grain and other necessities by trade with the British and Americans; consequently, the attempted enforcement of the czar's ukase proved to be detrimental to their interests.

The protests of the United States and British Governments were followed by the Treaty of 1824 with the United States and the Treaty of 1825 with Great Britain. In the first treaty the Russians merely engaged themselves to form no settlements south of latitude 54° 40′, and the United States to form no settlements north of that latitude. In Russia's treaty with Great Britain, however, the boundaries were defined, dividing the possessions of the High Contracting Powers from latitude 54° 40′ northward to the Arctic Ocean. It should be noted here that the United States and Great Britain acted in concert during the negotiations leading to these treaties, which primarily dealt with the extent of Russia's maritime jurisdiction, and that in the Treaty of 1825 the land boundaries were defined principally to protect the trading privileges of the Russian American Company, the adjoining territory being considered in itself valueless.

The Russian American Company had to fear principally the encroachments of the Hudson's Bay Company, which in 1821 had absorbed the Northwest Company, and claimed that its jurisdiction west of the Rocky Mountains extended southward to latitude 42° and northward to the undefined boundary of Russian America. Consequently, in the negotiations leading to the definition of this boundary the governments of Russia and Great Britain were influenced largely by the representations of the rival companies.

The earlier discussions between the plenipotentiaries of the two countries were chiefly concerned with the more southerly section of the boundary, the British insisting and the Russians consenting that the boundary of the northern section should lie somewhere west of Mackenzie River. The first informal British proposal was that the 57th degree of north latitude and the 135th meridian of west longitude should roughly limit the Russian possessions on the coast. But the Russian reply to that proposal was that it would be attempting to impose too great an embarrassment on the Imperial Government to have it say to its own subjects: "We have allowed you to believe for 22 years that the boundaries of our possessions on the northwest coast of America extended from Bering Strait to the 55th degree of latitude; well, we tell you now it was a mistake, that the southern boundary must stop at the 57th degree, because it has just been proved to us that that boundary never belonged to us".

As a reply to the Russian proposal that the 55th degree of north latitude should be the dividing line, the British representative on February 16, 1824, proposed as the boundary, a line "through Chatham Straits to the head of Lynn Canal, thence northwest to the 140th degree of longitude west of Greenwich, and thence along that degree to the Polar Sea". As a counter project the Russians proposed a line following Portland Canal as far as the mountains that run along the coast, thence along these mountains parallel with the sinuosities of the coast as far as the 139th degree of longitude, and thence north along the meridian.

Various projects and counter projects followed, only to be rejected by the two governments. The Russians maintained that the Hudson's Bay Company had no establishments near the coast above latitudes 53° or 54°, and the British protested that the discovery or mere occupation of some islands situated along the coast could not give a right to supremacy over the mainland. The insistence of Russia's demands that the southeastern part of the boundary should be a line roughly paralleling the coast at some distance inland, no doubt accounts to a large extent for the gradual change on the part of the British diplomats from a probable acquiescence in the choice of the 135th meridian as the northerly part of the boundary, to what practically amounted to a demand that the 141st meridian be selected.

Eventually the Treaty of February 28, 1825, was signed, the ratifications being exchanged about 2 weeks later. The wording that has reference to the southeastern section of the boundary in articles III and IV is as follows:

"III. The line of demarcation between the possessions of the High Contracting Parties, upon the coast of the continent, and the islands of America to the northwest coast, shall be drawn in the manner following:

"Commencing from the southernmost point of the island called Prince of Wales Island, which point lies in the parallel of 54 degrees 40 minutes, north latitude, and between the 131st and 133rd degree of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland Channel, as far as the point of the continent where it strikes the 56th degree of north latitude; from this last mentioned point, the line of demarcation shall follow the summit of the mountains situated parallel to the coast as far as the intersection of the 141st degree of west longitude (of the same meridian).

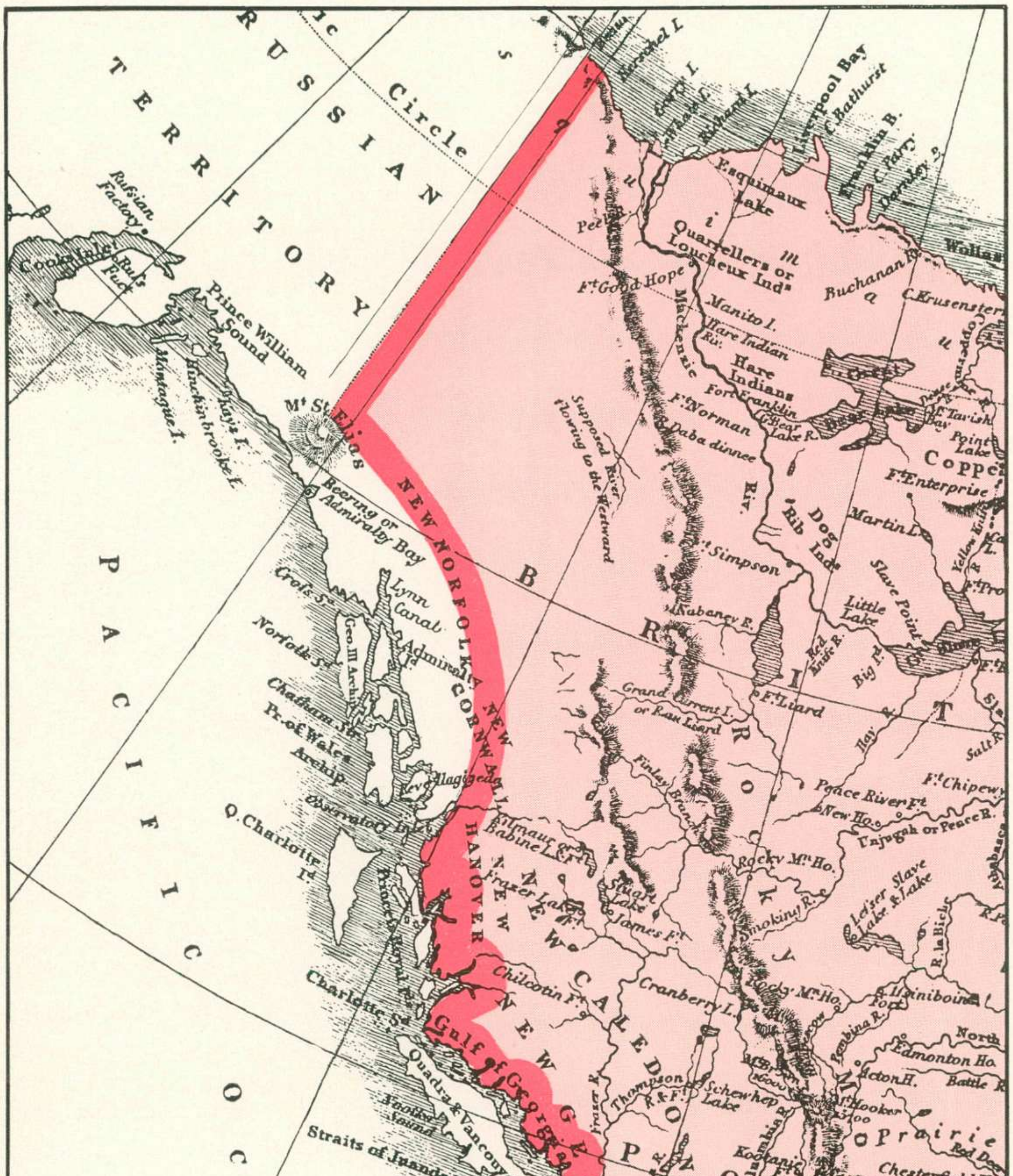
"IV. With reference to the line of demarcation laid down in the preceding Article, it is understood:

"1st. That the island called Prince of Wales Island shall belong wholly to Russia. (On Vancouver's map this included Dall Island.)

"2nd. That whenever the summit of the mountains which extend in a direction parallel to the coast, from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude, shall prove to be at the distance of more than 10 marine leagues from the ocean, the limit between the British possessions and the line of the coast which is to belong to Russia, as above mentioned, shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of 10 marine leagues therefrom."

In 1834, taking advantage of the above treaty, which contained a clause providing free navigation of streams crossing Russian territory, the Hudson's Bay Company fitted out an expedition to establish a post "within British territories at a distance from the Ocean extending ten Marine leagues up the Stikine River". But the Russians, claiming that the company had violated the agreement to abstain from selling firearms and liquor to the natives, rescinded the clause, and to prevent the enterprise, built a fort, which they called Fort Dionysius, near the site of the present town of Wrangell. Negotiations followed and in 1839 the Russian American Company granted a lease to the Hudson's Bay Company of their continental territory from Cape Spencer southward, for an annual rental of two thousand otter skins, and at the same time the Hudson's Bay Company contracted to supply the Russians with a large quantity of provisions at reasonable rates. In 1840 the Hudson's Bay Company's men took possession of Fort Dionysius, renaming it Fort Stikine, and in the same year built Fort Taku on the coast 10 miles south of the mouth of Taku River.

The Hudson's Bay Company in 1845 had eight permanent posts on Columbia River, six on the Fraser, and a great number of smaller stations scattered throughout the territory. But their virtual monopoly was not to last. Although in 1839 there were only one hundred and fifty American citizens in the Columbia River Valley, after that date their numbers were considerably increased. At about this time the whole area between latitudes 42° and 54° 40′ had become known to Americans as "Oregon"; but gradually the name became restricted to the regions of the Columbia Valley. In 1843 American immigrants were pouring over the mountains by the thousands. In 1844 a provisional government was formed, and the next year the elected governor swore to perform his duties "as a citizen of the United States or a subject of Great Britain". In 1844, notwithstanding, the Polk presidential election slogan was: "Fifty-four forty or fight". By the Oregon Treaty of 1846 the disputed territory was split in two, the existing boundary



Part of map of British Dominions in North America, compiled by Joseph Bouchette, Jr., Deputy Surveyor General of the Province of Lower Canada, 1831.

between the United States and British America east of the Rocky Mountains, the 49th Parallel of latitude, being extended westward to the Strait of Georgia, and thence southerly through the middle of that strait and Juan de Fuca Strait to the Pacific Ocean.

Following the Oregon Boundary settlement the British Government, fearing a rush of Americans to Vancouver Island and the formation of another provisional government there, decided to make it a British colony. The task of founding this colony was assigned to the Hudson's Bay Company, in 1849. But the interests of the company clashed with those of the settlers, and following the discovery of gold on the mainland and the consequent inrush of settlers there, the end of the company's monopoly became inevitable. In 1858 the mainland territory was proclaimed a colony under the name of British Columbia, and the next year the British Government purchased back from the company its right to rule in Vancouver Island. In 1866 the two colonies were united under the name of British Columbia, with the northern boundary placed in latitude 60°. In 1871 British Columbia entered the confederation of British colonies in North America and became a part of the Dominion of Canada.

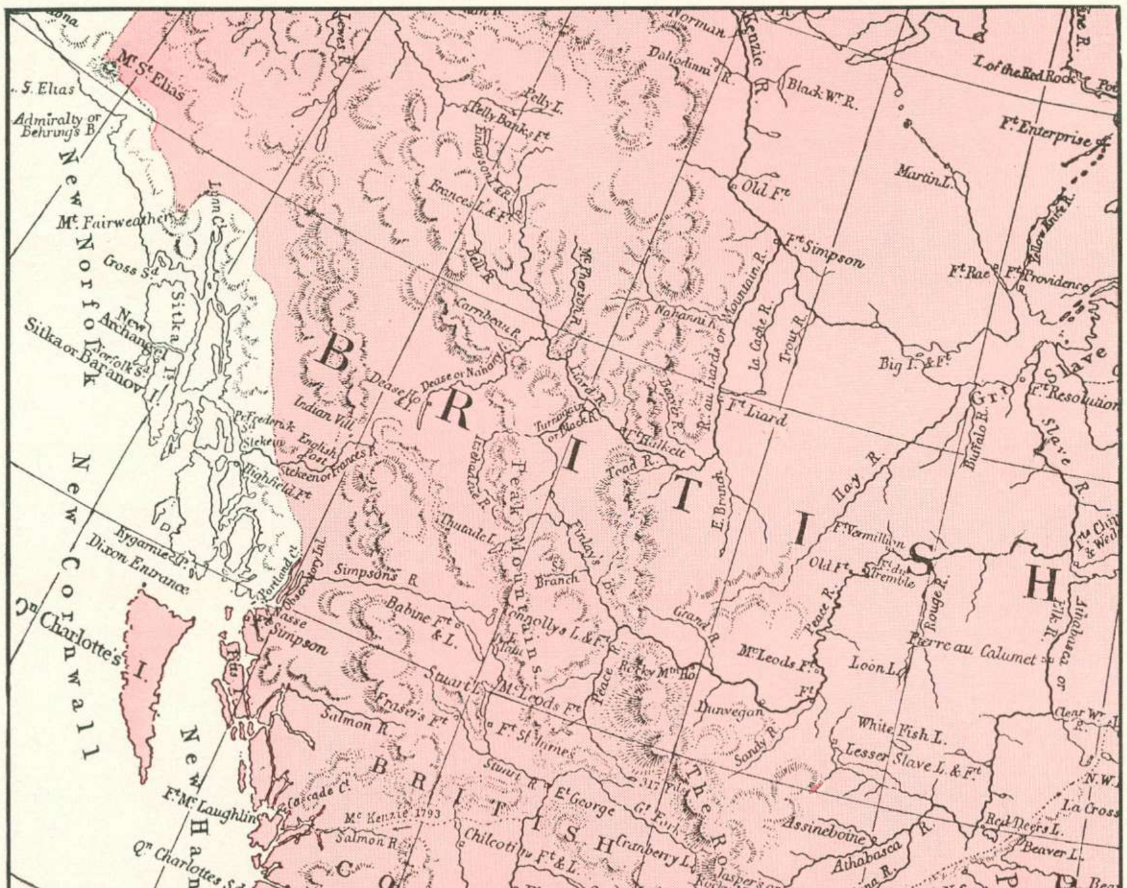
The agreement made between the Hudson's Bay Company and the Russian American Company in 1839 apparently had been agreeable to both sides as it was renewed once for a period of 10 years and twice for periods of 4 years, and in 1841 the Russians sold their Ross colony in California. Even the outbreak of war in 1853 between Great Britain and Russia did not disturb the monopolies of the two companies, the British and Russian possessions in Northwest America being declared neutral. But in 1862 the Russian Imperial Government, alleging abuses by the Russian American Company to be prevalent in the colonies, refused to renew their charter except on such terms as the company was unwilling to accept[1]; and the subsequent sale of the Russian colonies to the United States put an end to the Hudson's Bay Company's occupancy of the coastal strip.

By the Treaty of March 18, 1867 (the Treaty of Cession), Russia transferred all her territorial rights and dominion on the northwest coast of America and the adjacent islands to the United States, together with all the installations and equipment of the Russian American Company. The original purchase price was placed as $7,000,000 in gold coin, and to this was added $200,000 for the transfer of funds. The transfer took place and the American flag was raised at Sitka on October 18, 1867; payment, however, was not made until the following year. In this treaty the definition of the eastern boundaries of these territories was identical with that of the Treaty of 1825 between Great Britain and Russia; to Article IV in the Treaty of 1867, however, a paragraph was added that defined the western boundaries through Bering Strait to the Arctic Ocean.

Prior to the acquisition of these territories by the United States the Russians had always referred to them as their "Possessions in America"; on British and American maps the area was designated "Russian America"; henceforth it became known as Alaska.

The United States assumed control of their new territory in a most half-hearted way. The Army, the Navy, and the Customs Service, each in turn administered whatever law existed. Public opinion in the United States considered the purchase to have been the height of folly. The fur-bearing animals, thought to be the only resource of the country, had become scarce; few minerals had been discovered and the fisheries of Alaska were unknown; neither had the Pribilof Islands at that time attracted much attention, although between 1871 and 1883 about $5,000,000 was paid to the United States treasury as rent for these islands and tax on seal skins alone. Illustrative of the disorder consequent to the general ignorance concerning the territory was the dispatch of the British sloop of war *Osprey* from Victoria to Sitka in 1879, at the request of the white citizens, to prevent a feared native uprising there. Later in the same year the United

[1] The charter expired January 1, 1862, at which time the company was almost bankrupt. While terms for the renewal of the charter which would include an annual subvention of 200,000 rubles to be paid to the company were still being discussed, negotiations for the sale of the territory to the United States were commenced. These negotiations and the transfer of the territory were concluded without the knowledge of Great Britain. However, the Foreign Office considered that if Her Majesty's Government or the Government of Canada had been given the opportunity of purchasing the territory, it would not have been bought.



Part of map of North America, published by John Arrowsmith, 10 Soho Square, London, 1858.

States navy took control, governing until 1884 from the warship *Jamestown*, stationed at Sitka. The first legislation toward establishing civil government in Alaska was the Organic Act of 1884, an act that applied solely to the administration of justice. The Territorial Act was not to be passed until the autumn of 1912.

The first move to have the boundary line between Alaska and the Dominion of Canada established on the ground came from the Legislature of British Columbia, which in 1872 requested the Dominion Government to discuss the matter with the United States Government. The British Ambassador at Washington approached the United States Government on the subject. President Grant, accordingly, in his message to Congress on December 2, 1872, recommended the appointment of a Commission "to act jointly with one that may be appointed on the part of Great Britain to determine the line between the territory of Alaska, and the coterminous possessions of Great Britain". A bill was laid before Congress and read the second time, but no appropriation was made to cover the expense.

On February 12, 1873, Secretary Fish informed Sir Edward Thornton that the estimated cost of the undertaking to the United States alone would be $1,500,000, and that it would require 10 years for completion. He suggested that it might be sufficient to decide upon some particular points, as at the head of Portland Canal, at the crossings of the larger rivers, at Mount St. Elias, and where the 141st Meridian crosses Yukon and Porcupine Rivers. In November of the same year Major Donald Cameron, Her Britannic Majesty's Boundary Commissioner for the 49th Parallel, was requested by the Governor General of Canada to make an approximate estimate of the cost and time. His estimate was that it would take from 2 to 7 years to complete the work, and that the cost would be not less than $425,000 nor more than $2,230,000. No action was taken, however, upon Fish's suggestion nor Cameron's report.

A few years later it became necessary to mark a provisional line across Stikine River. Gold had been discovered in the Cassiar district of British Columbia, which could be reached conveniently only by way of the Stikine, and in 1875 the question arose as to whether a settlement of British subjects on the river was within the territory of British Columbia. Then in the following year a criminal named Peter Martin, an alleged citizen of the United States, who was being taken down the river from the Cassiar district to Victoria by Canadian officials, attempted to escape when the party went on shore for lunch, and seizing a loaded gun he defied his guards to recapture him, insisting that he was in territory of the United States; after assaulting one of the guards he was overpowered and the party continued down the river to Wrangell, whence Martin was conveyed to Victoria for trial. Secretary Fish immediately demanded Martin's release, on the ground that the assault had been committed in territory of the United States. In 1877, Joseph Hunter was instructed by the Surveyor General of Canada "to ascertain with approximate accuracy the boundary on the said river, between the Dominion and the Territory of Alaska". By joining the summits of the mountains by a line parallel with the coast he established the boundary there about 20 miles from the coast. The United States accepted this line in the following year for customs and jurisdiction purposes, with the understanding that "it was not to be construed as affecting their rights under the treaty". The Martin incident was closed when Hunter reported that the place where the assault had been committed was within the jurisdiction of the United States and Martin was set at liberty.

In 1883, Lieutenant Frederick Schwatka of the United States army made a military reconnaissance across Chilkoot Pass and proceeded down Yukon River. Statements in his report were the subjects of diplomatic correspondence in 1887.

The first intimation that there might be a dispute over the Alaska boundary was in 1884, when W. H. Dall of the United States Coast and Geodetic Survey wrote to Dr. G. M. Dawson of the Geological Survey of Canada, saying: "The matter of the boundary should be stirred up. The language of the Treaty of 1825 is so indefinite that were the region included for any cause to become suddenly of evident value, or if any serious international question were to arise regarding jurisdiction, there would be no means of settling it by the Treaty. There being no natural boundary and the continuous range of mountains parallel to the coast shown on Vancouver's charts, like a long caterpillar, having no existence as such, the United States would undoubtedly wish to fall back on the 'line parallel to the windings of the coast and which shall never exceed the distance of ten marine leagues therefrom' of the Treaty . . . Before the question has attained any importance, it should be referred to a committee of geographers, a survey should be made, and a new treaty should be made stating determinable boundaries. Perhaps at some time you may be able to set the ball in motion on your side, and it would be only a matter of time when it would follow here". Some diplomatic correspondence followed and Dall and Dawson held several informal conferences in Washington in February 1888, but no agreement could be reached.

When, in 1891, the attention of the Canadian Government was drawn to an enactment of the United States Government of 1888, which authorized the Coast and Geodetic Survey "to survey the frontier line in accordance with plans and projects approved by the Secretary of State", the Canadian Government advanced the opinion that such a line could only be determined by a joint commission.

At Washington, July 22, 1892, a Convention was signed between Great Britain and the United States, Article I of which related to the boundary between British Columbia and the Territory of Alaska. T. C. Mendenhall, Superintendent of the Coast and Geodetic Survey, was named Commissioner for the United States, and W. F. King, Chief Astronomer of the Department of the Interior, Commissioner for Canada, to ascertain the facts and data necessary to the permanent delimitation of the boundary line in accordance with the spirit and intent of the treaty between Great Britain and Russia; furthermore, the respective Commissioners were to complete the survey and submit their reports within 2 years from the date of their first meeting. By a convention dated February 3, 1894, the time was extended to December 31, 1895.

Before this time, since 1878, small parties of prospectors had travelled from Lynn Canal, over Chilkoot Pass and down Yukon River to the placer diggings of Alaska. In August 1896 the gold fields of the Klondike, in Canadian territory, were discovered and the reports of the marvellous richness of the placers created the "rush" of the following spring. Men and women by the tens of thousands crowded over Chilkoot and White Passes. As the towns of Dyea and Skagway increased in population, some difficulty arose between the customs authorities of the two countries, which was settled by Dyea being declared a United States sub-port of entry, Canada reserving her rights as to the ultimate determination of the boundary. The limits of the Port of Dyea were later extended to include Skagway. Canadian vessels were accorded the same rights as those of the United States, and Canadian customs houses were established on both passes.

With this state of affairs the boundary question took on a new importance. On February 23, 1898, Sir Julian Pauncefote suggested to the United States Secretary of State "that the determination of the coast line of the boundary south from Mount St. Elias should be at once referred to three Commissioners who should be jurists of high standing, one to be appointed by each government, and a third by an independent power. It is suggested further that the Commissioners should proceed at once to fix the frontiers at the heads of the inlets, through which the traffic for the Yukon Valley enters; continuing subsequently with the remaining strip or line of coast". He added further "that if, pending the settlement of the boundary by the Commission, a *modus vivendi* could amicably be arranged, it would be viewed with satisfaction by Her Majesty's Government". No action, however, was taken on this proposal by the United States Government.

In 1898, also, an International Joint High Commission was appointed for the adjustment of questions at issue between the United States and Great Britain that involved the Dominion of Canada. The United States was represented by Mr. John W. Foster and Mr. John A. Kassan, and Great Britain by Sir Julian Pauncefote and Sir Louis Davies. One of the principal subjects presented for the action of the Commissioners was "provisions for the delimitation and establishment of the Alaska-Canadian Boundary by legal and scientific experts as the Commission should decide". They met at Quebec in August 1898, and again in Washington in January of the following year. Although the conferences ended without any agreement, the discussions resulted in the *modus vivendi,* concluded October 20, 1899, by an exchange of notes between Reginald Tower, Charge d'Affaires of Her Britannic Majesty at Washington, and John Hay, Secretary of State for the United States, which fixed a provisional boundary above the head of Lynn Canal and across Chilkoot and White Passes.

Mr. O. H. Tittmann, Superintendent of the United States Coast and Geodetic Survey, and Mr. W. F. King, Chief Astronomer of the Dominion of Canada, were named Commissioners to carry out the wording of the agreement. During the season of 1900 they temporarily marked a line following the right bank of Klehini River from a point 1 mile above Porcupine City to its junction with the Chilkat, crossing the valley of the latter stream ½ mile north of the village of Klukwan; they also marked provisional lines at the summits of Chilkoot and White Passes.

Matters remained in status quo until January 24, 1903, when a convention was signed at Washington that sought a mutally acceptable interpretation of the Anglo-Russian Treaty of 1825, and for this purpose agreed to the formation of a joint tribunal of six impartial jurists of repute, three from each nation, to whom the matter should be referred in the form of seven questions.

The first meeting of the Alaska Boundary Tribunal was held at the Foreign Office in London on September 3, 1903. The meetings were continued until October 20 of the same year and concluded with the Award rendered by the majority of the Tribunal.

The Convention signed at Washington in 1903 and the Alaska Boundary Tribunal Award are printed in full on preceding pages of this report. Canada had claimed that the line should follow the summits of the mountains nearest the coast and cut across all inlets and fiords, and the United States had claimed that it should lie ten marine leagues inland from the heads of all inlets and fiords. Although the Award gave neither country the full extent of territory claimed, it appears to have carried out as closely as possible the intentions of the framers of the Treaty of 1825. Nevertheless, it aroused a considerable amount of criticism in both Canada and the United States. Regarding the second question, "what was meant by Portland Channel", the decision that awarded Sitklan and Kanagunut Islands to the United States and Pearse and Wales Islands to Canada was manifestly a compromise. "The original negotiators might, logically, have intended the line to be drawn either as the British claimed or as the Americans claimed; certainly they had no intention of dividing the channel islands between the two".[1] Again, in respect to questions five and six: "This was the most important of all the problems before the tribunal, and here again the American case won by a vote of 4 to 2. A careful study of the documents on either side seems to confirm the justice of this conclusion. The American counsel claimed that in the negotiation of the Treaty of 1825 the Russian diplomats had intended 'to create an unbroken barrier along the entire waterfront of the continent'. Thus the boundary must be drawn parallel to a line joining the headwaters of the larger inlets, for otherwise this *lisière* would not be intact. This view seems to be supported by a perusal of the records of the negotiations of 1824-1825. The British claim that individual mountains might be joined to form a chain was so weak that it easily succumbed to argument".[2]

The Canadian members of the Tribunal, Sir Louis Jette and Mr. Aylesworth, issued a minority report in which they stated that they had refused to sign the Award because they could "not consider the finding of the tribunal as to the islands, entrance to Portland Channel, or as to the mountain line, a judicial one".

The Award having been accepted, the two Governments provided for the actual survey and demarcation of the line. The Commissioners appointed were Dr. O. H. Tittmann for the United States and Dr. W. F. King for the Dominion of Canada.

[1] Keenleyside, H. L.: Canada and the United States, p. 225; Alfred A. Knopf Inc., New York, 1929.
[2] Ibid., p. 226.

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APPENDIX II

Treaty Between Great Britain and Russia, Signed at St. Petersburgh, February 28/16, 1825.

[*Translation.*]

Au Nom de la Très Sainte et Indivisible Trinité.

Sa Majesté le Roi du Royaume Uni de la Grande Bretagne et de l'Irlande, et Sa Majesté l'Empereur de toutes les Russies, désirant resserrer les liens de bonne intelligence et d'amitié qui les unissent, au moyen d'un accord qui régleroit, d'après le principe des convenances réciproques, divers points relatifs au commerce, à la navigation, et aux pêcheries de leurs sujets sur l'Océan Pacifique, ainsi que les limites de leurs possessions respectives sur la côte nord-ouest de l'Amérique, ont nommé des Plénipotentiaires pour conclure une Convention à cet effet, savoir:—Sa Majesté le Roi du Royaume Uni de la Grande Bretagne et de l'Irlande, le Très Honorable Stratford Canning, Conseiller de Sa dite Majesté en Son Conseil Privé, etc. Et Sa Majesté l'Empereur de toutes les Russies, le Sieur Charles Robert Comte de Nesselrode, Son Conseiller Privé Actuel, Membre du Conseil de l'Empire, Secrétaire d'Etat dirigeant le Ministère des Affaires Etrangères, etc.; et le Sieur Pierre de Poletica, Son Conseiller d'Etat Actuel, etc. Lesquels Plénipotentiaires, après s'être communiqué leurs pleins-pouvoirs respectifs, trouvés en bonne et due forme, ont arrêté et signé les Articles suivans:

Art. I. Il est convenu que, dans aucune partie du grand Océan, appelé communément Océan Pacifique, les sujets respectifs des Hautes Puissances Contractantes ne seront ni troublés, ni gênés, soit dans la navigation, soit dans l'exploitation de la pêche, soit dans la faculté d'aborder aux côtes, sur des points qui ne seroient pas déjà occupés, afin d'y faire le commerce avec les indigènes, sauf toutefois les restrictions et conditions déterminés par les Articles qui suivent.

II. Dans la vue d'empêcher que les droits de navigation et de pêche exercés sur le grand océan par les sujets des Hautes Parties Contractantes ne deviennent le prétexte d'un commerce illicite, il est convenu que les sujets de Sa Majesté Britannique n'aborderont à aucun point où il se trouve un établissement Russe, sans la permission du Gouverneur ou Commandant; et que, réciproquement, les sujets Russes ne pourront aborder, sans permission, à aucun établissement Britannique, sur la côte nord-ouest.

III. La ligne de démarcation entre les possessions des Hautes Parties Contractantes sur la côte du continent et les îles de l'Amérique nord-ouest, sera tracée ainsi qu'il suit:

In the Name of the Most Holy and Undivided Trinity.

His Majesty the King of the United Kingdom of Great Britain and Ireland, and His Majesty the Emperor of all the Russias, being desirous of drawing still closer the ties of good understanding and friendship which unite them, by means of an agreement which may settle, upon the basis of reciprocal convenience, different points connected with the commerce, navigation, and fisheries of their subjects on the Pacific Ocean as well as the limits of their respective possessions on the northwest coast of America, have named Plenipotentiaries to conclude a Convention for this purpose, that is to say:—His Majesty the King of the United Kingdom of Great Britain and Ireland, the Right Honourable Stratford Canning, a member of His said Majesty's Most Honourable Privy Council, etc., and His Majesty the Emperor of all the Russias, the Sieur Charles Robert Count de Nesselrode, His Imperial Majesty's Privy Councillor, a member of the Council of the Empire, Secretary of State for the Department of Foreign Affairs, etc., and the Sieur Pierre de Poletica, His Imperial Majesty's Councillor of State, etc. Who, after having communicated to each other their respective full powers, found in good and due form, have agreed upon and signed the following Articles:

Art. I. It is agreed that the respective subjects of the High Contracting Parties shall not be troubled or molested, in any part of the Ocean, commonly called the Pacific Ocean, either in navigating the same, in fishing therein, or in landing at such parts of the coast as shall not have been already occupied, in order to trade with the natives, under the restrictions and conditions specified in the following Articles.

II. In order to prevent the right of navigating and fishing, exercised upon the ocean by the subjects of the High Contracting Parties, from becoming the pretext for an illicit commerce, it is agreed that the subjects of His Britannic Majesty shall not land at any place where there may be a Russian establishment, without the permission of the Governor or Commandant; and, on the other hand, that Russian subjects shall not land, without permission, at any British establishment, on the north-west coast.

III. The line of demarcation between the possessions of the High Contracting Parties, upon the coast of the continent, and the islands of America to the north-west, shall be drawn in the manner following:

A partir du point le plus méridional de l'île dite Prince of Wales, lequel point se trouve sous la parallèle du 54^{e} degré 40 minutes de latitude nord, et entre le 131^{e} et le 133^{e} degré de longitude ouest (méridien de Greenwich), la dite ligne remontera au nord le long de la passe dite Portland Channel, jusqu'au point de la terre ferme où elle atteint le 56^{e} degré de latitude nord: de ce dernier point la ligne de démarcation suivra la crête des montagnes situées parallèlement à la côte jusqu'au point d'intersection du 141^{e} degré de longitude ouest (même méridien); et finalement, du dit point d'intersection, la même ligne méridienne du 141^{e} degré formera, dans son prolongement jusqu'à la Mer Glaciale, la limite entre les possessions Russes et Britanniques sur le continent de l'Amérique nord-ouest.

IV. Il est entendu, par rapport à la ligne de démarcation déterminée dans l'Article précédent:

1. Que l'île dite Prince of Wales appartiendra toute entière à la Russie.

2. Que partout où la crête des montagnes qui s'étendent dans une direction parallèle à la côte depuis le 56° degré de latitude nord au point d'intersection du 141° degré de longitude ouest, se trouveroit à la distance de plus de 10 lieues marines de l'océan, la limite entre les possessions Britanniques et la lisière de côte mentionnée ci-dessus comme devant appartenir à la Russie, sera formée par une ligne parallèle aux sinuosités de la côte, et qui ne pourra jamais en être éloignée que de 10 lieues marines.

V. Il est convenu en outre, que nul établissement ne sera formé par l'une des deux Parties dans les limites que les deux Articles précédents assignent aux possessions de l'autre. En conséquence, les sujets Britanniques ne formeront aucun établissement, soit sur la côte, soit sur la lisière de terre ferme comprise dans les limites des possessions Russes, telles qu'elles sont désignées dans les 2 Articles précédens; et, de même, nul établissement ne sera formé par des sujets Russes au delà des dites limites.

VI. Il est entendu que les sujets de Sa Majesté Britannique, de quelque côté qu'ils arrivent, soit de l'océan, soit de l'intérieur du continent, jouiront à perpétuité du droit de naviguer librement, et sans entrave quelconque, sur tous les fleuves et rivières qui, dans leurs cours vers la mer Pacifique, traverseront la ligne de démarcation sur la lisière de la côte indiquée dans l'Article III de la présente Convention.

VII. Il est aussi entendu que, pendant l'espace de 10 ans, à dater de la signature de cette Convention, les vaisseaux des deux Puissances, ou ceux appartenant à leurs sujets

Commencing from the southernmost point of the island called Prince of Wales Island, which point lies in the parallel of 54 degrees 40 minutes, north latitude, and between the 131st and 133rd degree of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland Channel, as far as the point of the continent where it strikes the 56th degree of north latitude; from this last mentioned point, the line of demarcation shall follow the summit of the mountains situated parallel to the coast as far as the point of intersection of the 141st degree of west longitude (of the same meridian); and, finally, from the said point of intersection, the said meridian line of the 141st degree, in its prolongation as far as the Frozen Ocean, shall form the limit between the Russian and British possessions on the continent of America to the north-west.

IV. With reference to the line of demarcation laid down in the preceding Article it is understood:

1st. That the island called Prince of Wales Island shall belong wholly to Russia.

2nd. That whenever the summit of the mountains which extend in a direction parallel to the coast, from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude, shall prove to be at the distance of more than 10 marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned, shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of 10 marine leagues therefrom.

V. It is moreover agreed, that no establishment shall be formed by either of the two parties within the limits assigned by the two preceding Articles to the possessions of the other; consequently, British subjects shall not form any establishment either upon the coast, or upon the border of the continent comprised within the limits of the Russian possessions, as designated in the two preceding Articles; and, in like manner, no establishment shall be formed by Russian subjects beyond the said limits.

VI. It is understood that the subjects of His Britannic Majesty, from whatever quarter they may arrive, whether from the ocean, or from the interior of the continent, shall forever enjoy the right of navigating freely, and without any hindrance whatever, all the rivers and streams which, in their course towards the Pacific Ocean, may cross the line of demarcation upon the line of coast described in Article III of the present Convention.

VII. It is also understood, that, for the space of ten years from the signature of the present Convention, the vessels of the two Powers, or respectifs, pourront réciproquement fréquenter, sans entrave quelconque, toutes les mers intérieures, les golfes, havres, et criques sur la côte mentionnée dans l'Article III, afin d'y faire la pêche et le commerce avec les indigènes.

VIII. Le Port de Sitka, ou Novo Archangelsk, sera ouvert au commerce et aux vaisseaux des sujets Britanniques durant l'espace de 10 ans, à dater de l'échange des ratifications de cette Convention. Au cas qu'une prolongation de ce terme de 10 ans soit accordée à quelque autre Puissance, la même prolongation sera également accordée à la Grande Bretagne.

IX. La susdite liberté de commerce ne s'appliquera point au trafic des liqueurs spiritueuses, des armes à feu, des armes blanches, de la poudre à canon, ou d'autres munitions de guerre; Les Hautes Parties Contractantes s'engageant réciproquement à ne laisser ni vendre, ni livrer, de quelque manière que ce puisse être, aux indigènes du pays les articles ci-dessus mentionnés.

X. Tout vaisseau Britannique ou Russe naviguant sur l'Océan Pacifique, qui sera forcé par des tempêtes, ou par quelque accident, de se réfugier dans les ports des parties respectives, aura la liberté de s'y radouber, de s'y pourvoir de tous les objets qui lui seront nécessaires, et de se remettre en mer, sans payer d'autres droits que ceux de port et de fanaux, lesquels seront, pour lui, les mêmes que pour les bâtimens nationaux. Si, cependant, le patron d'un tel navire se trouvoit dans la nécessité de se défaire d'une partie de ses marchandises pour subvenir à ses dépenses, il sera tenu de se conformer aux ordonnances et aux tarifs de l'endroit où il aura abordé.

XI. Dans tous les cas de plaintes relatives à l'infraction des Articles de la présente Convention, les autorités civiles et militaires des deux Hautes Parties Contractantes, sans se permettre au préalable ni voie de fait, ni mesure de force, seront tenues de faire un rapport exact de l'affaire et de ses circonstances à leurs Cours respectives, lesquelles s'engagent à la régler à l'amiable, et d'après les principes d'une parfaite justice.

XII. La présente Convention sera ratifiée, et les ratifications en seront échangées à Londres dans l'espace de 6 semaines, ou plutôt si faire se peut.

En foi de quoi les Plénipotentiaires respectifs l'ont signé, et y ont apposé le cachet de leurs armes.

Fait à St. Pétersbourg, le 28/16 Février, de l'an de Grâce 1825.

(L.S.) STRATFORD CANNING.
(L.S.) LE COMTE DE NESSELRODE.
(L.S.) PIERRE DE POLETICA.

those belonging to their respective subjects, shall mutually be at liberty to frequent, without any hindrance whatever, all the inland seas, the gulfs, havens, and creeks on the coast mentioned in Article III for the purposes of fishing and of trading with the natives.

VIII. The port of Sitka, or Novo Archangelsk, shall be open to the commerce and vessels of British subjects for the space of ten years from the date of the exchange of the ratifications of the present Convention. In the event of an extension of this term of ten years being granted to any other Power, the like extension shall be granted also to Great Britain.

IX. The above-mentioned liberty of commerce shall not apply to the trade in spirituous liquors, in fire-arms, or other arms, gunpowder, or other warlike stores; the High Contracting Parties reciprocally engaging not to permit the above-mentioned articles to be sold or delivered, in any manner whatever, to the natives of the country.

X. Every British or Russian vessel navigating the Pacific Ocean, which may be compelled by storms or by accident, to take shelter in the ports of the respective Parties, shall be at liberty to refit therein, to provide itself with all necessary stores, and to put to sea again, without paying any other than port and lighthouse dues, which shall be the same as those paid by national vessels. In case, however, the master of such vessel should be under the necessity of disposing of a part of his merchandise in order to defray his expenses, he shall conform himself to the regulations and tariffs of the place where he may have landed.

XI. In every case of complaint on account of an infraction of the Articles of the present Convention, the civil and military authorities of the High Contracting Parties, without previously acting or taking any forcible measure, shall make an exact and circumstantial report of the matter to their respective Courts, who engage to settle the same, in a friendly manner, and according to the principles of justice.

XII. The present Convention shall be ratified, and the ratifications shall be exchanged at London within the space of six weeks, or sooner if possible.

In witness whereof, the respective Plenipotentiaries have signed the same, and have affixed thereto the seal of their arms.

Done at St. Petersburgh, the 28/16th day of February, in the year of Our Lord, 1825.

[L.S.] STRATFORD CANNING.
[L.S.] COMTE DE NESSELRODE.
[L.S.] PIERRE DE POLETICA.

(Hertslet's Commercial and Slave Trade Treaties, vol. iii, p. 362.)

Treaty Concerning the Cession of the Russian Possessions in North America by His Majesty the Emperor of all the Russias to the United States of America

(Concluded March 30, 1867. Ratified by the United States May 28, 1867. Exchanged June 20, 1867. Proclaimed by the United States, June 20, 1867.)

Sa Majesté l'Empereur de toutes les Russies et les Etats-Unis d'Amérique, désirant raffermir, s'il est possible, la bonne intelligence qui existe entre eux, ont nommé, à cet effet, pour leurs Plénipotentiaires, savoir: Sa Majesté l'Empereur de toutes les Russies, le Conseiller Privé Edouard de Stoeckl, son envoyé extraordinaire et ministre plénipotentiaire aux Etats-Unis; et le Président des Etats-Unis, le Sieur William H. Seward, Secrétaire d'Etat, lesquels, après avoir échangé leurs pleins-pouvoirs, trouvés en bonne et due forme, ont arrêté et signé les articles suivants:

Article I.

Sa Majesté l'Empereur de toutes les Russies s'engage, par cette convention, à céder aux Etats-Unis, immédiatement après l'échange des ratifications, tout le Territoire avec droit de souveraineté actuellement possédé par Sa Majesté sur le continent d'Amérique ainsi que les îles contiguës, le dit Territoire étant compris dans les limites géographiques ci-dessous indiquées, savoir: la limite orientale est la ligne de démarcation entre les possessions Russes et Britanniques dans l'Amérique du Nord, ainsi qu'elle est établie par la convention, conclue entre la Russie et la Grande-Bretagne, le 16/28 Février, 1825, et définie dans les termes suivants des Articles III et IV de la dite convention.

"A partir du point le plus méridional de l'Ile dite Prince of Wales, lequel point se trouve sous la parallèle du 54me degré 40 minutes de latitude nord, et entre le 131me et le 133me degré de longitude ouest (méridien de Greenwich) la dite ligne remontera, au nord le long de la passe dite Portland Channel, jusqu'au point de la terre ferme, où elle atteint le 56me degré de latitude nord; de ce dernier point la ligne de démarcation suivra la crête des montagnes situées parallèlement à la côte jusqu'au point d'intersection du 141me degré de longitude ouest (même méridien), et finalement, du dit point d'intersection la même ligne méridienne du 141me degré formera, dans son prolongement jusqu'à la mer Glaciale, la limite entre les possessions Russes et Britanniques sur le continent de l'Amérique nord-ouest.

[*Translation.*]

The United States of America and His Majesty the Emperor of all the Russias, being desirous of strengthening, if possible, the good understanding which exists between them, have, for that purpose, appointed as their Plenipotentiaries: The President of the United States, William H. Seward, Secretary of State; and His Majesty the Emperor of all the Russias, the Privy Councillor, Edward de Stoeckl, his Envoy Extraordinary and Minister Plenipotentiary to the United States.

And the said Plenipotentiaries, having exchanged their full powers, which were found to be in due form, have agreed upon and signed the following articles:

Article I.

His Majesty the Emperor of all the Russias agrees to cede to the United States, by this convention, immediately upon the exchange of the ratifications thereof, all the territory and dominion now possessed by his said Majesty on the continent of America and in the adjacent islands, the same being contained within the geographical limits herein set forth, to wit: The eastern limit is the line of demarcation between the Russian and the British possessions in North America, as established by the Convention between Russia and Great Britain, in February 28–16, 1825, and described in Articles III and IV of said Convention, in the following terms:

"Commencing from the southernmost point of the Island called Prince of Wales Island, which point lies in the parallel of 54 degrees 40 minutes north latitude, and between the 131st and the 133rd degree of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland Channel, as far as the point of the continent where it strikes the 56th degree of north latitude; from this last-mentioned point the line of demarcation shall follow the summit of the mountains situated parallel to the coast as far as the point of intersection of the 141st degree of west longitude (of the same meridian); and finally, from the said point of intersection, the said meridian line of the 141st degree, in its prolongation as far as the Frozen Ocean.

"IV. Il est entendu, par rapport à la ligne de démarcation déterminée dans l'article précédent:

"1° Que l'Ile dite Prince of Wales, appartiendra toute entière à la Russie;" (mais dès ce jour en vertu de cette cession aux Etats-Unis).

"2° Que partout où la crête des montagnes qui s'étendent dans une direction parallèle à la côte, depuis le 56me degré de latitude nord au point d'intersection du 141me degré de longitude ouest se trouverait à la distance de plus de dix lieues marines de l'océan la limite entre les possessions Britanniques et la lisière de côte mentionnée ci-dessus comme devant appartenir à la Russie" c'est-à-dire la limite des possessions cédées par cette Convention: "sera formée par une ligne parallèle aux sinuosités de la côte et qui ne pourra jamais en être éloignée que de dix lieues marines."

La limite occidentale des territoires cédés passe par un point au détroit de Behring sous la parallèle du soixante-cinquième degré trente minutes de latitude Nord à son intersection par le méridien qui sépare à distance égale les Iles Krusenstern ou Ignalook et l'Ile Ratmonoff ou Noonarbook et remonte en ligne directe, sans limitation, vers le Nord jusqu'à ce qu'elle se perde dans la mer Glaciale. Commençant au même point de départ, cette limite occidentale suit de là un cours presque Sud-ouest, à travers le détroit de Behring et la mer de Behring, de manière à passer à distance égale entre le point Nord-ouest de l'île Saint-Laurent et le point Sud-est du cap Choukotski jusqu'au méridien cent soixante-douzième de longitude Ouest; de ce point, à partir de l'intersection de ce méridien, cette limite suit une direction Sud-ouest de manière à passer à distance égale entre l'île d'Attou et l'île Copper du groupe d'îlots Kormandorski dans l'océan Pacifique Septentrional jusqu'au méridien de cent quatre-vingt treize degrés de longitude Ouest, de manière à enclaver, dans le Territoire cédé toutes les îles Aléoutes situées à l'est de ce méridien.

Article II.

Dans le Territoire cédé par l'article précédent à la Souveraineté des Etats-Unis sont compris le droit de propriété sur tous les terrains et places publics, terres inoccupées, toutes les constructions publiques, fortifications, casernes et autres édifices qui ne sont pas propriété privée individuelle. Il est toutefois entendu et convenu que les églises construites par le Gouvernement Russe sur le Territoire cédé, resteront la propriété des membres de l'Eglise Grecque Orientale résidant dans ce Territoire et appartenant à ce culte. Tous les archives, papiers, et documents du Gouvernement ayant

"IV. With reference to the line of demarcation laid down in the preceding Article, it is understood—

"1st—That the island called Prince of Wales Island shall belong wholly to Russia" (now, by this cession, to the United States).

"2nd—That whenever the summit of the mountains which extend in a direction parallel to the coast from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude shall prove to be at the distance of more than ten marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia as above mentioned (that is to say, the limit to the possessions ceded by this Convention) shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of ten marine leagues therefrom."

The western limit within which the territories and dominion conveyed, are contained, passes through a point in Behring's Straits on the parallel of sixty-five degrees thirty minutes north latitude, at its intersection by the meridian which passes midway between the islands of Krusenstern, or Ignalook, and the island of Ratmanoff, or Noonarbook, and proceeds due north, without limitation, into the same Frozen Ocean. The same western limit, beginning at the same initial point, proceeds thence in a course nearly southwest, through Behring's Straits and Behring's Sea, so as to pass midway between the north-west point of the island of St. Lawrence and the south-east point of Cape Choukotski, to the meridian of one hundred and seventy-two west longitude; thence, from the intersection of that meridian, in a south-westerly direction, so as to pass midway between the island of Attou and the Copper Island of the Komandorski couplet or group in the North Pacific Ocean, to the meridian of one hundred and ninety-three degrees west longitude, so as to include in the territory conveyed the whole of the Aleutian Islands east of that meridian.

Article II.

In the cession of the territory and dominion made by the preceding article, are included the right of property in all public lots and squares, vacant lands, and all public buildings, fortifications, barracks, and other edifices which are not private individual property. It is, however, understood and agreed that the churches which have been built in the ceded territory by the Russian Government, shall remain the property of such members of the Greek Oriental Church resident in the territory, as may choose to worship therein. Any Government archives, trait au susdit Territoire, et qui y sont maintenant déposés seront placés entre les mains de l'agent des Etats-Unis; mais les Etats-Unis fourniront toujours quand il y aura lieu des copies légalisées de ces documents au Gouvernement Russe, aux officers ou sujets Russes qui pourront en faire la demande.

Article III.

Il est réservé aux habitans du territoire cédé le choix de garder leur nationalité et de rentrer en Russie dans l'espace de trois ans; mais s'ils préfèrent rester dans le territoire cédé ils seront admis, à l'exception toutefois des tribus sauvages à jour de tous les droits, avantages et immunités des citoyens des Etats-Unis et ils seront maintenus et protégés dans le plein exercice de leur liberté, droit de propriété et religion. Les tribus sauvages seront assujéties aux lois et règlements que les Etats-Unis pourront adopter de temps en temps à l'égard des tribus aborigènes de ce pays.

Article IV.

Sa Majesté l'Empereur de toutes les Russies nommera, aussitôt que possible un agent ou des agents chargés de remettre formellement à l'agent ou aux agents nommés par les Etats-Unis, le territoire, la souveraineté, les propriétés, dépendances, et appartenances ainsi cédés et de dresser tout autre acte qui sera nécessaire à l'accomplissement de cette transaction. Mais la cession, avec le droit de possession immédiate, doit toutefois être considérée complète et absolue à l'échange des ratifications sans attendre la remise formelle.

Article V.

Immédiatement après l'échange des ratifications de cette convention, les fortifications et les postes militaires qui se trouveront sur le territoire cédé seront remis à l'agent des Etats-Unis et les troupes Russes qui sont stationnées dans le dit Territoire, seront retirées dans un terme praticable et qui puisse convenir aux deux parties.

Article VI.

En considération de la susdite cession les Etats-Unis s'engagent à payer à la Trésorerie à Washington, dans le terme de dix mois après l'échange des ratifications de cette convention, sept millions deux cent mille de dollars en or, au Représentant diplomatique ou tout autre agent de Sa Majesté l'Empereur de toutes les Russies dûment autorisé à recevoir cette

papers, and documents relative to the territory and dominion aforesaid, which may now be existing there, will be left in the possession of the agent of the United States; but an authenticated copy of such of them as may be required, will be, at all times, given by the United States to the Russian Government, or to such Russian officers or subjects, as they may apply for.

Article III.

The inhabitants of the ceded territory, according to their choice, reserving their natural allegiance may return to Russia within three years; but if they should prefer to remain in the ceded territory, they, with the exception of uncivilized native tribes, shall be admitted to the enjoyment of all the rights, advantages, and immunities of citizens of the United States, and shall be maintained and protected in the free enjoyment of their liberty, property, and religion. The uncivilized tribes will be subject to such laws and regulations as the United States may from time to time adopt in regard to aboriginal tribes of that country.

Article IV.

His Majesty the Emperor of all the Russias shall appoint, with convenient dispatch, an agent or agents for the purpose of formally delivering to a similar agent or agents appointed on behalf to the United States, the territory, dominion, property, dependencies and appurtenances which are ceded as above, and for doing any other act which may be necessary in regard thereto. But the cession, with the right of immediate possession, is nevertheless to be deemed complete and absolute on the exchange of ratifications, without waiting for such formal delivery.

Article V.

Immediately after the exchange of the ratifications of this Convention, any fortifications or military posts which may be in the ceded territory, shall be delivered to the agent of the United States, and any Russian troops which may be in the territory, shall be withdrawn as soon as may be reasonably and conveniently practicable.

Article VI.

In consideration of the cession aforesaid, the United States agree to pay at the Treasury at Washington, within ten months after the exchange of the ratifications of this Convention, to the diplomatic representative or other agent of His Majesty the Emperor of all the Russias, duly authorized to receive the same, seven million two hundred thousand dollars in gold.

somme. La cession du territoire avec droit de souveraineté faite par cette convention, est déclarée libre et dégagée de toutes réservations, privilèges, franchises ou des possessions par des compagnies Russes ou tout autre légalement constituées ou autrement ou par des associations sauf simplement les propriétaires possédant des biens privés individuels et la cession ainsi faite transfère tous les droits, franchises et privilèges appartenant actuellement à la Russie dans le dit Territoire et ses dépendances.

Article VII.

Lorsque cette convention aura été dûment ratifiée par Sa Majesté l'Empereur de toutes les Russies d'une part et par le Président des Etats-Unis avec l'avis et le consentement du Sénat de l'autre, les ratifications en seront échangées à Washington dans le terme de trois mois, à compter du jour de la signature, ou plus tôt si faire se peut.

En foi de quoi les Plénipotentiaires respectifs ont signé cette convention et y ont apposé le sceau de leurs armes.

Fait à Washington le 18–30 jour de mars de l'an de Notre-Seigneur mil huit cent soixante-sept.

[L.S.] EDOUARD de STOECKL.
[L.S.] WILLIAM H. SEWARD.

The cession of territory and dominion herein made is hereby declared to be free and unincumbered by any reservations, privileges, franchises, grants, or possessions, by any associated companies, whether corporate or incorporate, Russian or any other, or by any parties except merely private individual property holders; and the cession hereby made conveys all the rights, franchises, and privileges now belonging to Russia in the said territory or dominion, and appurtenances thereto.

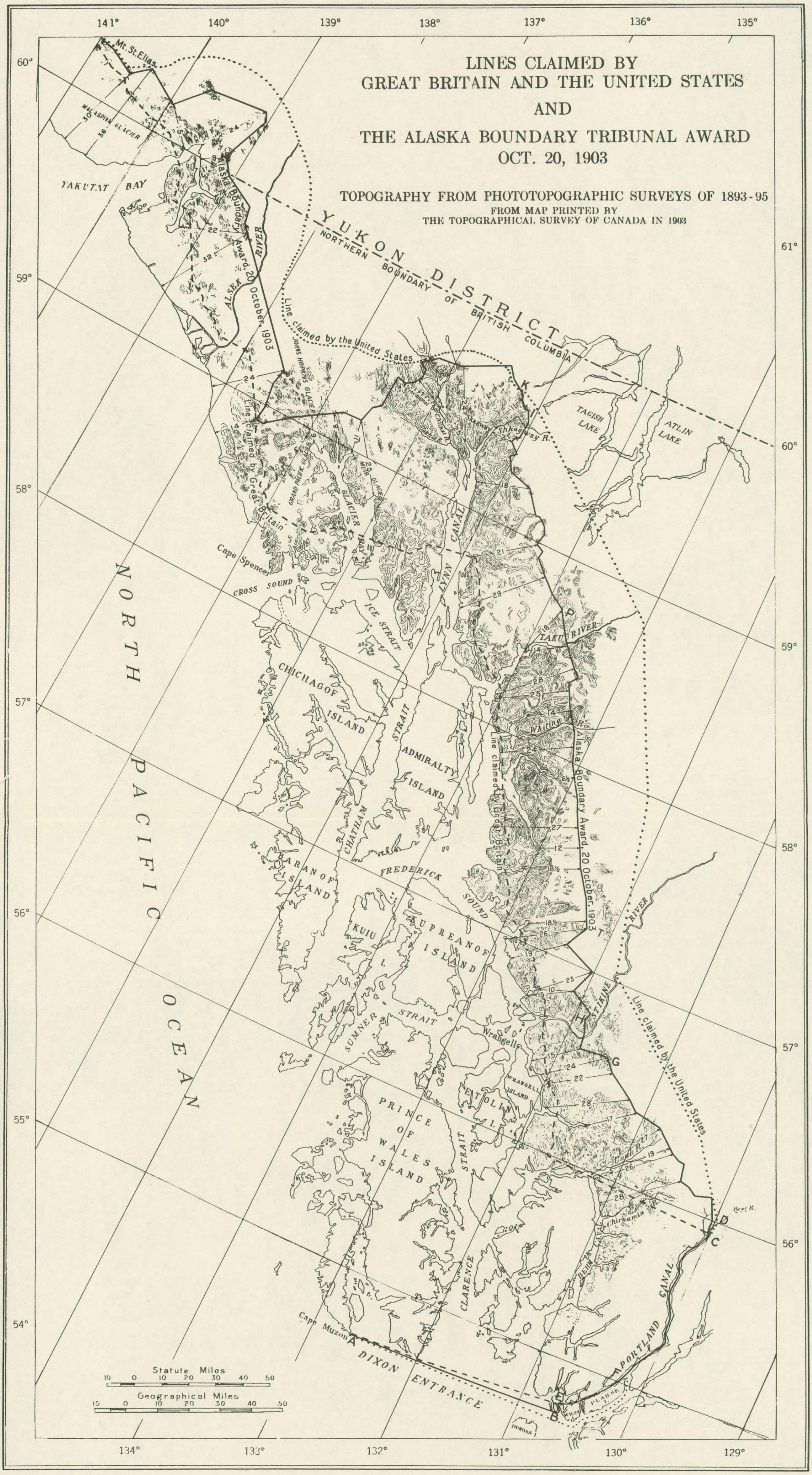
Article VII.

When this Convention shall have been duly ratified by the President of the United States, by and with the advice and consent of the Senate, on the one part, and on the other by His Majesty the Emperor of all the Russias, the ratifications shall be exchanged at Washington within three months from the date hereof, or sooner, if possible.

In faith whereof, the respective Plenipotentiaries have signed this Convention, and thereto affixed the seals of their arms.

Done at Washington, this thirtieth day of March, in the year of our Lord one thousand eight hundred and sixty-seven.

[L.S.] WILLIAM H. SEWARD.
[L.S.] EDOUARD de STOECKL.


LINES CLAIMED BY
GREAT BRITAIN AND THE UNITED STATES
AND
THE ALASKA BOUNDARY TRIBUNAL AWARD
OCT. 20, 1903
TOPOGRAPHY FROM PHOTOTOPOGRAPHIC SURVEYS OF 1893-95
FROM MAP PRINTED BY
THE TOPOGRAPHICAL SURVEY OF CANADA IN 1903
YUKON DISTRICT
NORTHERN BOUNDARY OF BRITISH COLUMBIA
Line claimed by the United States
Line claimed by Great Britain
Alaska Boundary Award 20 October 1903
Mt. St. Elias
MALASPINA GLACIER
YAKUTAT BAY
ALSEK RIVER
JOHNS HOPKINS GLACIER
GLACIER BAY
LYNN CANAL
Shkagway R.
TAGISH LAKE
ATLIN LAKE
TAKU RIVER
Whiting R.
Cape Spencer
CROSS SOUND
ICE STRAIT
CHICHAGOF ISLAND
ADMIRALTY ISLAND
CHATHAM STRAIT
BARANOF ISLAND
FREDERICK SOUND
KUIU I.
KUPREANOF ISLAND
SUMNER STRAIT
Wrangell
WRANGELL ISLAND
ETOLIN I.
STIKINE RIVER
PRINCE OF WALES ISLAND
CLARENCE STRAIT
Unuk R.
Chickamin R.
PORTLAND CANAL
Cape Muzon
DIXON ENTRANCE
NORTH PACIFIC OCEAN
Statute Miles
Geographical Miles

OPINIONS OF THE MEMBERS OF THE ALASKA BOUNDARY TRIBUNAL RELATIVE TO THE AWARD

OPINION BY LORD ALVERSTONE (1)

Second Question

What Channel is the Portland Channel ?

The answer to this question, as indicated by the learned Counsel on both sides, depends upon the simple question: What did the Contracting Parties mean by the words "the channel called the Portland Channel" in Article III of the Treaty of 1825 ? This is a pure question of identity. In order to answer it one must endeavour to put oneself in the position of the Contracting Parties, and ascertain as accurately as possible what was known to them of the geography of the district so far as relates to the channel called the Portland Channel.

There are certain broad facts which, in my opinion, establish beyond any reasonable question that the negotiators had before them Vancouver's maps, the Russian map (No. 5 in the British, No. 6 in the American Atlas), Arrowsmith's maps (probably the map numbered 10 in the American Atlas), and Faden's maps (British Appendix, pp. 10 and 11).

I have, moreover, no doubt that the negotiators were acquainted with the information contained in Vancouver's narrative. I do not think it necessary to state in detail the evidence which has led me to this conclusion beyond stating that, quite apart from the overwhelming probability that this was the case, there are passages in the documents which, in my judgment, establish it to demonstration, but, for the purpose of my reasons, it is sufficient to say that I have come to that clear conclusion after the most careful perusal of the documents.

I will now endeavour to summarize the facts relating to the channel called Portland Channel, which the information afforded by the maps and documents to which I have referred, establish. The first and most important is that it was perfectly well known before, and at the date of the Treaty, that there were two channels or inlets, the one called Portland Channel, the other Observatory Inlet, both of them coming out to the Pacific Ocean.

That the seaward entrance of Observatory Inlet was between Point Maskelyne on the south and Point Wales on the north.

That one entrance of Portland Channel was between the island now known as Kannaghunut and Tongas Island.

That the latitude of the mouth or entrance to the channel called Portland Channel, as described in the Treaty and understood by the negotiators, was at 54° 45′.

The narrative of Vancouver refers to the channel between Wales Island and Sitklan Island, known as Tongas Passage, as a passage leading south-south-east towards the ocean—which he passed in hope of finding a more northern and westerly communication to the sea, and describes his subsequently finding the passage between Tongas Island on the north and Sitklan and Kannaghunut on the south. The narrative and the maps leave some doubt on the question whether he intended the name Portland Canal to include Tongas Passage as well as the passage between Tongas Island on the north and Sitklan and Kannaghunut Island on the south. In view of this doubt, I think, having regard to the language, that Vancouver may have intended to include Tongas Passage in that name, and looking to the relative size of the two passages, I think that the negotiators may well have thought that the Portland Channel, after passing north of Pearse and Wales Islands, issued into the sea by the two passages above described.

For the purpose of identifying the channel, commonly known as Portland Channel, the maps which were before the negotiators may be useful. This is one of the points upon which the evidence of contemporary maps as to general reputation is undoubtedly admissible. It is sufficient to say that not one of the maps which I have enumerated above in any way contradicts the precise and detailed situation of Portland Channel and Observatory Inlet given by Vancouver's narrative, and the other documents to which I have referred. The Russian map of 1802 shows the two channels distinctly; and the same may be said of Faden's maps, on which so much reliance was placed on the part of the United States.

I do not attach particular importance to the way in which names on the maps are written or printed, and therefore I do not rely upon the fact that, in the case of some of these contemporary maps, the words "Portland Channel" are written so as to include, within the name, the lower part of the channel which is in dispute. From long experience I have found that it is not safe to rely upon any such peculiarities.

After the most careful consideration of every document in this Case, I have found nothing to alter or throw any doubt on the conclusion to which I have arrived, and there are certain general considerations which strongly support it.

Russia and Great Britain were negotiating as to the point on *the coast* to which Russian dominion should be conceded. It is unnecessary to refer to all the earlier negotiations, but it is distinctly established that Russia urged that her dominion should extend to 55° of latitude, and it was in furtherance of this object that Portland Channel, which issues into the sea at 54° 45′, was conceded and ultimately agreed to by Great Britain. No claim was ever made by Russia to any of the islands south of 54° 45′ except Prince of Wales Island, and this is the more marked because she did claim the whole of Prince of Wales Island, a part of which extended to about 54° 40′.

The islands between Observatory Inlet and the channel, to which I have referred above as the Portland Channel, are never mentioned in the whole course of the negotiations.

It is suggested on behalf of the United States that Portland Channel included both the channels, namely, the channel coming out between Point Maskelyne and Point Wales, and that running to the north of Pearse and Wales Islands, and that, upon the doctrine of the thalweg, the larger channel must be taken as the boundary. It is sufficient to say that, in my opinion, there is no foundation for this argument. The lengths and the points of land at their entrances are given in the case of each channel by Vancouver in a way which precludes the suggestion that he intended to include both channels under one name, and it must be remembered that he was upon a voyage of discovery, and named these channels when he had discovered and explored them.

Inasmuch as the question submitted to us only involves the determination of the channel described in the Treaty by the words already cited "the channel called Portland Channel", subsequent history can throw no light upon this question; but I think it right to say that the use in the year 1853 of the name Portland Inlet in the British Admiralty Chart, upon which much reliance was placed on behalf of the United States has, in my opinion, no bearing upon the question, and the references to Tongas Island in 1835 as being on the frontier of the Russian Straits, and in 1863 as being on the north side of the Portland Canal, and in 1869 as to Tongas being on the boundary between Alaska and British Columbia, are strongly confirmatory of the view at which I have arrived upon the consideration of the materials which were in existence at the date of the Treaty.

I therefore answer the Second Question as follows:—

The Channel which runs to the North of Pearse and Wales Islands, and issues into the Pacific between Wales Island and Sitklan Island.

(Signed) ALVERSTONE.

October 20, 1903.

OPINION BY LORD ALVERSTONE (2)

Fifth Question

IN EXTENDING THE LINE OF DEMARCATION NORTHWARD FROM SAID POINT ON THE PARALLEL OF THE 56TH DEGREE OF NORTH LATITUDE, FOLLOWING THE CREST OF THE MOUNTAINS SITUATED PARALLEL TO THE COAST UNTIL ITS INTERSECTION WITH THE 141ST DEGREE OF LONGITUDE WEST OF GREENWICH, SUBJECT TO THE CONDITION THAT IF SUCH LINE SHOULD ANYWHERE EXCEED THE DISTANCE OF 10 MARINE LEAGUES FROM THE OCEAN, THEN THE BOUNDARY BETWEEN THE BRITISH AND THE RUSSIAN TERRITORY SHOULD BE FORMED BY A LINE PARALLEL TO THE SINUOSITIES OF THE COAST, AND DISTANT THEREFROM NOT MORE THAN 10 MARINE LEAGUES, WAS IT THE INTENTION AND MEANING OF SAID CONVENTION OF 1825 THAT THERE SHOULD REMAIN IN THE EXCLUSIVE POSSESSION OF RUSSIA A CONTINUOUS FRINGE, OR STRIP OF COAST ON THE MAINLAND NOT EXCEEDING 10 MARINE LEAGUES IN WIDTH, SEPARATING THE BRITISH POSSESSIONS FROM THE BAYS, PORTS, INLETS, HAVENS, AND WATERS OF THE OCEAN, AND EXTENDING FROM THE SAID POINT ON THE 56TH DEGREE OF LATITUDE NORTH TO A POINT WHERE SUCH LINE OF DEMARCATION SHOULD INTERSECT THE 141ST DEGREE OF LONGITUDE WEST OF THE MERIDIAN OF GREENWICH?

Stated shortly, I understand this question to ask whether the eastern boundary, whether fixed by the crest of the mountains or by a distance of 10 marine leagues, was to run round the heads of the bays, ports, inlets, havens, and waters of the ocean, or not. I have come to the conclusion in the affirmative, viz., that the boundary, whether running along the summits or crests of the mountains, or—in the absence of mountains—at a distance of 10 marine leagues, was to run round the heads of the inlets, and not to cross them.

The language of the Treaty of 1825 does not of itself enable this question to be answered distinctly—on the contrary, it contains the ambiguities which have given rise to the discussion upon the one side and the other.

Paragraph 2 of Article III states that the line of demarcation shall follow the summit of the mountains situated parallel to the coast ("parallèlement à la côte"). This is the clause upon which the question really depends, because in the event of mountains being found to exist, situated parallel to the coast within a distance of 10 marine leagues, no recourse need be had to Article IV. Article IV, however, is of importance, as it may tend to throw light upon what was the meaning of the word "coast" in Article III; and the words in paragraph 2 of Article IV are "wherever the summits of the mountains which extend in a direction parallel to the coast from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude shall prove to be at a distance of more than 10 marine leagues from the ocean". It is, in my opinion, correctly pointed out, on behalf of the United States, that the word "coast" is an ambiguous term, and may be used in two, possibly in more than two, senses. I think, therefore, we are not only entitled, but bound, to ascertain as far as we can from the facts which were before the negotiators the sense in which they used the word "coast" in the Treaty.

Before considering this latter view of the case, it is desirable to ascertain, as far as possible from the Treaty itself, what it means, and what can be gathered from the language of the Treaty alone. The parties were making an Agreement, as the opening words of the Treaty show, as to the limits of their respective possessions on the northwest coast of America, and there cannot be any question that the word "coast" in Articles I and II refers to the north-west coast of America. In Article III the opening words, "upon the coast of the continent", also refer to the north-west coast of America. The first ambiguity arises upon the word "coast" in the phrase "parallel to the coast" in the description of the boundary in Article III, and as to the word "coast" in the words "parallel to the coast" in the second paragraph of Article IV, and the words "the line of coast" and "the windings of the coast" in the same paragraph. Article V does not bear directly upon the question in dispute, but the words "or upon the border of the continent" ("*lisière de* *terre ferme*"), which follow the words "upon the coast", afford some slight guide to the meaning of the word "coast" in Article III. The word "coast" in Article VI evidently means the coast of the continent, as it is in contrast with the words "ocean" and "the interior". I postpone the consideration of the meaning of the word "coast" in Article VII, as it raises a very important question, which is in controversy. Considering these various passages, and the use made of the word "coast" therein, do they enable one, without reference to the previous negotiations, to answer the question as to whether the strip of territory mentioned in Article III was to run round the heads of the bays and inlets, or to cross them ? I am of opinion that they do not. The broad, undisputed facts are that the parties were engaged in making an Agreement respecting an archipelago of islands off the coast, and some strip of land upon the coast itself. The western limit of these islands extends in some places about 100 miles from the coast, and the channels or passages between the islands and between the islands and the coast are narrow waters of widths varying from a few hundred yards to 13 miles. In ordinary parlance no one would call the waters of any of these channels or inlets between the islands, or between the islands and the mainland, "ocean". I agree with the view presented on behalf of Great Britain, that no one coming from the interior and reaching any of these channels, and particularly the head of the Lynn Canal or Taku Inlet, would describe himself as being upon the ocean; but, upon the other hand, it is quite clear that the Treaty does regard some of these channels as ocean. For instance, to take points as to which no question arises, between Wrangell Island, Mitkoff Island, and Kupreanoff Island, all of which are north of latitude 56, it cannot, I think, be disputed that, for the purpose of the Treaty, the waters between these islands and the mainland were included in the word "ocean", and that the coast upon which the eastern boundary of the *lisière* was to be drawn was the coast of the continent, and the mountains referred to in Article III were to be upon that coast, and the line referred to in paragraph 2 of Article IV was to be measured from those waters. This consideration, however, is not sufficient to solve the question; it still leaves open the interpretation of the word "coast" to which the mountains were to be parallel.

Now, it is to be observed that *prima facie* the eastern boundary is to be fixed under Article III; as already pointed out, it is not necessary to have recourse to Article IV unless the mountains which correspond to those described in Article III prove to be at a distance of more than 10 marine leagues from the ocean. Assuming that the boundary is being determined in accordance with Article III, the mountains which are on the continent are to be parallel to the coast, and a person fixing the boundary under Article III would not leave the line which follows the summits or crest of the mountains unless that line was situated at more than 10 marine leagues from the ocean. As I have already pointed out, for a considerable part of the distance referred to in Article III, namely, from the southern end of Wrangell Island up to the northern end of Kupreanoff Island, the distance must be measured from the shore of these inland waters, which, and which alone, are the ocean referred to in Article IV. I am unable to find any words in the Treaty which direct that the mountain line contemplated by Article III shall cross inlets or bays of the sea. In so far as the language of Article III of itself is a guide, it does not seem to me to contemplate such a state of things. Of course, if the main contention of Great Britain can be adopted, viz., that the words "line of coast" and "windings of the coast", in paragraph 2 of Article IV, should it be necessary to have recourse to that paragraph, mean the general line of coast or the windings of the general coast, excluding inlets, the difficulty would disappear; but, in order to establish that position, it seems to me that Great Britain must show that the Treaty uses the word "coast" in the second paragraph of Article III, and in the second paragraph of Article IV, in that sense.

I see some broad objections to this view. In the first place, it necessitates the word "coast" being used with two different meanings in the same clause; and, secondly, it makes it necessary to assume a view of the geographical position as being known to the negotiators, or to postulate that they assumed some definition, or common understanding, as to what the general line of the coast was.

There is, as far as I know, no recognized rule of international law which would by implication give a recognized meaning to the word "coast" as applied to such sinuosities and such waters different from the coast itself.

As I have said more than once, the *locus in quo* to which the Treaty was referring precludes the possibility of construing the word "coast" in any particular Article in any special way, if it does not refer to the coast-line of the continent. I think the words, "upon the border of the continent (*lisière de terre ferme*) comprised within the limits of the Russian possessions", in Article V, rather confirm the view that Russia was to get a strip all along the continent, but I do not think that much reliance can be placed upon this because of the provision as to rivers and streams in Article VI.

Before leaving the Treaty, it is, in my opinion, necessary to notice the very important argument put forward by Great Britain, founded upon Article VII. It was contended by Great Britain that the words "gulfs, havens, and creeks on the coast mentioned in Article III", referred only to the gulfs, havens, and creeks on the *lisière* or strip bounded as described in that Article. If Great Britain could have made good that contention it would, in my opinion, have afforded the strongest argument that the Treaty contemplated that the *lisière* or strip might cross bays, inlets, and arms of the sea; but in my opinion the contention cannot be successfully maintained.

The coast mentioned in Article III is, in my opinion, the coast of the continent, and the coast referred to in the second paragraph of Article IV is also the coast of the continent. The *lisière*, ascertained by drawing the boundary in accordance with the directions in Article III, is a strip upon the coast, and would not, I think, be naturally described by the words "the coast mentioned in Article III". My view is that the provisions of Article VII are perfectly general, and gave mutual rights for a period of ten years to Russia and Great Britain respectively in respect of their possessions upon the northwest coast of America.

Turning now from the consideration of the language of the Treaty alone, what light is thrown upon this question by reference to the negotiations ?

After most careful examinations, I have been unable to find any passage which supports the view that Great Britain was directly or indirectly putting forward a claim to the shores or ports at the head of the inlets. This is not remarkable, inasmuch as no one at the time had any idea that they would become of any importance.

In March 1824, among the objects desired to be secured by Great Britain are stated to be the "embouchures" of such rivers as might afford an outlet. In the proposals referred to in the same letter the *lisière* is spoken of as a strip of land on the mainland, also as a strip of land on the coast of the continent. In the same documents the boundary is spoken of as "the mountains which follow the windings of the coast", and in correspondence of July 1824 as "following the sinuosities of the coast along the base of the mountains nearest the sea", and "the base of the mountains which follow the sinuosities of the coast", and "mountains designated as the boundary shall extend down to the very border of the coast". It is sufficient to say that these passages certainly do not suggest, or imply, that the line from summit to summit will cross any substantial arm of the sea; and that it was not so understood by the negotiators, for Great Britain seems to me to follow from the passage in the letter of the 24th July, 1824, in which Great Britain consented to substitute the summit of the mountains for the seaward base, and suggested that a stipulation should be added that no fort should be established, or fortification erected, by either party, on the summit or in the passes of the mountains. It is difficult to see how such words could be applicable if it was contemplated that there might be a gap of 6 miles between summit and summit crossing the water. I have only to add upon this point that the language of both the British and Russian Representatives, in reporting the conclusion of the Treaty to their respective Governments, is in accordance with the view which I have suggested.

I have felt it my duty to express the reasons which have led me to the conclusion to which I have come, that the answer to the Fifth Question should be in the affirmative, because I am constrained to take a view contrary to that presented by the advocates on behalf of Great Britain; but it must not be thought that I am insensible to the fact that there are strong arguments which might be urged in favour of the British view. I have little doubt that, if shortly after the making of the Treaty of 1825 Great Britain and Russia had proceeded to draw the boundary provided by the Treaty in accordance with the terms thereof, the difficulties, and, in certain events, the impossibilities, of drawing a boundary in strict accordance with the Treaty would have been made evident. If, for instance, it had become necessary to draw a boundary in accordance with paragraph 2 of Article IV of the Treaty, I believe that the view expressed by both the American and British authorities, that it is impossible to do so, would at once have become apparent. And in the same way, if the contention of the United States be well founded that no mountains exist on the coast which correspond with the Treaty, a further difficulty would have been made manifest.

I can, therefore, well understand and appreciate the contention of Great Britain, that, under the existing state of circumstances, difficulties in delimiting the boundaries described must arise in one view, and might arise in any view. But these considerations, strong as they are in favour of a just and equitable modification of the Treaty, do not in my opinion enable one to put a different construction upon the Treaty. I think that the parties knew and understood what they were bargaining about, and expressed the terms of their bargain in terms to which effect can be given. The fact that when, sixty-five years later, the representatives of the two nations attempted to draw the boundary in accordance with the Treaty, they were unable to agree upon its meaning, does not entitle me to put a different construction upon it.

In the view I take of the terms of the Treaty itself, it is not necessary to discuss subsequent action. Had the terms of the Treaty led me to a different conclusion, and entitled me to adopt the view presented by Great Britain, I should have felt great difficulty in holding that anything that had been done or omitted to be done by, or on behalf of, Great Britain, or that any conduct on her part, prevented her from insisting on the strict interpretation of the Treaty; nor do I think that the representations of mapmakers that the boundary was assumed to run round the heads of the inlets could have been properly urged by the United States as a sufficient reason for depriving Great Britain of any rights which she had under the Treaty had they existed.

I THEREFORE ANSWER THIS QUESTION IN THE AFFIRMATIVE.

(Signed) ALVERSTONE.

October 20, 1903.

OPINION BY MR. AYLESWORTH

AS the majority of the members of the Tribunal have arrived at a conclusion which is entirely opposed to what, "according to my true judgment", is the plain meaning of the Treaty we have to interpret, it appears necessary that I should state as briefly as I am able a few of the many reasons which compel me to dissent altogether from their Award.

With regard to the point of commencement of the boundary line no question arises, as all parties agree that it is Cape Muzon.

Upon the second question I quote the words of the President of this Tribunal, the italics, except in one instance, being my own.

Among the facts relating to Portland Channel he finds—

"That the latitude of the mouth or entrance to the channel called Portland Channel, *as described in the Treaty and understood by the negotiators, was at* 54° 45'."

Among the general considerations which support his conclusion he states that—

"Russia and Great Britain were negotiating as to the point *on the coast* to which Russian dominion should be conceded. It is unnecessary to refer to all the earlier negotations; but it is distinctly established that Russia urged that her dominion should extend to 55° of latitude, and it was in furtherance of this object *that Portland Channel, which issues into the sea at* 54° 45′, *was conceded and ultimately agreed to by Great Britain.* No claim was ever made by Russia to *any of the islands south of* 54° 45′ except Prince of Wales Island, and this is the more marked because she did claim the whole of Prince of Wales Island, a part of which extended to about 54° 40′.

"The islands between Observatory Inlet and the channel, to which I have referred above as the Portland Channel, are *never mentioned in the whole course of the negotiations.*"

These extracts are from Lord Alverstone's Memorandum, expressing his considered judgment on this branch of the case. These conclusions have been arrived at after full discussion among ourselves of the answer which, upon the evidence, should be given to the second question—in which discussion each member of the Tribunal has stated, at length, his individual views. Concurring, as I do, in the findings of fact stated in this Memorandum, I should have contented myself with differing from the conclusion reached but for the course our proceedings have taken.

Consideration of the second question has been to-day resumed, and by unanimous vote of the Tribunal it has been affirmed that each member, "according to his true judgment", believes the Portland Channel mentioned in the Treaty to be the channel extending towards the sea from latitude 55° 56′, and lying to the north of Pearse and Wales Islands. But, notwithstanding this unanimous finding of fact, it has been, by the majority of the Tribunal, decided that the boundary line, starting from Cape Muzon, shall run to the south, instead of to the north, of Kannaghunut and Sitklan Islands, and so shall enter Portland Channel between Sitklan and Wales Islands.

This course for the boundary is directly opposed to the distinct findings made, and the whole line of reasoning adopted by the President in his Memorandum of reasons for the decision. It is a line of boundary which was never so much as suggested in the written Case of the United States, or by Counsel, during the oral argument before us. No intelligible reason for selecting it has been given in my hearing. No Memorandum in support of it has been presented by any member of the Tribunal, and I can, therefore, only conjecture the motives which have led to its acceptance.

It is admitted by everybody as absolutely clear and indisputable that on the occasion of his naming Portland Canal, Vancouver, in his exploration of that channel, traversed it from its head inland to its entrance into the ocean in latitude 54° 45′, that, in so doing, he sailed down Portland Channel, along the passage north of Pearse and Wales Islands, and straight onward to the sea through the passage north of Sitklan and Kannaghunut Islands. Every one knows and admits that Vancouver never traversed the passage between Sitklan Island and Wales Island, through which this boundary line is now made to run. No more can it be pretended that this passage (which is now called Tongass Passage) was ever named by Vancouver, was ever treated by him, or by any mapmaker at any time, as in any way belonging to Portland Canal, or was ever thought of by those who negotiated the Treaty of 1825 as being any part of that channel.

The Lord Chief Justice finds as a fact, which the maps and documents establish, that *one* entrance of Portland Channel was between the islands now known as Kannaghunut and Tongass. I concur entirely in this finding, but must add that this entrance to the channel is the only entrance to it ever known, or in any way treated as part of the channel.

There is simply not the slightest evidence anywhere, that I am able to find, that either Vancouver or any subsequent explorer or mapmaker ever considered, or so much as spoke of, Portland Channel as having *two* entrances to the ocean, or as including the passage through which this boundary line is now made to run.

But even if there were two or more such entrances, Vancouver's narrative and maps absolutely fix the one he explored and named by giving its exact latitude to the minute—54° 45′. And the President finds, as a fact, that *this* mouth, or entrance, is the one "described in the Treaty and understood by the negotiators".

By what right, then, can this Tribunal, sitting judicially, and sworn to so determine and answer the questions submitted, reject the channel so "described in the Treaty and understood by the negotiators", and seek for a totally different channel, which, until now, no one ever thought of as any part of the Portland Channel mentioned in the Treaty ?

I point to the additional circumstances so forcibly stated by my Lord. The whole negotiations were as to the "point on *the coast*" to which Russia's southern boundary should be carried. The Treaty fixes as that point the promontory of the mainland immediately to the north of Kannaghunut and Sitklan Islands, the latitude of which is 54° 45′. The next point of mainland coast to the southward is Point Maskelyne, and it, of course, is undisputably British territory. The islands which lie between were never asked for by Russia. As the President's Memorandum says, they were never so much as *mentioned* in the whole course of the negotiations. They lie wholly to the southward of 54° 45′, wholly to the southward of that entrance to Portland Channel which alone is "described in the Treaty", or was "understood by the negotiators", that is to say, wholly to the southward of the true boundary, and yet the majority of this Tribunal is prepared to take two of those islands from Canada and transfer them to the United States.

How can such a determination be reconciled with our duty to decide judically upon the question submitted to us ?

It is no decision upon judicial principles; it is a mere compromise dividing the field between the two contestants.

The formal answer which the President's Memorandum makes to the question submitted is alone sufficient to condemn the boundary the Tribunal is making. *Question:* "What channel is the Portland Channel ?" *Answer:* "The channel which runs to the north of . . . . . the *Islands of Sitklan* and *Kannaghunut*, and issues into the Pacific between Wales Island and Sitklan Island".

This language simply disregards entirely the relative position of the islands in question. Wales Island lies due east of Sitklan. But the channel which runs to the north of Sitklan and Kannaghunut joins the ocean there, and, therefore, of necessity issues into the Pacific at that place, and it is the undoubted mouth of Portland Channel. The Treaty makes Portland Channel the boundary, and if, as this answer formally states, Portland Channel is that channel which runs to the *north* of these two islands, such two islands are necessarily British soil.

The whole truth of the matter is simply this: that, as to Portland Channel, the case of Great Britain before us has been demonstrated to be unanswerable. By unanimous vote of this Tribunal it has been so declared. It was, therefore, impossible to avoid awarding to Great Britain the islands called Pearse and Wales. It is equally impossible upon any intelligible principle for a Tribunal, acting judicially, to hold that Portland Channel, immediately on passing Wales Island, makes a turn at right angles to itself, and runs between the Islands of Wales and Sitklan. The sole question presented to us for decision on this branch of the case was whether the Portland Channel of the Treaty lay north of the four islands or south of the four, and until to-day it has been uniformly admitted by everybody that all four of these islands belonged, all together, either to Great Britain or to the United States. Instead of so finding, the majority of the Tribunal have chosen to compromise with the plain facts of the case, and, while awarding Pearse and Wales Islands to Great Britain, have determined to make those islands valueless to Great Britain or to Canada by giving to the United States the islands called Sitklan and Kannaghunut. The latter islands are of the utmost consequence, for they lie directly opposite to, and command the entrance to, the very important harbour of Port Simpson, British Columbia.

Upon such findings of fact as those above described, and after a solemn adjudication that the Portland Channel of the Treaty lies to the north of Pearse and Wales Islands, the taking of the two important islands, Sitklan and Kannaghunut, from Canada, and giving them to the United States by a proceeding said to be judicial, is, "according to my true judgment", nothing less than a grotesque travesty of justice.

In considering Questions 5, 6, and 7, the practical inquiry before us is where, upon the ground, the line of boundary described in the Treaty ought to be laid down. That line, from the 56th parallel to the 141st meridian, is to follow "la crête des montagnes situées parallèlement à la côte". Our duty is, therefore, to find what mountains those are which the High Contracting Powers intended to describe by the words just quoted.

To do so we must first determine the meaning of the words "la côte", by reference to which the particular mountains meant by the Treaty are to be identified.

It may be that the word "coast" is generally used as meaning the edge of the land next to the sea, or the line where the water and the land meet, though the double word "coast-line" would more accurately express that idea, but the word "coast" has another well-recognized signification. It frequently means the frontier of a country or territories near to the sea.

"Herod . . . . slew all the children that were in Bethlehem and in all the coasts thereof".—Matthew ii, 16.

"The Jews . . . . raised persecution against Paul and Barnabas, and expelled them out of their coasts".—Acts xiii, 50.

Exactly the same usage obtains in French in regard to the words "la côte".

In the Treaty of 1825 the word is used sometimes in the one sense, sometimes in the other, as the context will readily demonstrate.

The preamble speaks of the possessions of the two Powers "on the north-west coast of America".

Article I secures to the subjects of both Powers the right to land for purposes of trade at any unoccupied places "on the coasts".

Article II prohibits landing without permission at any establishment "on the north-west coast".

Article III defines a line of boundary between the possessions of the Powers "upon the coast of the continent".

Articles IV and VI each speak of "la lisière de côte" which is to belong to Russia.

In all these cases the word is used in its territorial signification.

But in Articles III and IV the word is used as well in another sense. By Article III the boundary line, on leaving the 56th parallel is to follow the top of the mountains "situées parellèlement à la côte". By Article IV, if these mountains should anywhere turn out to be more than 10 leagues "from the ocean", the line is there to run parallel to the "sinuosités de la côte", but so as never to be more than 10 leagues away from it.

It is perfectly plain that "la côte" here does not mean territorial possessions. The word is undoubtedly used in the same Treaty and in the same Article of the Treaty in different senses.

With what signification, then, is the word used in the instances just quoted ?

Plainly, in Article IV the meaning is synonymous with the edge "of the ocean". The 10 leagues spoken of are to be measured "from the ocean" or "from the coast". The result of the measurement must be the same in either case—therefore, water which is not the ocean cannot have a "coast-line" from which the measurement of the 10 leagues could be made.

This consideration alone seems to me to demonstrate that the head of such an inlet as the Lynn Canal forms no part of the coast-line within the contemplation of this Treaty. It would seem to me ridiculous to speak of a ship as making an ocean voyage while sailing along Lynn Canal. It may be answered that the waters of Stephen's Passage, or at the mouth of the Stikine, are not ocean either, and I agree that such waters are, by reason of the outlying islands opposite, territorial waters, and not the open ocean, but in this Treaty the Powers were, with reference to the *lisière*, dealing with mainland coast alone, and, in that regard, speaking and contracting exactly as though no islands existed, and as though the shore of the mainland were washed by the open sea.

Lynn Canal, from Point Couverden to Skagway, is some 90 miles in length, and of a width varying from 2 or 3 to 7 or 8 miles. It is occupied at its mouth by islands which divide the entrance into three channels, of which the widest is not more than 3 nautical miles across, and each of the other two less than half that size. It is simply a land-locked lake of salt water, literally one of "les mers intérieures" mentioned in Article VII of the Treaty.

If it were a question of determining the coast-line of Lynn Canal itself, such line would undoubtedly cross these islands at the entrance, just as the coast-line of Lake Ontario would cross from island to island where the waters of the lake, flowing through the Thousand Islands, become the River St. Lawrence.

Such line, crossing at its narrowest part the entrance of Lynn Canal from shore to shore, passing over the islands which lie in such entrance and the three intervening channels of water, is literally the dividing line between Lynn Canal on the one side of it and the ocean on the other. Such line, in my opinion, is part of the line of "coast" mentioned in Article IV, and the descriptive portion of Article III, of the Treaty.

The whole negotiations leading to the Treaty of 1825 grew out of the Russian Ukase of 1821, prohibiting foreign vessels from approaching the coast of North-west America within 100 miles. The language of the Ukase in which this prohibition is worded contrasts the coasts with the islands, and shows that the coast of the mainland was that from which the 100 miles were intended to be measured, and M. Poletica, writing to Count Nesselrode (November 3, 1823) so describes it, saying that this Edict had extended the maritime jurisdiction of Russia to the distance of 100 miles "des côtes de la terre ferme".

The mainland coast-line within the meaning of this Ukase would, beyond doubt, cross Lynn Canal at the entrance, and Russia would have laughed at a foreign navigator contending that his ship off the entrance to Lynn Canal, at say 30 miles distance, was not transgressing the Ukase, or that she was not within 100 miles of the coast, because she was more than 100 miles from the head of Lynn Canal inland.

Ignoring the presence of the islands in front of the *lisière*, as we must do in considering what meaning the makers of this Treaty attached to the words "la côte" when applying them to the mainland of the continent, it is too plain for argument to the contrary that the waters of Lynn Canal are territorial or inland waters, as distinguished from the main sea or the high sea.

It is the open uninclosed waters of the ocean, and not waters within the *fauces terræ* on the sea coast which constitute the high sea.

United States of America v. Grush (1829), 5 Mason 290.

Manchester v. Massachusetts (1890), 139 U.S., 139.

So, leaving the islands out of consideration, the mainland coast-line from which, if the islands were absent, one would have to measure the 3-mile strip of territorial sea water over which the Power owning the *lisière* would have jurisdiction would pass from headland to headland, following in a general way the windings of the natural shore, but never entering long and narrow inlets or departing substantially from the general trend of the coast.

That the Plenipotentiaries who negotiated the Treaty considered the coast as not ascending such an inlet as Lynn Canal is abundantly evident from their language. They considered the head of Lynn Canal as not ocean, but something very different. This is clearly shown by the language in which they speak of Portland Channel, an inlet of practically identical character, though not extending so far inland.

In their observations on Sir Charles Bagot's amended proposal (February-March 1824), the Russians speak of Portland Channel as having its "origine dans les terres" at the 56 parallel.

In writing Count Lieven, under date the 5th (17th) April, 1824, Count Nesselrode says the Russians were willing to fix as their southern boundary Portland Canal "dont l'embouchure dans l'océan est a la hauteur de l'Ile du Prince de Galles et l'origine dans les terres entre les 55^e et 56^e degrés de latitude".

It certainly never could have been Count Nesselrode's idea that the head of Portland Canal, 80 miles from its "embouchure dans l'océan", was none the less ocean, and no more ought any one now to think he could persuade an impartial mind that the head of Lynn Canal, still further inland, was the Pacific Ocean.

Reference may well be made also to the language of the Russian "contre-projet" of August 1824, by Article 1 of which it is proposed that the boundary-line shall ascend Portland Channel "jusqu'au point où cette passe se termine dans l'intérieur de la terre ferme".

In the draft of the proposed Treaty forwarded by Mr. George Canning to Mr. Stratford Canning on the 8th December, 1824, the boundary-line was described as to ascend Portland Channel till it strikes "the coast" of the continent in the 56th degree of north latitude. Translating this document into the French language, Mr. Stratford Canning submitted his final "projet", in which it is proposed that the boundary-line shall ascend Portland Channel until it reaches "la côte de terre ferme" at the 56th parallel. M. Matusevich, for the Russian Government, recognizing the impropriety of describing the head of such a channel as "the coast", changed the phraseology into "l'endroit où cette passe se termine dans l'intérieur de la terre ferme".

Surely, under such circumstances, Russia could never afterwards have pretended that the head of Portland Channel, or of any similar inlet, was upon the coast or formed part of the coast.

It seems to me equally an utter misapprehension and perversion of language to term a long, narrow fiord such as Lynn Canal a mere "sinuosité de la côte", parallel to the sides of which the Treaty intended this boundary-line to be drawn. The coast "parallèlement" to which the mountains forming the boundary are situate is, in my opinion, clearly the general trend or direction of the mainland coast-line, disregarding alike narrow inlets and narrow peninsulas—cutting off a headland, it may be, where physical features justify it, or crossing the mouth of an inlet as readily as though it were the mouth of a river. And it seems to me of much importance to note that this was the view adopted by the Superintendent of the United States' Coast and Geodetic Survey when issuing to his assistants instructions for their work of survey under the Convention of the 22nd July, 1892. It was upon this footing that the work of survey was done by the United States and British Governments, and the object of such survey was to ascertain the facts and data necessary to the permanent delimitation of the boundary-line. This work, done upon this principle by the parties now litigating, affords to us by their Convention the information upon which the boundary-line must now be established in accordance with the spirit and true intent of the Treaty in regard to it.

From such general trend of mainland coast-line the inner boundary of the *lisière* can never be *more than* 10 marine leagues distant; it may be much less if, nearer to the coast, mountains exist such as the Treaty contemplates.

Such a coast-line will follow literally the windings of the coast ("les sinuosités de la côte"), but will not depart from such coast to penetrate the interior 80 or 90 miles along a salt-water inlet any more than it would ascend for that distance a fresh-water river of possibly equal width.

If this is the true meaning of the words "la côte" as used in the Treaty in describing the boundary-line, such boundary-line must inevitably cross any inlet which is deeper than the maximum width of the *lisière* and leave the head waters of such inlet within British territory, and, in my judgment, the Treaty itself furnishes conclusive inherent evidence that such result was exactly what the Powers entering into it contemplated.

By Article VII of the Treaty the vessels of the two Powers were for ten years to be reciprocally at liberty to frequent, for purposes of fishing and trading, all the inland seas, gulfs, havens, and bays, "sur la côte mentionnée dans l'Article III".

What waters, then, were these, to frequent which the Russians were accepting from Great Britain a ten years' licence ?

If it can be shown that these waters were those of the *lisière*, or that the Russians so understood, it follows that they contemplated the boundary-line at least possibly crossing inlets, and leaving the upper waters of such inlets within British territory.

The waters are those "sur la côte mentionnée dans l'Article III", but Article III speaks first of the possessions of the High Contracting Parties "sur la côte du continent", and afterwards of the boundary of the *lisière* on the mountains "situées parallèlement à la côte".

Is it, then, the coast of the continent or the coast of the *lisière* to which Article VII refers ?

Let the history of the Article as traced from the negotiations give the answer.

Mr. George Canning first proposed it in his letter to Count Lieven of 29th May, 1824, and in his draft Convention forwarded from London on 12th July following.

As to the *lisière*, the proposal was (Article III, 2) that British subjects should *for ever* freely navigate and trade along its coast, nothing being offered to Russian subjects as to British waters *there*. But with regard to the other parts of the north-west coast of America, Article V proposed that for[1] years the vessels of the respective Powers and of their subjects should reciprocally enjoy the liberty of visiting for purposes of fishery and commerce the gulfs, havens, and creeks in places not already occupied.

Article V in this draft did not affect the *lisière* now in question, and made no mention of any right to either Power to fish or trade in "les mers intérieures" of the other's territory. Article V, as so presented to Russia, was merely an offer by Great Britain of a temporary licence to fish and trade in British waters south of Portland Channel upon Russia according to Great Britain similar licence in respect of Russian waters west of Mount St. Elias. But the Russians were unwilling to concede to Great Britain the right to navigate and trade along the coast of the *lisière for ever*, and with regard to the other parts of the continental coast, having never asked from Great Britain any privileges of fishing or trading south of Portland Channel, they absolutely refused to grant to her similar privileges north of the 60th parallel, or, which is to say, west of Mount St. Elias.

In his letter to Count Lieven of 31st August (4th September), 1824 (App., Br. Case at p. 98, last paragraph, and p. 99, first paragraph), Count Nesselrode is emphatic and indignant in his declaration that except as to the *lisière*, no concession whatever in regard to either fishing, hunting, or trading would be made to Great Britain. Adhering firmly to this determination as the Russians did, refusing inflexibly to grant to Great Britain any fishing or trading privileges west of Mount St. Elias, with what grace could Russia have demanded what she had never before asked, viz., exactly such privileges in the British territories south of Portland Canal ?

Nor was any such suggestion made. On the contrary, in the same letter Count Nesselrode was careful to point out (App., Br. Case, p. 99, last paragraph), that Russia was leaving free to the trade of future establishments which English Companies might form on the north-west coast "tout le territoire situé au midi du Portland Channel".

After consideration of Count Nesselrode's despatch, Mr. George Canning, on the 8th December, 1824, instructed Mr. Stratford Canning to conclude the Treaty, accepting in above respects the objections of Russia, and saying—

> "We are content also to assign the period of ten years for the reciprocal liberty of access and commerce with each other's territories."

This was in its very terms that which alone Russia had signified she would agree to, viz., reciprocity in access and commerce limited in time to ten years, and limited in extent to the waters between Mount St. Elias and Portland Canal. Between these points Britain could not possibly have any waters to give except the heads of inlets.

In the draft Convention which accompanied these instructions to Mr. Stratford Canning, the Article which is now No. VII of the Treaty was amended by inserting therein the words "the inland sea" before the words "gulfs, havens, and creeks", which alone had appeared in the corresponding Article of the draft Convention sent by the same Minister to Sir Charles Bagot five months before.

There is no body of water between Mount St. Elias and Portland Channel of which these words are so apt a description as they are of Lynn Canal.

In his "projet", submitted to the Russian Plenipotentiaries, Mr. Stratford Canning changed the words "the inland sea" to "toutes les mers intérieures", as they stand in Article VII of the Treaty as signed.

[1] This space was left blank in the report of the proceedings of the Alaska Boundary Tribunal, and in the draft Convention.

In Mr. Stratford Canning's "projet", as amended by the Russians in the handwriting of M. Matusevich, it is absolutely clear that the Russians understood the ten years' licence of fishing and trading they were giving to the British, and reciprocally receiving from the British, related to the waters of the *lisière*, and to no other waters whatever. The wording of the Article is "toutes les mers intérieures, les golphes, havres, et criques dans les parties de la côte mentionnées dans l'Article III", while in Article III the only coast mentioned, and the only parts of the coast included, are the "coast" and the parts of it between latitude 54° 40′ and longitude 141.

In the Treaty, as finally signed, the words "dans les parties de la côte" become simply "sur la côte", and the possessions of the Powers are, in Article III, described as "on the coast of the continent" instead of as "on the continent", but the true meaning and intention of the parties has been in no way altered thereby, and from the time of Count Nesselrode's refusal to treat as to reciprocal trading rights elsewhere than in the *lisière* and Mr. Canning's acquiescence in such refusal, no further negotiations whatever on that subject took place.

I am, therefore, of the clear opinion that Russia, by the Treaty in question, intended and understood that the boundary-line might cross inlets which would penetrate and divide the *lisière* exactly as a river would, and that, in that event, the heads of such inlets would lie within British territory, exactly as the upper reaches of a river would where that river flowed across the *lisière*.

With reference to the seventh question, as the majority of the Tribunal has decided that the mountains which shall form the eastern boundary of the *lisière* are to be sought inland at some place behind the head waters of every inlet, it is idle for me to express my views at any length.

Over and over again in the negotiations this "lisière de côte" which Russia was asking and England giving was spoken of by the Russians as a mere "point d'appui", as extending inland only "une très petite distance", as being only "une étroite lisière sur la côte même", or "une simple lisière du continent".

Consistently with this understanding of the width of the *lisière*, the mountains which were to form the inner boundary are always spoken of as being very near to the sea. The only knowledge of these mountains the negotiators of the Treaty had was derived from Vancouver's Travels, and Vancouver had seen the mountains only from his ships as these explored the coast

The mountains nearest the sea for the whole length of the *lisière* are, in fact, lofty peaks, 3,000 feet or more in height, often rising to double or treble that elevation, and sometimes exceeding 15,000 feet. It is manifest that from the water, and close to shore, as Vancouver's course lay, mountains such as these would completely shut out any view of the country further inland. Except for possibly an occasional glimpse between seaward peaks of another mountain further away, Vancouver could have no knowledge what the nature of the country was behind the mountains he saw, and the language used by those who negotiated the Treaty of 1825 shows that the extent of their knowledge was in this regard equally limited.

Under such circumstances, it is difficult for me to understand how the Treaty when it speaks of "montagnes situées parallèlement à la côte", can refer to mountains miles inland, invisible from the sea, which lie far behind the seaward mountains, and which it is an admitted impossibility that Vancouver ever saw or the negotiators of the Treaty ever knew the existence of.

The words of the Treaty, "montagnes situées parallèlement à la côte", and the idea of parallelism thereby conveyed, imply the line of mountains next adjacent to the coast. Apart from the circumstance that no kind of reason can be assigned for skipping over one or two, or it may be half-a-dozen, lines of mountains between the coast and the boundary, the very fact that the Treaty couples the boundary-line directly with the coast-line argues in favour of the first line of mountains being meant. I think any one who spoke of two lines as parallel one to the other would scarcely have in contemplation a third line parallel to each, but situate between the two.

In the present case we have, moreover, the circumstances that throughout the negotations preceding the Treaty, these mountains are invariably spoken of as near to the coast.

In February 1824 the first proposal of Russia as to the line (p. 70, Br. Case, App.) was that it should follow Portland Canal "jusqu'aux montagnes qui bordent la côte".

Repeating this proposal in their observations on Sir Charles Bagot's amended proposal, the Russians say they would make the limit of the *lisière* to the east the chain of mountains "qui suit à une très petite distance les sinuosités de la côte".

In narrating to Count Lieven the course of these negotiations, Count Nesselrode, in his letter of the 5th (17th) April, 1824, says they were willing their eastern frontier should run along the mountains "qui suivent les sinuosités de la côte".

On Sir Charles Bagot's despatches reaching England, the Hudson's Bay Company suggested that the boundary ought to be fixed at the "nearest chain of mountains not exceeding a few leagues off the coast".

Thereupon, Mr. George Canning sent to Sir Charles Bagot a draft Convention, with instructions to conclude the negotiations. In these instructions (12th July, 1824) Mr. Canning directs that the line of boundary be drawn along the "base of the mountains nearest the sea".

This draft Convention prepared by Mr. Canning shows very clearly his understanding of the trifling width the *lisière* would have, as it contains a provision (not carried into the final Treaty, as the Russians objected) that the British should for ever have the right to trade "sur la dite lisière de côte, et sur *celle* des isles qui l'avoisinent".

Mr. Canning's proposal that the boundary should be drawn along the base line of the mountains was objected to by Count Lieven for the reason, among others, that, considering the little certainty there then was in the geographical knowledge anybody had of the regions they were negotiating about, it would not be impossible that the mountains they were fixing as a boundary "s'étendissent par une pente insensible jusqu'aux bords même de la côte".

This language makes it absolutely certain that the Russians understood their boundary to be the mountains nearest the sea.

On their proposing to take the top instead of the base of these mountains as the line of boundary Mr. Canning assented, and the existing Treaty resulted. It is not pretended that any change in the particular mountains intended was ever made or suggested. Whatever mountains those were, the base of which the British proposed as the boundary, those were the mountains the tops of which, by the concluded Treaty, are the true boundary to-day, and it is to my mind clear to a demonstration that these were the mountains nearest the sea.

Three days after the Treaty was signed, Count Nesselrode, in advising Count Lieven of the fact, says it would have been more just if, without any occasion possibly arising for application of the 10-league limitation, the boundary-line had all along its length followed the natural frontier formed by "les montagnes qui bordent la côte".

Ten days later, in writing again to Count Lieven on the subject, he directs him to make this observation to Mr. Canning, then describing the boundary Russia would have preferred to have taken throughout as "la crête des montagnes qui suivent les sinuosités de la côte".

I am therefore of opinion that, upon the true interpretation of this Treaty, the mountains which constitute the boundary are those which skirt the coast, the more prominent peaks among which have been pointed out in the British Case and in the argument of Counsel before us.

Finally, I have merely to say this further, that the course the majority of this Tribunal has decided to take in regard to the islands at the entrance of Portland Channel is, in my humble judgment, so opposed to the plain requirements of justice, and so absolutely irreconcilable with any disposition of that branch of this case upon principles of a judicial character, that I respectfully decline to affix my signature to their Award.

(Signed) A. B. AYLESWORTH.

London, October 17, 1903.

OPINION BY THE UNITED STATES MEMBERS OF THE TRIBUNAL (1)

Opinion on Second Question

Question number two of the Convention, "What is the Portland Channel ?" has presented such peculiar difficulties that the Undersigned feel it necessary to set forth the reasons which have led them to join in the decision rendered by a majority of the Tribunal.

An inlet of great depth, starting just below the 56th parallel, runs down to the head of Pearse Island. At this point the inlet divides, and down to this point of division there is no question of identity, and none has ever been seriously raised. From the north-eastern corner of Pearse Island to within five miles of the 56th parallel the identity of this inlet with the Portland Channel, as intended by the negotiators of the Treaty of 1825, is undisputed, but after the division at Pearse Island the question has arisen whether the channel south of Pearse and Wales Islands is the Portland Channel, or whether that which passes to the north of those two islands is entitled to the name. Were we able to rest a decision solely on maps which we know to have been before the negotiators of the Treaty of 1825, the weight of evidence in the opinion of the Undersigned would be in favour of the view that the Portland Channel passed south of Wales and Pearse Islands, with Observatory Inlet entering it on the other side, and so on to the sea. The northern channel as indicated on contemporary maps is narrow and indistinct, so that it is not easy to believe that any negotiators would have taken it as a clear, well-defined natural boundary, such as they were seeking to establish in the Treaty of Delimitation. The testimony of maps subsequent to the Treaty is fluctuating, but general opinion seems to have settled down to the belief that the more obvious southern channel was a continuation and part of the Portland Channel, and on many of the later maps we find the channel passing south of Pearse and Wales Islands denominated "Portland Inlet". In determining, however, what should now be called Portland Channel, the question to be decided was what the negotiators meant when they used that term, and in arriving at the intention of the negotiators of the Treaty of 1825, it was not possible to reach it by an inspection of the maps alone. The negotiators undoubtedly intended when they named Portland Channel as the southern boundary of the Russian possessions to refer to that inlet or body of water which Vancouver named Portland Canal, for it was Vancouver who gave the name, as is well known, to this inlet. If Vancouver had left us nothing but maps the Case, although not free from doubt and obscurity, would be comparatively simple. But Vancouver also published in addition to his maps a detailed narrative of all his explorations upon the north-western coast of America.

It was argued very forcibly by the Counsel for the United States that there was no proof that the negotiators had read Vancouver's narrative, but while it is no doubt true that they made no such examination of that narrative as has lately been pursued, it is almost impossible to suppose that men of trained ability seeking to establish a natural boundary in a little-known region should not have read the only book which contained any detailed information as to that portion of the globe with which they were dealing. We know from undoubted evidence that Mr. Pelly, the representative of the Hudson Bay Company, who was consulted by Mr. Canning at every stage of the negotiations, had read Vancouver's narrative, or, at least, those portions relating to the part of the coast which was under discussion. It is almost incredible, therefore, that Mr. Canning and Sir Charles Bagot should not also have examined the narrative, and it is equally unlikely that the Russians should have failed to consult the one book which contained a detailed examination of that region, and which had appeared in no less than four editions, two in English and two in French.

It has seemed, therefore, to the Undersigned impossible to exclude the narrative in endeavouring to reach a conclusion as to what the negotiators meant by the Portland Channel. In 1888 Mr. Dall, of the Smithsonian Institution, in a Memorandum sent to Mr. Bayard, said (pp. 104 and 105, United States' Counter-Case):—

"At this point we come across another difficulty, or, rather, one has been suggested very recently. By a careful study of Vancouver's text it is evident that there is on this point a certain discrepancy between his charts and his text. In reading over his whole account of the survey of this inlet and its branches (Vancouver, official English edition, vol. ii, pp. 329, 330, 331, 334-340, and 371), he seems to have varied a little in his notions, but his final treatment of Observatory Inlet extends it to Points Wales and Maskelyne, while in another place he seems to regard it as beginning at Point Ramsden (cf. op. cit. 2, p. 375). On the other hand, he treats Portland Inlet as continuing to the sea behind Wales and Pearse Islands. So that, if the Treaty is to be tried by Vancouver's text, it will result in giving to Great Britain the above-mentioned islands and some other small ones."

Mr. Dall there points out for the first time the discrepancy which appeared to exist between the maps and the text of the narrative, or, perhaps, to state it more exactly, the discrepancy between the text and what appeared to be the obvious, though not necessarily the only, meaning of the maps. There is no need here to enter into all the details of Vancouver's narrative, but on page 379 of his narrative he says, under the date of Monday, the 19th August, 1793:—

"A want of wind and a flood tide prevented our weighing until nine the following morning, when with an ebb tide we again proceeded, but did not reach the entrance to Observatory Inlet until two of the morning of the 20th, a distance of not more than thirteen leagues from Salmon Cove. The western point of Observatory Inlet I distinguished by calling it Point Wales."

That is, he called that stretch of water from Salmon Cove, on Observatory Inlet, where his ships had been anchored, to the south-western extremity of Wales Island, a distance of 13 leagues, "Observatory Inlet". This includes, as a glance at the map will show, the channel which passes south of Pearse and Wales Islands. If, therefore, he intended to name that whole stretch of water Observatory Inlet, it is exclusive, and the name of Portland Canal cannot be applied to it. Portland Canal, therefore, must either have stopped at the north-eastern extremity of Pearse Island or must have continued by the channel north of that island to the eastern end of Wales Island.

The question is a very close one, but if we admit the text of the narrative it seems difficult to avoid the conclusion that by "Observatory Inlet" he included all the water from Salmon Cove to the south-western extremity of Wales Island. We also know that he explored the northern channel, occupying himself in that work from the 27th July to the 2nd August. He followed the channel westerly, passing what has been known as Tongass Passage, between Wales and Sitklan Islands, through which he looked and saw at a short distance the ocean. Desiring, however, to find, if possible, another opening to the ocean which followed the general line of the Continent, he kept on through the narrow passage which passes north of Sitklan and Kannaghunut Islands, and came out into the ocean opposite Cape Fox. Near Cape Fox he encamped. He then explored the waters around Revilla Gigedo Island, and on the 14th August returned to Cape Fox. At dawn the next morning, which in that latitude and in August must have been at a very early hour, he set out to return to his vessels, and he writes that in the forenoon, which must have been some hours after he started from the point opposite the narrow channel out of which he had issued the 2nd August, he passed the mouth of the channel which he had previously explored, and which he named "Portland's Canal, in honour of the noble family of Bentinck".

His exact language is as follows:—

"In the forenoon we reached that arm of the sea whose examination had occupied our time from the 27th of the preceding to the 2nd of this month. The distance from its entrance to its source is about 70 miles, which, in honour of the noble family of Bentinck, I named 'Portland's Canal' " (pp. 370-71, Vancouver).

It seems clear from this statement that if he considered, as the other extracts from his narrative already cited seem to prove, the northerly channel as the natural extension of the deep inlet running to the 56th parallel, he must have looked into it through Tongass Passage, and then and there gave it its name. Moreover, it is quite obvious from the maps that there are three outlets for the waters which come through the northern channel and are swelled by those from the inlets about Fillmore Island. Two of them are very small, so small as to be practically impossible to navigate. The third is the Tongass Passage, and that seems beyond a question, on the face of both the maps and the text, to be the true entrance to the channel which passes north of Wales and Pearse Islands. Accepting Vancouver's narrative as having the greatest weight, the conclusion follows that the award of the Tribunal must be that the Portland Channel intended by the makers of the Treaty of 1825 was that body of water which entered the sea by the Tongass Passage and passed thence north of Wales and Pearse Islands, and so onward to the immediate neighbourhood of the 56th parallel.

(Signed) ELIHU ROOT.
HENRY CABOT LODGE.
GEORGE TURNER.

October 20, 1903.

OPINION BY THE UNITED STATES MEMBERS OF THE TRIBUNAL (2)

Opinion on Fifth Question

The following statement presents in brief the chief considerations which have led the Undersigned Members of the Alaskan Boundary Tribunal to the conclusion that the Fifth Question submitted under the Treaty of the 24th January, 1903, should be answered in the affirmative.

The question calls for a construction of the Treaty between Great Britain and Russia signed the 16th (28th) February, 1825, agreeing upon a boundary-line between Alaska and British Columbia. The particular provisions which undertake to describe the boundary-line are in these words:—

"III. The line of demarcation between the possessions of the High Contracting Parties, upon the coast of the continent, and the islands of America to the north-west, shall be drawn in the manner following:—

"Commencing from the southernmost point of the island called Prince of Wales Island, which point lies in the parallel of 54° 40′ north latitude, and between the 131st and 133rd degrees of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland Channel, as far as the point of the continent where it strikes the 56th degree of north latitude; from this last-mentioned point, the line of demarcation shall follow the summit of the mountains ('la crête des montagnes') situated parallel to the coast, as far as the point of intersection of the 141st degree of west longitude (of the same meridian); and, finally, from the said point of intersection, the said meridian line of the 141st degree, in its prolongation as far as the Frozen Ocean, shall form the limit between the Russian and British possessions on the continent of America to the north-west.

"IV. With reference to the line of demarcation laid down in the preceding Article, it is understood:

"First. That the island called Prince of Wales Island shall belong wholly to Russia.

"Second. That whenever the summit of the mountains ('la crête des montagnes') which extend in a direction parallel to the coast, from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude, shall prove to be at the distance of more than 10 marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned, shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of 10 marine leagues therefrom."

Portland Channel begins on the full ocean, at a point very near latitude 54° 40′, and ascends for about 70 miles, in a general direction slightly east of north, to a point which is, in fact, about 5 miles from the 56th parallel.

The Fourth Question relates to the course of the line through this intervening space.

The Tribunal has agreed that as the intervening distance is not more than would naturally be covered in climbing from the sea level to the summit of the high mountains which were known in 1825 to exist, and which do in fact exist, at the head of the Portland Channel, the simple and obvious way to give effect to the intent of the Treaty is to take the shortest route from the water to the summit of the mountain, which is in plain sight from the water; and this course brings us to the 56th parallel, upon a mountain ridge over 5,000 feet in height, the foot of which is washed by the waters of the Portland Channel.

The Fifth Question relates to the course of the line northward from that point. It is in the following words:—

"In extending the line of demarcation northward from said point on the parallel of the 56th degree of north latitude, following the crest of the mountains situated parallel to the coast until its intersection with the 141st degree of longitude west of Greenwich, subject to the condition that if such line should anywhere exceed the distance of 10 marine leagues from the ocean, then the boundary between the British and Russian territory should be formed by a line parallel to the sinuosities of the coast, and distant therefrom not more than 10 marine leagues, was it the intention and meaning of said Convention of 1825 that there should remain in the exclusive possession of Russia a continuous fringe or strip of coast on the mainland, not exceeding 10 marine leagues in width, separating the British possessions from the bays, ports, inlets, havens, and waters of the ocean, and extending from the said point on the 56th degree of latitude north to a point where such line of demarcation should intersect the 141st degree of longitude west of the meridian of Greenwich?"

The main practical effect of the answer will be to determine whether the line was to run around the heads of the inlets, leaving them in Russian territory, or was to cut across the inlets, leaving their heads in British territory.

We are of the opinion that the true construction of the Treaty is that which carries the line around the heads of the inlets, and that the following considerations all require the adoption of this construction:—

1. The purpose of the Treaty, well understood by the negotiators, would be accomplished by this construction, and would be defeated by the other construction.

2. The natural and ordinary meaning of the terms used in the Treaty, when applied to the natural features of the country known to the negotiators, or supposed by them to exist, requires this construction.

3. The meaning expressly given to the words used in the Treaty by the negotiators, in their written communications during the course of the negotiations, requires this construction.

4. The official maps published by Russia, Great Britain, Canada, British Columbia, and the United States—many in number—for a period of more than sixty years after the Treaty, known to the public officers of the different Governments, and accepted as the basis of official action, without a single exception carried the line around the heads of all the inlets, and were wholly irreconcilable with the other construction.

During all that period the cartographers of England, France, Germany, Russia, Spain, the United States, and Canada were permitted to represent the line in the same way, without any question or suggestion to the contrary, so that it was permitted to become part of the common understanding of mankind that the region now in dispute was Russian and not British territory. And the United States were permitted to purchase the territory, forty-two years after the Treaty, with this understanding.

These things show a practical interpretation of the Treaty.

5. For more than sixty years after the Treaty, Russia, and in succession to her the United States, occupied, possessed, and governed the territory around the heads of the inlets without any protest or objection, while Great Britain never exercised the rights or performed the duties of sovereignty there, or attempted to do so, or suggested that she considered herself entitled to do so.

This was a practical interpretation of the Treaty by all parties concerned.

The purpose of the Treaty is not open to doubt and was, in substance, conceded upon the arguments before the Tribunal.

Both Russia and Great Britain had chartered great fur-trading Companies. On the one hand, the Russian-American Company had extended its establishments from the west up the chain of Aleutian Islands, and down the north-west coast of America as far as the 57th parallel, where it had a post at New Archangel, or Sitka, on Baranof Island. On the other hand, the Hudson's Bay Company, crossing the Rocky Mountains from the east, had pushed its posts west to the Mackenzie River and the upper waters of the Fraser River, to within about 100 miles of the coast at about latitude 55° or 56°. It was evident that before very long the agents of these two Companies would meet and dispute the control of the same hunting-grounds and of trade with the same native tribes.

By a Ukase dated the 8th July, 1799, Russia had granted to the Russian-American Company the exclusive right to hunt and trade upon the coast as far south as the 55th parallel; and by a Ukase dated the 4th September, 1821, Russia had undertaken to protect the Russian Company by prohibiting all foreign vessels not only to land on the coasts and islands which were declared to belong to Russia as far south as latitude 51 degrees, but also to approach the coast within less than 100 miles.

Great Britain protested against this assumption of exclusive jurisdiction over the Pacific Ocean, and incidentally to the settlement of that question, the two nations undertook to delimit their respective territorial possessions in that part of the world.

Russia based her claims upon occupation and trade by the Russian-American Company; Great Britain based her claims upon occupation and trade by the Hudson's Bay Company.

Both parties soon agreed to drop the discussion of strict right, and to make such a settlement as should be for their mutual convenience and interest. Proceeding upon this ground, the British negotiators proposed to confine Russia to the continent west of the Lynn Canal, and the islands in the immediate neighbourhood of the post at Sitka. Russia, upon the other hand, insisted that it was necessary for the protection of her trade of which the post at Sitka was the centre, to have a substantial strip or *lisière* of territory upon the mainland, opposite the islands, and extending as far south as the Portland Canal. To this contention Great Britain yielded, and the line now under consideration was designed to give to Russia a strip or *lisière* on the mainland which would afford to the Russian-American Company the protection desired.

The purpose of the *lisière* was stated by the Russian negotiators to be—

"the establishment of a barrier at which would be stopped once for all to the north as to the west of the coast allotted to our American Company the encroachments of the English agents of the amalgamated Hudson Bay and North-west English Company, whom a more intimate acquaintance with the country traversed by the Mackenzie River might easily bring, in the course of time, into the neighbourhood of our establishments." (B.C., App., p. 53.)

It is more fully stated in the observations of the Russian Plenipotentiaries upon the proposal of Sir Charles Bagot in February 1824 to assign to Russia a strip with the uniform width of 10 marine leagues from the shore, limited on the south by a line between 30 and 40 miles north from the northern end of the Portland Canal. They then said:—

"The motive which caused the adoption of the principle of mutual expediency to be proposed, and the most important advantage of this principle, is to prevent the respective establishments on the north-west coast from injuring each other and entering into collision.

"The English establishments of the Hudson's Bay and North-west Companies have a tendency to advance westward along the 53° and 54° of north latitude.

"The Russian establishments of the American Company have a tendency to descend southward toward the fifty-fifth parallel and beyond, for it should be noted that, if the American Company has not yet made permanent establishments on the mathematical line of the 55th degree, it is nevertheless true that, by virtue of its privilege of 1799, against which privilege no Power has ever protested, it is exploiting the hunting and the fishing in these regions, and that it regularly occupies the islands and the neighbouring coasts during the season, which allows it to send its hunters and fishermen there.

"It was, then, to the mutual advantage of the two Empires to assign just limits to this advance on both sides, which, in time, could not fail to cause most unfortunate complications.

"It was also to their mutual advantage to fix these limits according to natural partitions, which always constitute the most distinct and certain frontiers.

"For these reasons the Plenipotentiaries of Russia have proposed as limits upon the coast of the continent, to the south, Portland Channel, the head of which lies about ('par') the fifty-sixth degree of north latitude, and to the east the chain of mountains which follows at a very short distance the sinuosities of the coast." (U.S.C., App., p. 161.)

The reply of Sir Charles Bagot was that the line proposed by him would secure the advantage desired by Russia. He said:—

"Any argument founded on the consideration of practical advantage to Russia could not fail to have the greatest weight, and the Plenipotentiary of His Britannic Majesty did not hesitate to give up, in consequence of this observation of the Russian Plenipotentiaries, the line of demarcation which he had first proposed . . . and to offer another which would secure to Russia not only a strip on the continent opposite the southernmost establishment which she possesses on the islands, but also the possession of all the islands and waters in its vicinity, or which are situated between that establishment and the mainland ('terre ferme'), in short, possession of all that could in future be of any service either to its stability or its prosperity." (U.S.C., App., p. 163.)

And he then proposed to include the Prince of Wales Island within the Russian line. But Russia insisted upon having her *lisière* run to the Portland Canal, saying—

"That the possession of Prince of Wales Island, without a slice (portion) of territory upon the coast situated in front of that island, could be of no utility whatever to Russia. That any establishment formed upon said island, or upon the surrounding islands, would find itself, as it were, flanked ('tourné') by the English establishments on the mainland, and completely at the mercy of these latter." (U.S.C., App., p. 164.)

England finally yielded to the Russian demand that the *lisière* should extend to the Portland Canal.

It was thus the intent of the Treaty makers to provide for a strip of Russian territory on the mainland which would protect the trade of the Russian-American Company, from its central post at Sitka, against the competition of the Hudson's Bay traders, coming from the east. To ascertain what kind of a barrier was intended to furnish that protection, it is necessary only to inquire what the trade was. It was a trade with the Indian tribes who lived around the heads of the inlets, and the subject-matter of the trade consisted of the skins of the fur-bearing animals taken in and about the inlets and the streams flowing into them. It is quite incredible that for the purpose of protecting that Russian trade against competition of the Hudson's Bay Company the Treaty makers intended to draw a line which would throw all the natives with whom the trade was conducted, and substantially all the territory which produced the material of the trade, into the Hudson's Bay territory. Instead of a protection to Russian trade with the mainland, that would have been a complete abandonment of it. Instead of excluding the Hudson's Bay agents from those parts of the coast which were frequented by the Russian hunters and fishermen, it would have excluded the Russians, and given a monopoly to the Hudson's Bay Company. The line proposed by Great Britain cuts across some sixteen bays and inlets, leaving upon the Russian side substantially nothing but rocky and inaccessible promontories, and on the British side, including substantially all the harbours, anchorages, habitable shores, river mouths, avenues of access to the interior, hunting grounds and native tribes. It is plain that such a strip of territory, part land and part water, would have furnished no protection to Russian trade, would have interposed no barrier to the extension of Hudson's Bay posts as far as, in the nature of things, they could come, would have completely failed to furnish the natural boundary which both parties intended, and would not, in any respect, have answered the avowed purpose of the *lisière* intended by the Treaty.

We are not at liberty to ascribe a meaning to the terms of a Treaty which would frustrate the known and proved purpose of the instrument, unless the words used in the instrument are such as to permit no other construction. Whoever asserts a construction which would produce such a result must show not merely that it is a possible construction, but that it is a necessary construction, and that any other is impossible.

The most important and determining question in construing the words of the Treaty is the question: in what sense did the Treaty makers use the words "coast" and "sinuosities of the coast" ? The primary boundary provided for in Article III was to be "the crest of the mountains situated parallel to the coast". And, by Article IV, when that crest proves to be at the distance of more than 10 marine leagues from the ocean, the boundary is to be formed by "a line parallel to the sinuosities of the coast, and which shall never exceed the distance of 10 marine leagues therefrom".

In what sense did the Treaty makers use the word "coast" ?

Counsel for Great Britain contend that since the 10-marine-league line measured from the coast was to be applied only when the mountains proved more than 10 marine leagues from the ocean, the words "coast" and "ocean" must be deemed correlative, and the coast intended must be taken to be the line where land and ocean, properly so called, meet; and they say that the word "ocean" cannot be taken to describe the waters of long and narrow inlets, or fiords, like the Lynn Canal and the Taku Inlet, less than 6 miles in width, but must be taken to mean the great body of water which puts a limit to territorial jurisdiction, and they infer that the coast which is coterminous with the ocean must be the line upon one side of which is the mainland, including its territorial waters, and on the other the full ocean, excluding territorial waters. In other words, the general line or trend of the mainland coast, cutting across the mouths of inlets.

It is, however, impossible to give this meaning to the word "ocean", as used in this Treaty, because there stretches along the coast for 300 miles—from Cape Spencer down to the Portland Canal, and covering a space from 80 to 100 miles wide—an archipelago of islands, separated from each other and from the mainland by a multitude of narrow and tortuous passages, which do not at all answer to this meaning of the word "ocean". If this were the meaning of the word as used in the Treaty, the coast line would be outside of the islands, and a line drawn at 10 marine leagues from that coast would give to Russia no territory whatever upon the mainland. It is only by assigning to the word "ocean" an entirely different meaning, and making it include the narrow passages—which are no more and no less ocean than the inlets—that the Treaty can be made to provide any *lisière* upon the mainland. In this sense, which is necessary to effect the purpose of the Treaty, "ocean" means the salt water that washes the shore of the mainland, and "coast" means the line where the mainland meets the salt water, however narrow may be the passage, and however distant from the broad expanse of full ocean.

It is further to be observed that the contention of Great Britain completely ignores the provision that the 10-marine-league line, whenever drawn, is to be parallel to the sinuosities of the coast ("parallèle aux sinuosités de la côte"). The general trend of a coast takes no account of sinuosities. The two terms are directly opposed. The meaning of "general trend" is that sinuosities are ignored, and the meaning of "following the sinuosities" is that the general trend is departed from whenever the line where the land and water meet departs from it. Counsel for Great Britain were asked upon the argument to lay down on a map a line from which they contended that the 10 marine leagues were to be measured. The line which they presented took no account whatever of the sinuosities of the coast. According to their contention, precisely the same course was followed that would have been followed if those words had been omitted from the Treaty. We are not at liberty to omit them, or to refuse to give them effect. The only real effect they can have is to carry the line around the bays and inlets.

If we turn to the maps which were before the negotiators, and with reference to which they used the words of the Treaty, and seek to learn their meaning of the word "coast" by ascertaining what were the mountains which they describe as parallel to the coast, we reach the same result. We known that they had before them, and consulted, Vancouver's chart No. 7 (British Atlas, No. 2); Vancouver's chart No. 12 (British Atlas, No. 3); the Russian Official Map of 1802 (British Atlas, No. 5); Faden's Map of 1823 (British Atlas, No. 10), this last being specially relied upon by the British negotiators. Upon every one of these maps there appears a distinct and well-defined chain or ridge of mountains, running from near the head of the Portland Canal, and northerly along the coast, and in general parallel thereto, and furnishing the means of defining a line of natural boundary as distinctly as the mountain chains which constitute boundaries between countries in other parts of the world, such as the Pyrenees between France and Spain and the Andes between Chile and Peru. These maps embodied the results both of British and of Russian exploration, and they appear to justify the unquestioning confidence of the negotiators in the existence of a mountain crest extending generally parallel to the coast, and capable of defining the proposed boundary line. They clearly present a chain or range, and we know from numerous passages in the written communications which passed during the negotiations that the negotiators on both sides had in mind a chain or range of mountains, when they referred to mountains as defining the boundary. Thus the Russian negotiators described the proposed boundary which they had proposed, and which is the one adopted in the Treaty, as "the chain of mountains which follow, at a very small distance, the windings of the coast", and they say that they leave to Great Britain "all the territory situated behind the chain of mountains referred to previously". (B.C., App., pp. 71, 72.)

In July 1824, when Mr. Canning proposed that the line should run along the base of the mountains, Count Lieven represented to him "that when a chain of mountains is made to serve for the establishment of any boundary whatever, it is always the crest of those mountains that forms the line of demarcation". (B.C., App., pp. 90, 91.)

On the 20th October, 1824, the Hudson's Bay Company, through Mr. Pelly, wrote to the Foreign Office insisting that the eastern boundary from the Port'and Canal northerly should be "the chain of mountains at a 'très petite distance de la côte', but that if the summit of those mountains exceed 10 leagues, the said distance be substituted instead of the mountains", thus accepting and quoting the Russian language above cited. (B.C., App., p. 110.)

At the time of exchanging the Ratifications of the Treaty, the Russian Representative presented a formal expression of dissatisfaction on the part of Russia at Great Britain's insistence upon the alternative or corrective 10-marine-league line, and Mr. Canning replied that under the Treaty of Ghent, between Great Britain and the United States, "which likewise fixed a chain of mountains as the frontier between the possessions of the two States", dispute had arisen because the mountains had been found to deviate from the direction given them on the maps, and he wished to avoid such a dispute. (B.C., App., p. 135.)

When Great Britain finally accepted the Portland Canal line, the Russian Ambassador at London wrote to Count Nesselrode at St. Petersburgh as follows:—

> "The proposition of our Court was to make this frontier run along the mountains which follow the windings of the coast to Mount Elias. The English Government fully accepts this line as it is laid off on the maps ('désignée sur les cartes'); but as it thinks that the maps are defective, and that the mountains which are to serve as a frontier might, by leaving the coast beyond the line designated, inclose a considerable extent of territory, it wishes the line claimed by us to be described with more exactness, so as not to cede, in reality, more than our Court asks and more than England is disposed to grant." (B.C., App., p. 84.)

There can be no doubt that the chain of mountains depicted upon all of these maps as running northerly from the head of the Portland Channel along the coast to Mount St. Elias was the mountain crest described in the Treaty as running parallel to the coast. There are no other mountains on any of the maps which were before the negotiators which answered to the description of the Treaty and of the written negotiations.

That chain of mountains upon all the maps runs around the heads of all the bays and inlets. It is substantially parallel to those sinuosities, and it is not parallel to a line which cuts across the inlets.

The negotiators have themselves, however, furnished an explanation of their meaning of the word "coast" which leaves that provision of the Treaty in no possible doubt. The 10-marine-league line was proposed to the Russian negotiators by Sir Charles Bagot as the measure of the width of the *lisière* at the time when he proposed to fix its southern boundary a short distance north of the Portland Canal. He proposed it in these words:—

> "Thence extending in the same direction upon the mainland as far as a point 10 marine leagues distant from the coast. From this point the line would follow a northerly and north-westerly direction, parallel to the sinuosities of the coast, and always at a distance of 10 marine leagues from the shore."

The coast, to the sinuosities of which the line was to be drawn parallel, was thus explained as being equivalent to the shore ("rivage"). (B.C., App., p. 71.)

When Mr. Canning was about to assent to the mountain boundary proposed by Russia, the Hudson's Bay Company, which was consulted at every step of the negotiations by Mr. Canning, understood that the proposed line "parallel to the sinuosities of the coast" was equivalent to "parallel to the sinuosities of the shore", for in subsequently advising Mr. Canning upon the Russian proposal, Mr. Pelly says that "those mountains represented in the charts as closely bordering on the sea, and described by the Russians as a 'très petite distance', may really be at a very considerable distance from the coast, and to provide for which case the distance ought to be limited, as Sir Charles Bagot proposed, to a few leagues, say not exceeding ten, from the shores". (B.C., App., p. 80.)

When the Russians accepted the 10-marine-league line parallel to the sinuosities of the coast, as proposed by Sir Charles Bagot, as an alternative line to be applied in case the mountain chain proved to run off into the interior, and when they signed the Treaty with the provision for that line, there had never been the slightest intimation that the word "coast" was used in any other sense than that ascribed to it by Sir Charles Bagot in his original proposal of the line, that is to say, as equivalent to shore.

That the Russians understood that the word "coast" was used in this sense appears clearly from the fact that while the draft Treaty proposed by Mr. Canning, and inclosed in his letter of the 12th July, 1824, contained the same words that are used in the Treaty, that the line should be "carried along that coast in a direction parallel to its windings" (B.C., App., p. 87). Count Lieven transmits the draft to Count Nesselrode in a letter which describes this line as running along the base of the mountains which follow the sinuosities of the shore ("les sinuosités du rivage"). (B.C., App., pp. 88, 89.)

That the negotiators understood that the shore which they were describing was one a line parallel to which would give Russia the heads of all the inlets is apparent from Sir Charles Bagot's description of the effect of his offer of the 10-marine-league line, already cited, in which he declares that it would give to Russia all the islands and the waters adjacent or which are to be found between the Russian establishment and the mainland (B.C., App., p. 73), and by the letter of the Hudson's Bay Company to Mr. Canning, in which Mr. Pelly says that he is at a loss to understand "why Great Britain should cede to Russia the exclusive right to the islands and the coast from latitude 54° 40′ northward to Mount Elias" (B.C., App., p. 81). An arrangement under which substantially all the harbours and ports for trade on the coast were retained by Great Britain certainly would not be a cession of the exclusive right to the coast. If Great Britain was retaining the most valuable part of the coast it was unknown to the Hudson's Bay Company, upon whose settlements Great Britain based all her claims to territory, which was conducting all the trade that Great Britain was endeavouring to protect, which was most familiar with the country to which the Treaty related, most interested in the result, and which was consulted at every step of the negotiations. If Mr. Canning had considered that such was the effect of the proposed arrangement, a prompt explanation of his advisers' mistake would have followed, and a modification of the terms of the Treaty in such a way as to make it clear that he was not ceding an exclusive right to the whole coast.

In the face of this clear statement by the Hudson's Bay Company of their understanding that the effect of drawing a line either along the mountains or at 10 marine leagues from the shore would be to "cede to Russia the exclusive right to the islands and the coast, from latitude 54° 40′ northward to Mount Elias", the absence of any single word in the Treaty, or any draft of it, or in any of the negotiations, referring in any way whatever to Great Britain's having the heads of the bays and inlets, or the territory about them, has a special significance, and indicates most clearly that no such idea was entertained by the British negotiators.

It is argued by Counsel for Great Britain that Article VII of the Treaty, which gives to the vessels of the two Powers reciprocal rights to frequent the inland seas, gulfs, havens, and creeks on the coast mentioned in Article III, shows that Great Britain was the possessor of inland seas, gulfs, havens, and creeks on the coast along which the *lisière* ran, that is, between latitude 54° 40′ and latitude 60°. The argument is that Article VII applies exclusively to that part of the coast, and it is to be inferred, therefore, that the reciprocal rights which were granted on the part of Great Britain in that Article were rights to inlets, &c., which she had under the Treaty in that part of the coast.

But the coast mentioned in Article III is the "coast of the continent". It is true the same Article describes the boundary of the *lisière* as being parallel to the coast, but there is no warrant whatever for limiting the reference of Article VII to anything less than the possessions of the two parties upon the coast of the continent—the entire coast mentioned in Article III. If Great Britain had no other possessions upon the coast of the continent in which she could give reciprocal rights to Russia, there would be some force in the argument, but by the terms of this very Treaty the coast from the head of the Portland Canal to the southern limits of the Russian claims, viz., latitude 51°, was assigned to Great Britain, and upon that stretch of coast, a part of the coast mentioned in Article III, there were numerous gulfs, havens, and creeks. The terms of Article VII are, therefore, entirely satisfied, without assigning the rights granted by Great Britain to any part of the coast north of the head of the Portland Canal.

The view that the grant by Great Britain in Article VII was intended to apply, not to the *lisière*, but to the coast to the south of it, is supported by the fact that by the terms of the Treaty of 1818 between the United States and Great Britain, those countries acknowledged equal rights, each in the other, to the coast south of 54° 40′, and that Article VII of the Treaty now under consideration was taken bodily from the Treaty of the 5th April, 1824, between Russia and the United States, which, in the same words, granted reciprocal rights in the possessions of the two parties on "the north-west coast of America". The provision of the American Treaty could not have been intended to confer upon Russia any rights except below 54° 40′, for America had none. The natural inference from the incorporation of this same provision into the British Treaty would be that it was intended to give Russia the same rights from the co-tenant of the same coast.

A further examination of the history of Article VII leaves no doubt that instead of the grant of rights by Great Britain to Russia in that Article being intended to apply exclusively to the coast of the *lisière*, it was intended to apply exclusively to the coast below the *lisière*; for the first appearance of the Article was in the draft Treaty prepared by Mr. Canning, and inclosed by him in his letter to Sir Charles Bagot of the 12th July, 1824. In that draft Mr. Canning proposed, in Article III, a provision, not that there should be reciprocal rights in regard to the *lisière*, but that Russia should grant to British subjects a perpetual right to navigate and trade along the coast of the *lisière*; while the reciprocal provision for ten years, which now constitutes Article VII, was proposed as Article V of the draft, "with regard to the other parts of the north-west coast of America" (B.C., App., p. 87). This was after the American Treaty of 1824, and Article V of Mr. Canning's draft, providing for reciprocal relations in the other parts of the north-west coast, copied the language of the American Treaty. As England had unquestionably no interests in the parts of the north-west coast other than the *lisière*, except south of the *lisière*, the reciprocal provision proposed by Mr. Canning in Article V of his draft applied, so far as it involved a grant of right by Great Britain, solely to the same coast which was affected by the American grant in the Treaty of 1824.

Russia refused to grant to British subjects the perpetual right to trade in the *lisière*, but expressed a willingness to give such a right for ten years, and she carried into the Treaty of 1825, now under consideration, the reciprocal provision which Mr. Canning proposed as to the other parts of the north-west coast, unchanged, except that the words "other parts" were stricken out; so that the reciprocal clause operated not only to accomplish the original effect of a British grant of rights to Russia below the *lisière* for ten years, but also of a Russian grant to British subjects of rights in the *lisière* for ten years.

There is absolutely no ground for claiming that, in broadening the scope of Mr. Canning's original reciprocal provision so that it would include a grant by Russia in the *lisière*, it was intended to exclude the other parts of the coast, to which solely the provision originally applied.

The maps which we have said furnished an interpretation of the Treaty by the parties include—

The Russian Admiralty Chart of 1826 (U.S. Atlas, No. 11); the Russian Admiralty Chart of 1844 (U.S. Atlas, No. 22, British Atlas, No. 15); Atlas sent by Sir J. H. Pelly, the Governor of the Hudson's Bay Company, 13th September, 1849, to Earl Grey, as part of a statement of the rights as to territory, trade, taxation, and government, claimed and exercised by the Hudson's Bay Company, and printed in the Parliamentary Papers of the House of Commons, 11th July, 1850 (U.S. C.-C., p. 253; British Atlas, No. 19); map produced by Sir George Simpson, Governor of the Hudson's Bay territories, before a Select Committee of the House of Commons on the affairs of the Hudson's Bay Company, as showing the territory leased by that Company from the Russian-American Company, and published by order of the House of Commons in 1857 (U.S. C.-C., App., pp. 38, 39; British Atlas, No. 21); British Colonial Office manuscript map of 1831 (British Atlas, No. 13); British Admiralty Chart of 1856, corrected 1861, 1862, and 1864 (U.S. Atlas, No. 23); British Admiralty Chart of 1876 (U.S. Atlas, No. 38); official map of the Dominion of Canada, showing the extent and situation of its public lands, published by the Canadian Department of the Interior in 1878 (U.S. Atlas, No. 39); map published by the

Canadian Department of Railways, 1883 (U.S. Atlas, No. 43); official map of Province of British Columbia published by the Commissioner of Lands and Works, Victoria, 1884 (British Atlas, No. 31); map of the Dominion of Canada, published in 1884 by the Director of the Canadian Geological Survey from surveys made by the Geological Corps, 1842 to 1882 (British Atlas, No. 32); the map published by the United States' Coast Survey in 1867, compiled for the Department of State at the time of the purchase of Alaska by the United States (U.S. Atlas, No. 24).

In all of these maps the boundary line is drawn around the heads of the inlets. It is not contended that this boundary line was an accurate location of the true boundary. In the absence of knowledge as to the mountains, it appears to have been drawn on the 10-marine-league line, measuring from the heads of the bays and inlets. It precludes no one from saying that the occurrence of a mountain crest within 10 marine leagues of the coast would call for a change of the position of the line. But it is manifest that in every case the line was drawn in accordance with the American theory of what constituted the coast, and not in accordance with the theory now maintained by the Counsel for Great Britain as to what constitutes the coast. According to the construction of the Treaty claimed by the British Case, the 10-marine-league line should have been drawn across the Lynn Canal 34½ miles from its mouth. In all those maps it is drawn 90 miles away from that point, 34½ miles above the head of the Lynn Canal. It is not contended that the action of any one of the officials making these maps worked an estoppel against his Government, but the uniform and continuous adoption and promulgation for sixty years, by all these officers, of the view that the line went around the head of the Lynn Canal, without a single map, or paper, or act, or word indicating the existence of any differing view on the part of their Governments, certainly does lead to a strong inference that their Governments understood the Treaty consistently with the maps, and not inconsistently with them.

It would be a strange thing if, six years after the Treaty was made, the British Colonial Office recorded the limits of the British possessions in North-west America inconsistently with the views of the British Government; that for fifty years after the making of this Treaty of 1825, the British Admiralty should issue the charts which constituted the guide for the vessels of the British Navy, putting down upon them the heads of the bays and inlets in Southern Alaska as being Russian waters, if the British Government regard them as British waters; that the Government of British Columbia, the Canadian Department of the Interior, Department of Railroads and Geological Survey, should all be mistaken regarding the construction which the British Government put upon this Treaty. It would be a still stranger thing if Mr. Pelly, Governor of the Hudson's Bay Company, who was Mr. Canning's adviser throughout the negotiations of the Treaty, and Sir George Simpson, who was the Resident Governor in America, both at the time the Treaty was made and at the time the Hudson's Bay Company leased the property from the Russian-American Company, were ignorant of the construction put upon the Treaty by the British Government, and, being in charge of the great interests directly affected by that construction, continued the rest of their lives in that ignorance.

It is impossible to resist the conclusion that the construction of the Treaty now contended for by Great Britain is an after-thought, never entertained by any officer of the British Government during the lifetime of the makers of the Treaty, and originated at least sixty years after the Treaty was signed.

The principal feature of Russia's occupation of Alaska was that in 1839 the Russian-American Company, with the express assent of the Russian Government, leased to the Hudson's Bay Company the mainland coast from Cape Spencer to the Portland Canal, and that this lease was renewed from time to time until the American purchase. The terms of the lease were apt to describe the entire coast, and the maps showing the leased territory, which were furnished to the British Government by Sir J. H. Pelly in 1849 and Sir George Simpson in 1857, showed that territory to include the heads of the bays and inlets and all the land surrounding them. It is conceded that the British Government knew of the lease, for it was given in settlement of a claim which the British Government was pressing against the Russian Government, the subject of a diplomatic controversy regarding the construction of the Treaty of 1825. The knowledge of the territory leased is brought home to the British Government by the last-mentioned maps. If the Government of Great Britain considered that the true construction of the Treaty gave to that Government, and therefore to the Hudson's Bay Company, the heads of the inlets and the territory surrounding them, it is quite impossible that, without a word upon that subject, the Hudson's Bay Company should have recognized Russia's title to that very territory by becoming a tenant.

Upon the purchase of Alaska by the United States in 1867, the officers of the United States took formal possession, with appropriate ceremonies, of the territory at the head of the Lynn Canal, and the officers of the Hudson's Bay Company surrendered the possession which they had theretofore held as tenants of Russia, and departed, leaving the head of the Lynn Canal in the possession of the United States. From that time until the present the United States has retained that possession, and has performed the duties and exercised the powers of sovereignty there.

For certainly more than twenty years after that, there was not a suggestion from the British Government that the possession was not rightful. In the meantime, the Naval and Military officers of the United States governed the Indians who lived at the heads of the inlets; those Indians were included in the United States' Census; order was enforced among them, and their misdeeds were punished by the United States; a public school and mission schools were established at the head of the Lynn Canal, under the auspices of the United States' Government; the land laws of the United States were extended over the territory, and mineral claims were located in the territory now in question; the revenue laws of the United States were extended over the territory, and were enforced in the territory in question; foreign vessels were forbidden to unload at Chilkat, and obeyed this prohibition; a post-office was established at the head of the Lynn Canal; an astronomical station of the United States' Coast Survey was established there; factories for the canning of salmon were erected and operated by American citizens; and all these operations of Government were unaccompanied by any suggestion that the United States was not rightfully there. In the meantime, Great Britain refrained from exercising. or attempting to exercise, any of the functions of Government in the neighbourhood of these inlets. The true condition was stated by the Prime Minister of Canada, in the Canadian Parliament, on the 16th February, 1898, when he said:—

> "My honourable friend is aware that, although this is disputed territory, it has been in the possession of the United States ever since they acquired this country from the Russian Government in 1867, and, so far as my information goes, I am not aware that any protest has ever been raised by any Government against the occupation of Dyea and Skaguay by the United States;"

and when, on the 7th March, 1898, he said:—

> "The fact remains that, from time immemorial, Dyea was in possession of the Russians, and in 1867 it passed into the hands of the Americans, and it has been held in their hands ever since. Now, I will not recriminate here; this is not the time nor the occasion for doing so, but, so far as I am aware, no protest has ever been entered against the occupation of Dyea by the American authorities, and when the American authorities are in possession of that strip of territory on the sea which has Dyea as its harbour, succeeding the possession of the Russians from time immemorial, it becomes manifest to everybody that at this moment we cannot dispute their possession, and that, before their possession can be disputed, the question must be determined by a settlement of the question involved in the Treaty."

It is manifest that the attempt to dispute that possession to which the Prime Minister refers is met by the practical, effective construction of the Treaty presented by the long-continued acquiescence of Great Britain in the construction which gave the territory to Russia and the United States, and to which the Prime Minister testifies. Only the clearest case of mistake could warrant a change of construction, after so long a period of acquiescence in the former construction, and no such case has been made out before this Tribunal.

(Signed) ELIHU ROOT.
HENRY CABOT LODGE.
GEORGE TURNER.

October 20, 1903.

OPINION BY SIR LOUIS JETTÉ

BY a majority of four the Alaska Boundary Tribunal has come to a decision on the questions upon which it had to pass judgment in accordance with the provisions of the Treaty signed between Great Britain and the United States on the 24th January, 1903.

My honourable colleague, Mr. Aylesworth, and myself, have been unable to concur in most of the findings of the majority, and, although the Treaty does not call for any expression of opinion by those who differ, I feel it my duty to place on record, as briefly as I can, a few of the reasons by which I have been guided in arriving at conclusions different from those adopted by the other members of the Commission.

I have no intention of writing exhaustively on the different questions submitted to the Tribunal, as it would be more than useless at this moment. I will therefore refrain from any comment which could only be a repetition of the able argument advanced by the distinguished Counsel in the Case, and I will confine myself to a short and concise statement of the views which I firmly believe should have been accepted by the Tribunal.

The first Article of the Treaty of 1903 gives the following directions to the members of the Commission:—

"The Tribunal shall consist of six impartial jurists of repute, who shall consider judicially the questions submitted to them, each of whom shall first subscribe an oath that he will impartially consider the arguments and evidence presented to the Tribunal, and will decide thereupon according to his true judgment."

Thus, the character of the functions which had been confided to us is clearly defined. We have not been intrusted with the power of making a new Treaty, and it was not in our province to make concessions for the sake of an agreement; we had simply to give a judicial interpretation of the Articles of that Treaty which were submitted to us. And this position, as I take it, was rendered still more clear by the fact that, if a majority could not be found to agree, no harm was done, the way being then still left open for the Governments of both countries to do what would, unquestionably, be in their power, that is, to settle the difficulty by mutual concessions if they found it advantageous to each other.

Finding, thus, that the line of demarcation between our duties and our powers had been very clearly defined, I took it to be my first duty, in passing on the different questions submitted to us, not to assume any more power than had been given to me by this 1st Article of the Convention of 1903.

Article III of this Treaty of 1903 then provides:—

"It is agreed by the High Contracting Parties that the Tribunal shall consider, in the settlement of the question submitted to its decision, the Treaties respectively concluded between His Britannic Majesty and the Emperor of All the Russias, under date of the 28th February (16th March)[1], A.D. 1825, and between the United States of America and the Emperor of All the Russias, concluded under date of the 30th March (18th April)[2], A.D. 1867, and particularly the Articles III, IV, and V of the first-mentioned Treaty, which in the original text are word for word as follows:—

"III. La ligne de démarcation entre les possessions des Hautes Parties Contractantes sur la côte du continent et les îles de l'Amérique Nord-ouest, sera tracée ainsi qu'il suit:—

"A partir du point le plus méridional de l'île dite *Prince of Wales*, lequel point se trouve sous la parallèle du 54° 40′ de latitude nord, et entre le 131[e] et le 133[e] degré de longitude ouest (méridien de Greenwich) la dite ligne remontera au nord le long de la passe dite *Portland Channel*, jusqu'au point de la terre ferme où elle atteint le 56[e] degré de latitude nord; de ce dernier point la ligne de démarcation suivra la crête des montagnes situées parallèlement à la côte, jusqu'au point d'intersection du 141[e] degré de longitude ouest (même méridien); et, finalement, du dit

[1] 28th February, Gregorian Calendar, 16th February (not March), Julian Calendar.
[2] 30th March, Gregorian Calendar, 18th March (not April), Julian Calendar.

point d'intersection, la même ligne méridienne du 141^e degré formera, dans son prolongement jusqu'à la Mer Glaciale, la limite entre les possessions Russes et Britanniques sur le continent de l'Amérique Nord-ouest.

"IV. Il est entendu, par rapport à la ligne de démarcation déterminée dans l'Article précédent—

"1. Que l'île dite *Prince of Wales* appartiendra tout entière à la Russie.

"2. Que partout où la crête des montagnes qui s'étendent dans une direction parallèle à la côte depuis le 56^e degré de latitude nord au point d'intersection du 141^e degré de longitude ouest, se trouverait à la distance de plus de 10 lieues marines de l'océan, la limite entre les possessions Britanniques et la lisière de côte mentionnée ci-dessus comme devant appartenir à la Russie sera formée par une ligne parallèle aux sinuosités de la côte, et qui ne pourra jamais en être éloignée que de 10 lieues marines.

"V. Il est convenu, en outre, que nul établissement ne sera formé par une des deux Parties dans les limites que les deux Articles précédents assignent aux possessions de l'autre. En conséquence, les sujets Britanniques ne formeront aucun établissement soit sur la côte, soit sur la lisière de terre ferme comprise dans les limites des possessions Russes, telles qu'elles sont désignées dans les deux Articles précédents; et, de même, nul établissement ne sera formé par des sujets Russes au delà des dites limites."

The Treaty then further provides:—

"The Tribunal shall also take into consideration any action of the several Governments or of their respective Representatives, preliminary or subsequent to the conclusion of said Treaties, so far as the same tends to show the original and effective understanding of the Parties in respect to the limits of their several territorial jurisdictions under and by virtue of the provisions of said Treaties.

"Article IV

"Referring to Articles III, IV, and V of the said Treaty of 1825, the said Tribunal shall answer and decide the following questions:—

"1. What is intended as the point of commencement of the line?

"2. What channel is the Portland Channel?

"3. What course should the line take from the point of commencement to the entrance to Portland Channel?

"4. To what point on the 56th parallel is the line to be drawn from the head of the Portland Channel, and what course should it follow between these points ?

"5. In extending the line of demarcation northward from said point on the parallel on the 56th degree of north latitude, following the crest of the mountains situated parallel to the coast until its intersection with the 141st degree of longitude west of Greenwich, subject to the condition that if such line should anywhere exceed the distance of 10 marine leagues from the ocean, then the boundary between the Russian and the British territory should be formed by a line parallel to the sinuosities of the coast and distant therefrom not more than 10 marine leagues, was it the intention and meaning of said Convention of 1825 that there should remain in the exclusive possession of Russia a continuous fringe or strip of coast on the mainland, not exceeding 10 marine leagues in width, separating the British possessions from the bays, ports, inlets, havens, and waters of the ocean, and extending from the said point on the 56th degree of latitude north to a point where such line of demarcation should intersect the 141st degree of longitude west of the meridian of Greenwich?

"6. If the foregoing question should be answered in the negative, and in the event of the summit of such mountains proving to be in places more than 10 marine leagues from the coast, should the width of the *lisière* which was to belong to Russia be measured (1) from the mainland coast of the ocean, strictly so-called, along a line perpendicular thereto, or (2) was it the intention and meaning of the said Convention that where the mainland coast is indented by deep inlets forming part of the territorial waters of Russia, the width of the *lisière* was to be measured (a) from the line of the general direction of the mainland coast, or (b) from the line separating the waters of the ocean from the territorial waters of Russia, or (c) from the heads of the aforesaid inlets?

"7. What, if any exist, are the mountains referred to as situated parallel to the coast, which mountains, when within 10 marine leagues from the coast, are declared to form the eastern boundary ?"

The Treaty then provides for the meetings of the Tribunal and the rendering of the Award in the following terms:—

"Article V

"The Tribunal shall assemble, for their first meeting, at London as soon as practicable after receiving their commissions, and shall themselves fix the times and places of all subsequent meetings.

"The decision of the Tribunal shall be made as soon as possible after the conclusion of the Arguments in the Case, and within three months thereafter . . . . . The decision shall be made in writing, and dated, and shall be signed by the members of the Tribunal assenting to the same. It shall be signed in duplicate, one copy whereof shall be given to the Agent of the United States of America for his Government, and the other to the Agent of His Britannic Majesty for his Government.

"Article VI

"Should there be, unfortunately, a failure by a majority of the Tribunal to agree upon any of the points submitted for their decision, it shall be their duty to so report in writing to the respective Governments through their respective Agents. Should there be an agreement by a majority upon a part of the questions submitted, it shall be their duty to sign and report their decision upon the points of such agreement in the manner hereinbefore prescribed."

As I have already said, these two last Articles do not provide for any expression of opinion by those members of the Tribunal who have the misfortune to find themselves in the minority.

The questions to be answered by the Tribunal are seven in number. I will now take them in the order of the Treaty:—

1st Question

"What is intended as the point of commencement of the line ?"

The answer to this question is as follows:—

"The Tribunal unanimously agrees that the point of commencement of the line is Cape Muzon."

The Representatives of both Governments having agreed to accept Cape Muzon as the southernmost point of Prince of Wales Island, and to take it as the point of commencement of the line, nothing further need be said on this first question.

2nd Question

"What channel is the Portland Channel ?"

The following is the answer of the Commission to this question:—

"The Tribunal unanimously agrees that the Portland Channel is the channel which runs from about 55° 56′ north latitude, and passes to the north of Pearse and Wales Islands.

"A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner decides that the Portland Channel after passing to the north of Wales Island is the channel between Wales Island and Sitklan Island called Tongass Channel.

"The Portland Channel above mentioned is marked throughout its length by a dotted red line from the point marked B to the point marked C on the map, signed in duplicate by the members of the Tribunal at the time of signing their decision."

The contention of the United States on this point was that Portland Channel is that body of water which goes seaward between Pearse Island and the peninsula, passes Ramsden Point in (or at the entrance of) Observatory Inlet, and reaches the ocean by the channel between Pearse and Wales Islands on the west and the easternly continental shore, entering the ocean between Point Wales on the west and Point Maskelyne on the east.

The contention of Great Britain was, that it is the channel which enters the ocean between Tongass Island and Kannaghunut Island, leaving Sitklan, Wales and Pearse Islands on the south and east, and extending northerly 82 miles to its head.

The difference between the two contentions will be rendered more striking by saying that the British Portland Channel would run straight from its head to the ocean, whilst the American Portland Channel would divide in two passages at the head of Pearse Island, and there leaving its northern branch would make a curve, and, entering Observatory Inlet, would run down to the sea through that inlet, at the south of Pearse and Wales Islands.

The contention of Great Britain is, to my mind, clearly supported by Vancouver's narrative of his voyage of 1794, when, after relating his movements in these waters, day by day, and specially from the 27th July to the 2nd August, he says:—

"In the morning of the 2nd (August) we set out early, and passed through a labyrinth of small islets and rocks, along the continental shore; this, taking now a winding course to the south-west and west, showed the south-eastern side of the canal to be much broken, through which was a passage leading S.S.E. towards the ocean. We passed this in the hope of finding a more northern and westerly communication, in which we were not disappointed, as the channel we were then pursuing was soon found to communicate also with the sea, making the land to the south of us one or more islands. From the north-west point of this land, situated in latitude 54° 45½′, longitude 229° 28′, the Pacific was evidently seen between N. 88 W. and S. 81 W."

Adding finally (under date 15th August):—

"In the forenoon we reached that arm of the sea whose examination had occupied our time from the 27th of the preceding to the 2nd of this month. The distance from its entrance to its source is about 70 miles, which, in honour of the noble family of Bentinck, I named PORTLAND CANAL."

When this second question was put to the Commissioners, at the time of rendering the Award, every one of them, as will appear by the official Report, answered that Portland Channel was the channel that passed—contrary to the American contention—to the north of Pearse and Wales Islands.

But on a sub-question being put, the majority of the Commission decided that after passing north of Pearse and Wales Islands, it should pass south of Sitklan and Kannaghunut Islands, which lie directly to the westward of Pearse and Wales Islands; should make a curve there, and, abandoning its northern course, should reach the sea through Tongass Passage instead of following the continuous straight line which, a moment before, had been found to be the proper one.

I voted against this sub-proposition, because I found that it was totally unsupported either by argument or authority, and was, moreover, illogical. The Commission had, just a moment before, decided—and very properly, I believe—that Portland Channel, as described by Vancouver, was that channel indicated on all the maps as running straight to the sea; it had refused to accept the contention of the United States to have it leave its northern course, and, making a curve at Pearse Island, to run through Observatory Inlet, and all at once it is decided that this very channel shall make a curve lower down, that it will now leave its straight northern course and run into the sea through Tongass Passage.

I can only say that if this decision is a correct and just one, I am very much afraid that the majority of the Commission has committed an injustice towards the United States in refusing to admit its contention that the channel ought to make that curve a little higher up, at the head of Pearse Island, which solution would appear, to any one having studied the map, a much more sensible and reasonable one than that which has been adopted.

The result of this last decision, on the sub-question above mentioned, is to deprive Canada of the two islands which lie at the very entrance of Portland Channel, Sitklan, and Kannaghunut Islands. It will strike the eye of everyone who looks at the map that the position of those two islands, at the entrance of the channel, is a most important one from a military point of view, and that the loss of them to Canada may be felt seriously in the future.

3rd Question

"What course should the line take from the point of commencement to the entrance to Portland Channel ?"

The answer of the majority of the Tribunal to this question is as follows:—

"A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner decide that the course of the line from the point of commencement to the entrance of Portland Channel is the line marked A B in red on the aforesaid map."

The line indicated in this answer is a direct line from Cape Muzon to the south entrance of Tongass Passage.

This being in opposition to the language of the Treaty, which is: "Commencing from the southernmost point of the island called Prince of Wales Island, ... the said line shall ascend to the north along the channel called *Portland Channel*"; I feel bound to differ from the decision of the majority. *Tongass Passage*, as I have stated, on the previous question, is not *Portland Channel*, and the Treaty says that the line shall be drawn along Portland Channel, but does not say that it can be drawn along Tongass Passage.

4th Question

"To what point of the 56th parallel is the line to be drawn from the head of the Portland Channel, and what course should it follow between these points?"

This has been answered as follows:—

"A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner decides that the point to which the line is to be drawn from the head of Portland Channel is the point on the 56th parallel of latitude marked D on the aforesaid map, and the course which the line should follow is drawn from C to D on the aforesaid map."

The decision on this point is not of great importance, as it affects only a few miles of territory. I must say, however, that it is not in accordance with the rule given by the Treaty, which requires that, from this point, the 56th degree of north latitude, "the line of demarcation shall follow the summit of the mountains situated parallel to the coast, ... and that whenever the summit of such mountains . . . . . shall prove to be at a distance of more than 10 marine leagues from the ocean, the limit shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of 10 marine leagues therefrom".

But, as I have just said, the territory affected by this decision is not of great importance, and the rule adopted by the majority on this point will, I may add, be examined further on, when dealing with Question 7.

5th Question

"In extending the line of demarcation northward from said point on the parallel of the 56th degree of north latitude, following the crest of the mountains situated parallel to the coast, until its intersection with the 141st degree of longitude west of Greenwich, subject to the condition that if such line should anywhere exceed the distance of 10 marine leagues from the ocean, then the boundary between the British and the Russian territory should be formed by a line parallel to the sinuosities of the coast, and distant therefrom not more than 10 marine leagues, was it the intention and meaning of said Convention of 1825 that there should remain in the exclusive possession of Russia a continuous fringe or strip of coast on the mainland, not exceeding 10 marine leagues in width, separating the British possessions from the bays, ports, inlets, havens, and waters of the ocean, and extending from the said point on the 56th degree of latitude north to a point where such line of demarcation should intersect the 141st degree of longitude west of the meridian of Greenwich?"

The answer to this question, in the Award rendered by the majority, is in the following terms:—

"A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner decide that the answer to the above question is in the affirmative."

The contention of the United States on this point is therefore accepted as well founded. It follows from this decision that the strip of territory granted to Russia by the Treaty runs around all the openings of the coast, specially Lynn Canal, and thus deprives British possessions of any access to the sea on the whole length of the said *lisière*.

This Treaty of 1825 was signed between England and Russia after very protracted negotiations, which took place during a period extending from November 1821 to February 1825. At the end of a considerable amount of communication and diplomatic correspondence the parties had come to an understanding, and agreed on the terms of a Convention apparently satisfactory to both, and which seemed to contain, if not what each would have liked to have obtained, at least what they had mutually conceded to each other.

It will be useful here to recall briefly the circumstances which led the Governments of Great Britain and Russia to sign this Treaty, and to go back to the negotiations which preceded it, in order to have a fair understanding of its importance and bearing.

The Emperor of Russia, Paul the First, following the course adopted by all the Governments of Europe from the beginning of the 17th century, had, in 1799, granted to an important Company, called the Russian American Company, the monopoly of trade, hunting, and fishing on all the territory claimed by Russia on that part of North America (indicating as the limit the 55th degree of latitude), and also "on the chain of islands extending from Kamschatka to the north, to America, and southward to Japan".

Great Britain, whose possessions on the North American continent extended as far as those of Russia, had granted a similar monopoly to the Hudson's Bay Company, and in their adventurous explorations, advancing more and more every year in the unknown regions of this vast continent, the trappers of this Company and of the North-west Company had at last met with the agents of the Russian American Company.

Hence there soon arose the necessity of determining the limit of both Empires' territory on this continent.

But another reason also necessitated the attention and action of the Government of Great Britain in this instance.

Emperor Alexander the First, wishing to grant additional favour to the Russian American Company, had published, in 1821, by a Ukase bearing date the 4th September, a regulation prohibiting all foreign vessels from approaching the coasts of this part of the Russian territory within less than 100 Italian miles.

The two great maritime nations, Great Britain and the United States, could not acquiesce in a prohibition so completely antagonistic to the rules of international law and to the interests of commerce. Consequently, representations were made to the Russian Government.

In the course of the negotiations which followed, the question of maritime supremacy over a distance of 100 Italian miles was soon settled, as stated in a despatch of Mr. George Canning to Sir Charles Bagot, bearing date the 15th January, 1824. Mr. Canning clearly and concisely analyses the situation in the following terms:—

"The questions at issue between Great Britain and Russia are short and simple.

"The Russian Ukase contains two objectionable pretensions: first, an extravagant assumption of maritime supremacy; second, an unwarranted claim of territorial dominion.

"As to the first, the disavowal of Russia is, in substance, all we could desire."

The only thing remaining to be settled, therefore, was the question of the frontier.

Russian establishments at that date were more especially on the islands, and Count Nesselrode acknowledges that on the continent they had none below the 57th degree of latitude. These establishments were therefore the ones whose protection was specially desired and intended, and we will now see that it was in that spirit that the negotiations, which were to end in this Treaty of 1825, were begun and continued.

In order to indicate the true character of these negotiations, a few quotations will be sufficient.

In a despatch dated the 3rd November, 1823, and addressed to Count Nesselrode, M. de Poletica, giving the account of an interview he had had with Sir Charles Bagot, His Britannic Majesty's Ambassador to St. Petersburgh, says:—

"In the midst of this argument the British Ambassador suddenly suspended the discussion in order to tell me that his Government had, after all, no intention of discussing the territorial question according to the abstract principles of public law or of international law; that that would have the effect of rendering the discussion interminable; that the Cabinet of London expected a more satisfactory result, for the two parties interested, from an amicable arrangement which would be based only upon mutual consent, and that his instructions had been drawn up in that spirit.

"I replied to Sir Charles Bagot that in the matter in question, so far as I could foresee the views of the Imperial Government, I believed that I could take upon myself boldly to assure him that they were in perfect agreement with those of the Cabinet of London."

The position of both parties is therefore clearly defined by these very plain and very full declarations.

Let us see now what were the claims of Russia as to this strip of territory, which is the subject of the present difficulty.

As I have already said, Russian establishments at that time were more especially situated on the islands, and the Russian Plenipotentiaries openly declare that it is for the protection of those establishments that they require this strip of territory on the coast of the mainland, coming so far down towards the south, when the principal line of separation between the possessions of the two Empires on this continent was, however, to be placed much higher up.

So we find in the counter-proposition offered by Russia, in answer to a draft of Convention submitted by Sir Charles Bagot in March 1824, the following declaration:—

"The principal motive which forces Russia to insist upon retaining the sovereignty over the strip of land described previously on the mainland from the Portland Canal as far as the point of intersection of the 60th degree of latitude with the 139th degree of longitude is that, if deprived of this territory, the Russian American Company would be left without any means of supporting the establishments, which would thereby be left without any support, and could not have any strength nor solidity."

A few days later (29th March, 1824), in the document containing the final answer to the British proposition, the Russian Plenipotentiaries, affirming their previous claims, also say:—

"The Emperor instructs his Plenipotentiaries to declare once again to the Ambassador of England—

"That the possession of Prince of Wales Island without a portion of territory *on the coast opposite* this island could not be of any use to Russia.

"That any establishment formed on the said island, or on those around it, would, in some manner, be turned by the English establishments of the mainland, and be completely at the mercy of the latter."

On the 5th April following Count Nesselrode, in a despatch to Count Lieven, Russian Ambassador to London, says:—

"In order to avoid intersecting the Prince of Wales Island, which, according to this arrangement, should belong to Russia, we proposed to carry the southern frontier of our domains to the 54th degree 40 minutes of latitude, and to make it strike on the continent the Portland Canal, the mouth of which, on the ocean, lies at the height of Prince of Wales Island, and the head inland between the 55th and 56th degree of latitude.

"This proposition only secured to us *a narrow strip on the coast* itself, and left to the English establishments all the space required for their increase and extension."

And a little further on he adds:—

"As for us, we restrict our demands to a small strip (*lisière*) of coast on the continent, and in order to dispel all objections whatsoever, we guarantee the free navigation of the rivers, we proclaim the opening of the Port of Novo-Archangelsk."

One month later, Count Nesselrode in another despatch to Count Lieven again says:—

"If the principle of reciprocal convenience is advocated, Russia gives up for the progressive extension of the English establishments a vast extent of coast and of territory; she guarantees free markets; she makes provision for the interests of their trade, and, as a compensation for so many offers inspired by the sincerest spirit of conciliation, she reserves for herself only *a point of support*, without which it would not be possible for her to keep one half of her dominions."

It is unnecessary to multiply these quotations.

Let us see now how—after coming to such an understanding—the final Convention was drafted.

A number of drafts and counter-drafts were exchanged between the Representatives of the two Governments, and it is interesting to note the successive changes made in the wording of those documents as to the strip of territory claimed by Russia.

In the draft of Agreement sent by Mr. George Canning to Sir Charles Bagot on the 12th July, 1824, it is stated, in Article II, that the line "shall be carried along the coast in a direction parallel to its windings, and at or within *the seaward base* of the mountains by which it is bounded."

Mr. Canning, in his letter inclosing this draft, uses the following expressions: "thence following the sinuosities of the coast, along the base of *the mountains nearest to the sea*".

Article III of this draft then mentioned a width—to be determined upon—which this strip of land could not exceed.

This proposal was not accepted, and Count Nesselrode sent to Count Lieven a counter-draft, the terms of which, with regard to the *lisière*, he himself analyzes in the following terms: "Our counter-draft carries our boundary from the 51st degree of north latitude to 54° 40′. It leaves the establishments which the English Companies may form hereafter on the north-west coast all the territory situated to the south of Portland Channel. It abolishes the establishment of the mountains as the boundary of the strip of mainland which Russia would possess on the American continent, and limits the width of this strip to 10 marine leagues, in accordance with the wishes of England".

In a letter addressed to Mr. Stratford Canning, dated the 8th December, 1824, Mr. George Canning replied to Count Nesselrode's proposal as follows:—

"The Russian Plenipotentiaries propose to withdraw entirely the limit of the *lisière* on the coast which they were themselves the first to propose, viz., the summit of the mountains which run parallel to the coast, and which appear, according to the map, to follow all its sinuosities, and to substitute generally that which we only suggested as a corrective of their first proposition.

"We cannot agree to this change. It is quite obvious the boundary of mountains, where they exist, is the most natural and effectual boundary. The inconvenience against which we wished to guard was that which you know to have existed on the other side of the American continent, when mountains laid down in a map as in a certain given position, and assumed, in faith of the accuracy of the map, as a boundary between the possessions of England and the United States, turned out to be quite differently situated, a discovery which has given rise to the most perplexing discussions. Should the maps be no more accurate as to the western than as to the eastern mountains, we might be assigning to Russia immense tracts of inland territory, *where we only intended to give, and she only intended to ask, a strip of the sea coast* . . . . .

"Where the mountains are the boundary, we are content to take the *summit* instead of the seaward base as the line of demarcation."

Article III of the draft of Treaty sent with this letter by Mr. George Canning to Mr. Stratford Canning, says: "Provided, nevertheless, that if the summit of the aforesaid mountains shall turn out to be, in any part of their range, at more than the distance of 10 marine leagues *from the Pacifick*, then that, *for that space*, the line of demarcation shall be a line of parallel to the coast and its windings", &c.

This draft having been submitted to M. Matusevich—an official of the Russian Office, and afterwards Ambassador Extraordinary—was slightly changed. Thus, in Article IV, instead of maintaining the expression "*the Pacifick*", he says: "That wherever the distance between the crest of the mountains and *the sea* shall be more than 10 marine leagues, the boundary of this same strip shall be formed by a line parallel to the sinuosities of the coast, and which shall nowhere be more than 10 marine leagues from *the sea*".

Was it M. Matusevich's intention, in substituting this word *sea*, to the word *Pacifick* which had been used by Mr. Canning, to weaken the force and bearing of the expression chosen by him? It is impossible to know; but one thing is certain, however, and it is that if such was his intention it was not realized, the Treaty in its definite form using the word "*ocean*", which, in this instance, is the equivalent of the expression used by Mr. Canning.

Thus the second paragraph of Article IV of the Treaty of 1825 provides:—

"Que partout où la crête des montagnes qui s'étendent dans une direction parallèle à la côte, depuis le 56[e] degré de latitude nord au point d'intersection du 141[e] degré de longitude ouest, se trouverait à la distance de plus de 10 lieues marines *de l'océan*, la limite entre les possessions Britanniques et la lisière de côte mentionnée ci-dessus comme devant appartenir à la Russie, sera formée par une ligne parallèle aux sinuosités de la côte et qui ne pourra jamais en être éloignée que de 10 lieues marines."

It is a well-known rule in the interpretation of contracts that one of the safest modes of arriving at the true intention of the parties is to take into consideration the circumstances which have led to the settlement, to study the claims which each party pressed upon the other, and to ascertain the end which it would have wished to secure.

Now, if I apply this rule to the Treaty of 1825, it seems to me impossible to arrive at the conclusion that the intention of the parties to this Treaty was that this strip of territory should be traced so as to run up to the source of all the rivers, and to the head of all the inlets, which passed through this strip to reach the sea.

This, however, is the meaning which a majority of the Tribunal has given to this Treaty when by an interpretation of the word *coast*, which appears to me to be forced and untenable under the circumstances, they are led to say that Lynn Canal is the ocean, and that the coast of the ocean means equally the coast of Lynn Canal!

I cannot accept this interpretation. My humble opinion, after having maturely considered the documents from which I have taken the quotations made above, is that those who prepared and drafted this Treaty of 1825 never contemplated such a result. Consequently, leaving aside the learned distinctions which were pressed upon us as to the meaning of the word coast, to retain only what I believe was the intention of the parties, I still say that even if we were to consider Lynn Canal as an arm of the sea, or even as an inland sea, the coast of Lynn Canal could not, even then, be considered the coast of the ocean!

There is, in my country, one of the largest rivers of the world, and I have often heard it said by some of my compatriots, when contemplating with pride the immense sheet of water at its mouth: "Why, but this is the sea"!

However, it has not yet entered the mind of any one to say: "This is the ocean !"

It has been reserved for Lynn Canal to be raised to that dignity!

6th Question

"If the foregoing question should be answered in the negative, and in the event of the summit of such mountains proving to be in places more than 10 marine leagues from the coast, should the width of the *lisière* which was to belong to Russia be measured—(1) from the mainland coast of the ocean, strictly so-called, along a line perpendicular thereto, or (2) was it the intention and meaning of the said Convention that where the mainland coast is indented by deep inlets forming part of the territorial waters of Russia, the width of the *lisière* was to be measured (a) from the line of the general direction of the mainland coast, or (b) from the line separating the waters of the ocean from the territorial waters of Russia, or (c) from the heads of the aforesaid inlets ?"

The majority of the Tribunal declares that:—

"Question 5 having been answered in the affirmative, Question 6 requires no answer."

The opinion of the members of the Tribunal on this question, moreover, is made apparent from the views expressed on the other question, and it would be useless to add anything more.

7th Question

"What, if any exist, are the mountains referred to as situated parallel to the coast, which mountains when within 10 marine leagues from the coast, are declared to form the eastern boundary? "

Answer:—

"A majority of the Tribunal, that is to say, Lord Alverstone, Mr. Root, Mr. Lodge, and Mr. Turner, decides that the mountains marked S on the aforesaid map, are the mountains referred to as situated parallel to the coast, where such mountains marked S are situated.

"Between the point marked P (mountain marked S 8,000) on the north and the point marked T (mountain marked S 7,950), in the absence of further survey the evidence is not sufficient to enable the Tribunal to say which are the mountains parallel to the coast within the meaning of the Treaty."

Article III of the Treaty of 1825, after declaring that the line of demarcation shall ascend to the north along the channel called Portland Channel, as far as the point of the continent where it strikes the 56th degree of north latitude, adds:—

"From this last-mentioned point the line of demarcation shall follow the summit of the mountains situated parallel to the coast as far as the point of intersection of the 141st degree of west longitude."

Article IV, § 2, then provides:—

"That whenever the summit of the mountains which extend in a direction parallel to the coast, from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude, shall prove to be at the distance of more than 10 marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned, shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of 10 marine leagues therefrom."

The contention of the United States, on this point, is stated in the following words, on p. 206 of the Case:—

"The United States request the Tribunal to answer and decide that such mountains (as mentioned in question 7) do not exist within 10 marine leagues from the coast."

This, however, cannot be said to express correctly what was argued before the Tribunal on this question. It would perhaps be safer to say that the real contention of the United States, on this point, was that in the intention of the negotiators of the Treaty the line was to follow a chain of mountains, and that there being no such chain, the line was to be drawn at a uniform and regular distance of 35 miles from the coast.

It was also suggested, in the argument, that the word *crest* carries with it the indication of a continuous chain or range of mountains, and that this does not exist within the limit of the 10 leagues.

The British contention was that mountains answering the description of the Treaty do exist.

The evidence on this point clearly establishes the contention of Great Britain.

Mr. King, chief astronomer of the Department of the Interior, at Ottawa, in his Affidavit (p. 307, British Case Appendix), says:—

"Throughout its entire length, from the 56th parallel to Lynn Canal, the coast is bordered by mountains 3,000 to 5,000 feet in height, having rocky peaks and ridges. Their summits average 5 or 6 miles in distance from the sea, and in many places they approach even nearer. These mountains preserve for considerable distances much uniformity of height, and also of direction, forming elongated mountain masses lying with their lengths parallel to the general line of the coast. Penetrating inlets and valleys separate these mountain masses from one another, but without greatly disturbing their continuity of direction."

And on p. 308:—

"Hence a line following mountain summits parallel to the general line of the mainland is possible, subject only to the breaks caused by inlets and river valleys, which breaks are comparatively short compared with the lengths of the continuous lines of the mountain summits."

The decision of the Tribunal, on this point, is adverse to the contention of the United States; it acknowledges that the Treaty does not call for a continuous chain of mountains, and that those mountains which exist along the coast, answer the requirements of the Treaty for the tracing of the line-frontier.

I entirely concur in the foregoing part of the decision of the Tribunal on this question, but I stop there, and cannot follow the majority in the adoption of its system for the demarcation of the line.

The Treaty of 1825 clearly indicates, in my opinion, that the mountains which were to constitute the boundary-line, were those *nearest to the coast.* In fact, when the Treaty says: "the summit of the mountains situate parallel to the coast", it evidently points to the mountains on the coast, those which are situated on the border of the coast, and if we were to suppose two chains of mountains, one parallel to the other, the one which would lie the farthest from the coast would not be situated parallel to the coast, but it would be situated parallel to the other chain of mountains. Therefore, the first range of mountains, the one nearest to the coast, is the one which is alone indicated by the Treaty. This, to me, seems unanswerable.

But a few quotations from the opinions of those who have negotiated this Treaty, will render the point still more evident.

Mr. George Canning, in a despatch to Sir Charles Bagot, dated the 12th July, 1824, says:—

"His Majesty's Government have resolved to authorize your Excellency to consent to include the south points of Prince of Wales Island within the Russian frontiers, and to take as the line of demarcation a line drawn from the southernmost point of Prince of Wales Island from south to north through Portland Channel, till it strikes the mainland in latitude 56, thence following the sinuosities of the coast, along the base of the *mountains nearest the sea* to Mount Elias . . . . ."

Count Lieven, in a Memorandum which he prepared on the North-west Coast Convention (24th July, 1824), says:—

"In the case now under consideration, the word *base*, by the indefinite meaning which it presents, and the greater or less extension which can be given to it, would appear hardly suitable to secure the delimitation against subsequent disputes, for it would not be impossible, in view of the little exactness of the geographical ideas which we as yet possess as to these regions, *that the mountains designated as the boundary should extend*, by an insensible slope, *down to the very border of the coast.*"

In his despatch to Count Lieven, bearing date the 20th February, 1825, Count Nesselrode again mentions "the natural frontier formed by *the mountains bordering on the coast*".

There is, therefore, no doubt in my mind that the mountains indicated by the Treaty are those situated nearest to the coast.

Nevertheless, instead of following the evident meaning of the Treaty, the majority of the Tribunal has adopted a line which, at a number of points of its course, rests on mountains which lie far from the coast, and are separated from it by nearer ones, which ought consequently to have been chosen in their stead, as the points of demarcation of the line.

I found it impossible, under such circumstances, to concur in this arbitrary determination of a line which, although it does not concede all the territory they claimed to the United States, nevertheless deprives Canada of the greater part of that to which she was entitled.

(Signed) L. A. JETTÉ.

October 22, 1903.

APPENDIX III

EXPLORATIONS AND SURVEYS PRIOR TO THE CONVENTION OF 1903

I. The Russians

The information we have regarding the first discovery of Alaska is indefinite. In 1730 or thereabout a Russian vessel under the commander Krupischef, accompanied by the surveyor Gvosdef, is said to have sailed or been driven by a storm from Kamchatka eastward beyond the Diomede Islands to a coast, the description of which would fit Norton Sound. Actual discovery, however, is accredited to Vitus Bering and his lieutenant, Alexis Chirikof.

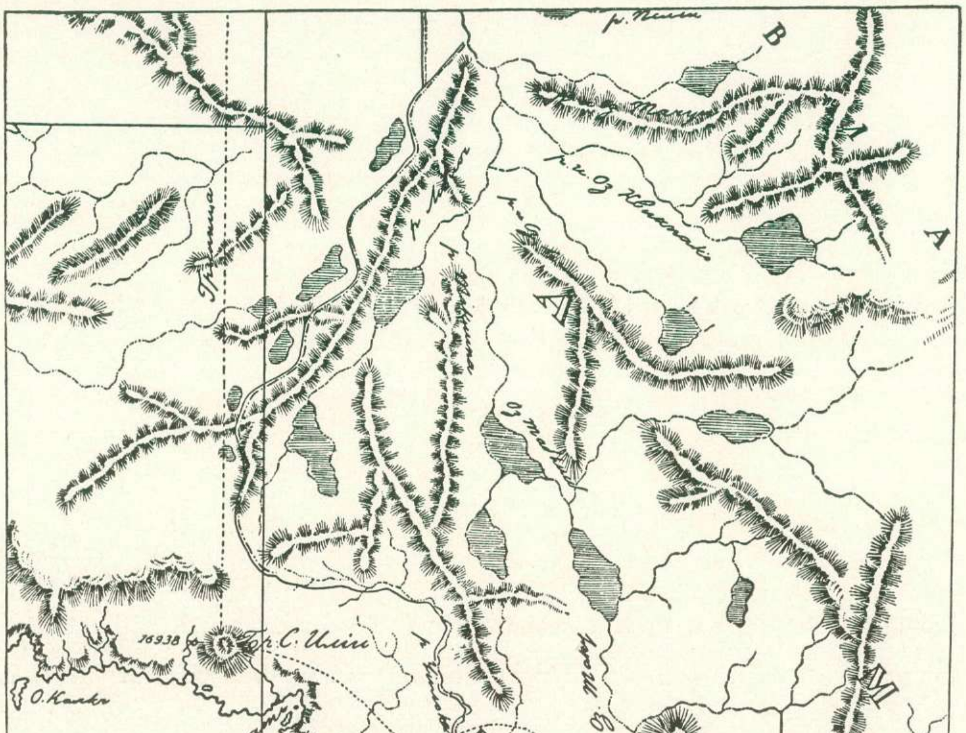
In 1725 Peter the Great issued a commission to Vitus Bering, a Dane in his employ, to explore thoroughly eastern Siberia and the Pacific Ocean. In 1728 Bering sailed northeast from Kamchatka, passed and named St. Lawrence Island, sailed through the strait that now bears his name, and arriving at Cape Serdze, where the coast of Asia trends westward, returned to Kamchatka without seeing the coast of Alaska.

In the following year he sailed eastward from Kamchatka, but meeting contrary winds he turned back and returned to St. Petersburg.

In the year 1741, on June 4, Bering and Chirikof sailed from Petropavlovsk, a post they had built on the eastern shore of Kamchatka and named after their vessels the *St. Peter* and *St. Paul.* First they sailed southeasterly in search of a mythical Gamaland, supposed to be at no great distance from Kamchatka, but upon reaching latitude 46 degrees north without finding any signs of land they changed their course to the northeast. On June 20 their two vessels became separated in a storm.

Chirikof, from the deck of the *St. Paul,* was the first to see the Alaskan coast. This was on July 15, near the north end of Dall Island. Two days later he entered Sitka Sound. Here a boat was landed and as the crew was long ashore without showing signs of returning, a second boat was sent to investigate. Neither crew was ever seen again. With both his landing boats lost and his crew further reduced by scurvy, Chirikof was forced to return to Kamchatka. Keeping land in sight on his return voyage, his shortage of fresh water was relieved some time after passing Unalaska by some Indians who brought a supply in bladders. On September 21 high land was seen, probably Attu Island, the westernmost of the Aleutians. On October 10 Chirikof was back in Petropavlovsk.

The date of Bering's discovery farther north has been variously stated. Müller makes it July 20, St. Elias Day, Steller July 18, and Bering himself July 16. The first part of the coast seen by the crew of the *St. Peter* was undoubtedly Mount St. Elias. Two days after sighting the peak they anchored off Kayak Island, which Bering named Cape St. Elias. There a landing was made for fresh water, and several huts and some implements for hunting, fishing, and cooking were seen. But Bering, ill with scurvy, would allow no time for exploration and ordered an immediate return to Kamchatka. Thick fog and contrary winds made progress slow during August. Near a large group of islands the sailor Shumagin died of scurvy; he was buried on one of the islands and the group was given his name. At another island of the same group some natives were encountered who at first were friendly but later turned hostile. In September and October the vessel was driven back and forth along the thousand mile length of the Aleutian Islands. Early in November land was seen, which was thought to be the coast of Kamchatka, but it proved to be an island, one of the Commander group, about 100 miles from Kamchatka, which later was named Bering Island. Here Bering's crew resolved to spend the winter. Near the end of the month the *St. Peter* was driven ashore and wrecked. Bering died early in December. In all, thirty-one men had died of scurvy before the following spring. On August 26, 1742, the survivors of Bering's crew returned to Petropavlovsk in a small craft improvised from the wreck of the *St. Peter.*



Part of Captain Michael Tebenkof's map of the Northwest Coast of America, compiled in New Archangel, 1849.

The voyages of Bering and Chirikof gave the Russians a very vague idea of the outline of the coast of Alaska, and the later visits of fur hunters, sailing in rickety sewn vessels by dead reckoning, did little to enlighten them. In fact, until some time after the publication of the account of Captain Cook's voyage in 1778, the maps published by the Russian Government showed the whole area between Mount St. Elias and Kamchatka to be occupied by a great number of islands of assorted sizes. But the Russians were the first to make use of Cook's charts. At Unalaska Cook had met the trader Grigor Ismailof with whom he exchanged information by signs, and in the following year his successor, Captain Clerke, gave copies of the charts to the governor of Kamchatka. In 1784 the Russians made their first settlement beyond the Aleutians on Kodiak Island, and trading posts were extended to Cook Inlet and Prince William Sound. In 1788 Ismailof sailed from Kodiak with a supply of painted posts and boards and some copper plates "to mark the extent of Russia's domain". He made his most southerly landing at Lituya Bay, presumably destroying the monument erected there by the French navigator, La Perouse. But although the Russian Government sent several exploring and surveying expeditions to Northwest Alaska, they showed no interest in the delineation of the shores of Southeast Alaska until after the formation of the Russian American Company in 1799.

During the regime of Alexander Baranof, the first governor of the Russian American Company, Captain Kruzenstern, of the Russian navy, who took part in the subjugation of the rebellious Indians of Sitka Sound in 1804, in the same year made a chart of the sound; 2 years later Ivan Vasilief, a naval pilot or mate, surveyed the western shore of Baranof Island. Some time later Captain Peter Ilin is supposed to have surveyed the bay named after him on the western shore of Chichagof Island. Under the administration of Baron Wrangell extensive surveys were made, principally in Northwest Alaska. In Southeast Alaska, however, Adolph Etolin made surveys of Tongass Harbour and Kaigani Strait in 1833; in 1834 Dionysius Zarembo surveyed Wrangell Harbour and 4 years later Woewodski Harbour; in the latter year, also, a survey was made of the head of Lynn Canal and the lower part of Chilkat River by a Mr. Lindenberg, who was in the employ of the Russian American Company. Not much interest in geographical matters seems to have been shown during the governorship of Etolin from 1841 to 1845, but his successor, Michael Tebenkof, contributed more to the geographic knowledge of the whole Alaskan coast than any other Russian. In addition to the extensive surveys in the northern parts of Alaska, Tebenkof had similar work done on the shores of Baranof and Cruzof Islands, and in 1848-49 he had compiled and engraved at New Archangel an atlas of the northwest coast of America. The foundation of this work was from Vancouver's charts, it is true, but Tebenkof had additions and corrections made from the surveys of the later navigators. The only other notable survey made under the Russian regime seems to have been that made in 1863, by a party of officers on the corvette *Rynda*, from which a chart of Stikine River was made. Regarding the Western Union Telegraph Company's exploration of 1865-67, the American end of the line was to be on the eastern shore of Puget Sound, and construction was actually begun on Fraser River, behind the Coast Range and via Telegraph Creek (at the head of navigation on Stikine River) towards Yukon River, down which it had been intended to build the line to Bering Strait. This project was abandoned when news was received of the successful laying of the Atlantic Cable in 1866.[1]

II. The Spaniards

The early voyages of discovery of the Spaniards, mentioned in our Historical Sketch (*See* page 183), added little to the geographical knowledge of the northwest coast, except that land existed from California northward to Russian America. In 1774, at the northern limit of his voyage in about latitude 54 degrees, Juan Perez traded with some Indians who approached his vessel in canoes, and it was noted then that the Indians had in their possession an old bayonet and some pieces of iron, which were conjectured to have belonged to the men lost by Chirikof in

[1] The purpose of this project was to have a telegraph line from Europe across Asia and Bering Strait to America.

1741. South of Nootka Sound he again traded with Indians, but he returned southward without landing on the coast of British Columbia. It should be noted, though, that Bodega y Quadra and his pilot Maurelle executed the first survey in Southeast Alaska. In 1775 they landed and "took possession" of the territory adjacent to Mount Edgecumbe, sailed northward and turned back at about latitude 58 degrees, and on their return journey entered, named, and in part surveyed Bucareli Bay. In 1779, accompanying Ignacio Arteaga, they resumed their survey of Bucareli Bay, and, while searching for a passage to the Atlantic Ocean, entered Prince William Sound, where they landed on Montague Island and "took possession" of a harbour that they named Port Santiago. As the journals of these navigators were long kept secret by the Spanish Government, a copy of Maurelle's journal alone escaping to be published in London in 1781, many of the place names applied by them did not survive.

The second phase of exploration by the Spaniards, and that which had the most effect on the place names along the coast, took place during their occupation of Nootka from 1790 to 1792. In 1790 Manual Quimper in a confiscated British vessel made a rough exploration of Juan de Fuca Strait; and Salvador Fidalgo visited Prince William Sound and Cook Inlet. During 1791 Francisco Eliza, accompanied by Jose Maria Narvaez, explored Georgia Strait northward for about 100 miles; and Alexandro Malaspina, an Italian in the employ of Spain, sailed between Prince William Sound and Mount Fairweather in search of the supposed passage to the Atlantic. During the last year of the occupation, 1792, Jacinto Caamano surveyed southward from Bucareli Bay; and Dionisio Galiano and Cayento Valdes continued the work in Juan de Fuca Strait commenced by Quimper and Eliza. This expedition of Galiano and Valdes was the last voyage of discovery made by the Spaniards on the northwest coast of America, and the only one up to that time of which an account was published with the consent of the Spanish Government.

III. The British

On his third great voyage of discovery, Captain James Cook, sailing in the *Resolution* and accompanied by Captain James Clerke in the *Discovery*, entered Nootka Sound in April 1778. There he made a survey, the plan of which was not superseded until 1862, when Captain George Richards made his survey of the sound. But as the primary purpose of Cook's voyage was for the discovery of a passage to the Atlantic, supposed to exist somewhere near or above latitude 60 degrees, he made his next landfall in the vicinity of Bucareli Bay. Sailing northward he passed Quadra's "Mount Jacinto" (to which he gave its present name, Mount Edgecumbe), named Mount Fairweather and Cross Sound, passed Dry Bay, which he supposed to be the place of Bering's anchorage, and accordingly named "Beerings Bay", and identified Mount St. Elias as the peak discovered by Bering in 1741. Westward from Mount St. Elias he carefully surveyed the coast, assigning many of the names applied by Bering to places that seemed to correspond to those described in the narrative of Bering's voyage, besides add ng a great number of his own. North of Unalaska he was turned back by ice in latitude 70° 41′.

In February 1779, Captain Cook was killed by natives in the Hawaiian Islands. Later in the year the *Resolution* and the *Discovery* returned to the Arctic under the leadership of Captain Clerke on their second unsuccessful search for the northeast passage. On their return journey to England the crews of the two vessels sold in Canton, China, the unspoiled third of the furs they had obtained the previous year "for a sum that did not fall short of 2,000 pounds sterling".

The news of this profitable sale aroused considerable interest in England, and a few years later about a dozen British navigators, some of whom flew the flags of foreign nations to avoid paying the fees of the East India and South Sea Companies, which held monopolies on the coastal trade, cruised along the coast from the latitude of Columbia River to Unalaska. Although these men were primarly fur traders, they were also experienced navigators, and charted many geographical features in the course of their voyages. The first to arrive was James Hanna, who sailed from Macao, a Portuguese colony in China, making Nootka his base of operations. Notable among others who traded along the coast in the following years were John Meares, whose vessels were to become involved in the Nootka controversy; Nathaniel Portlock, who gave its present name to Salisbury Sound; George Dixon, after whom Dixon Entrance was named; and Charles Barkley, who named Juan de Fuca Strait, believing it to be the inlet reported by the Greek navigator of that name in the employ of Spain in 1592.

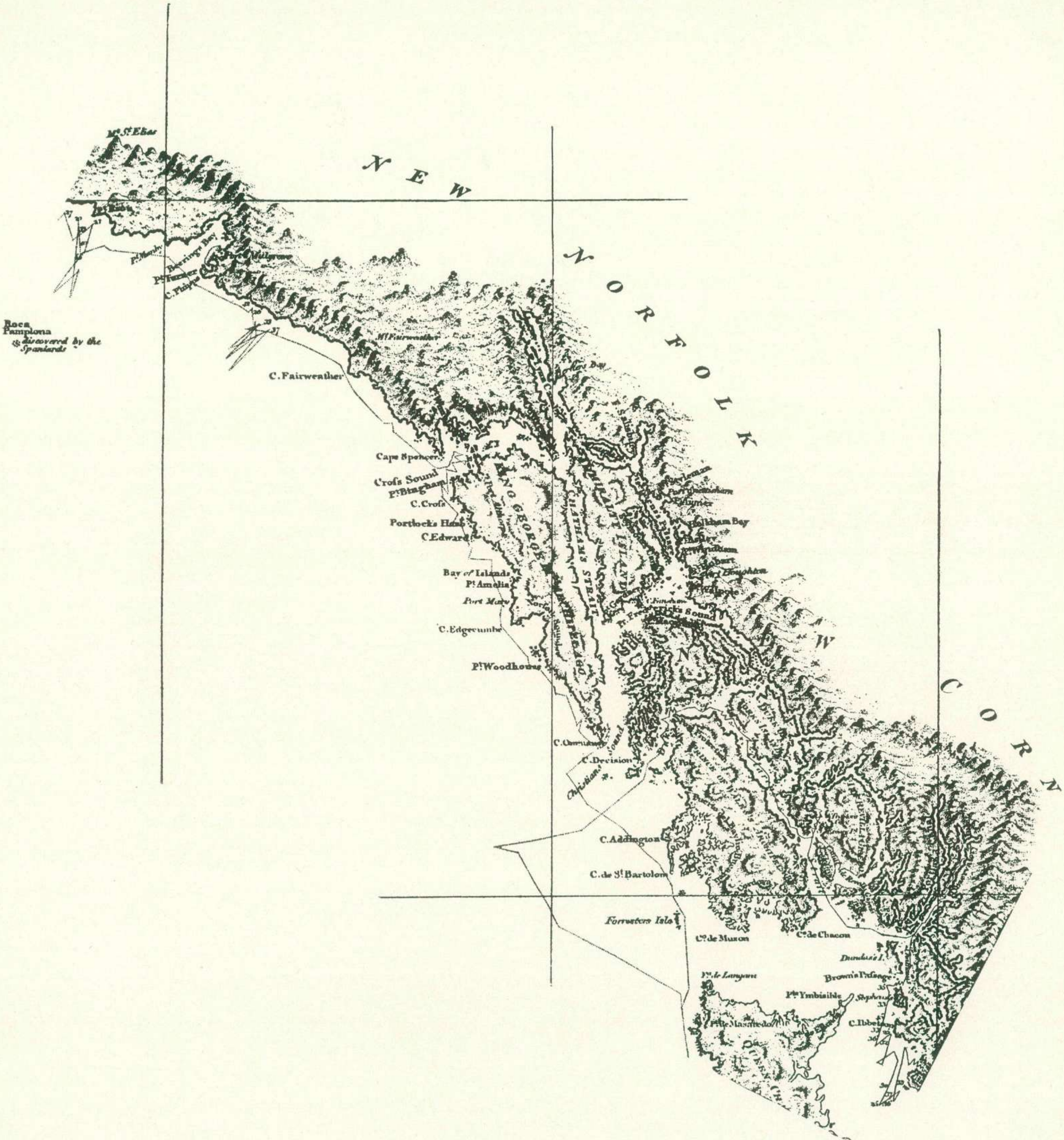
The most thorough exploration, however, of the northwest coast was made by Captain George Vancouver in the years 1792-94. In addition to his commission to negotiate with Quadra at Nootka, Vancouver received instructions to make an accurate survey of the coast of North America from latitude 30 degrees towards Cook Inlet, "principally with a view to ascertain the existence of any navigable communication between the North Pacific and Atlantic Oceans". Early in May 1792, sailing in the *Discovery* and accompanied by Commander William Broughton in the *Chatham*, he arrived at Port Discovery in Juan de Fuca Strait. From there the first of the boat expeditions that were to survey the numerous inlets and islands of the coast left his vessels to enter Puget Sound. Returning from Puget Sound the two navigators met the vessels of the Spaniards, Galiano and Valdes, and the British and Spaniards continued together their survey of the Strait of Georgia. Leaving the Spaniards after about 3 weeks, the British passed through Johnstone Strait, emerged into Queen Charlotte Sound, and conducted their last boat expedition of the season from an anchorage in Fitzhugh Sound, after which they sailed to Nootka. Leaving Nootka on October 13, the expedition sailed to Monterey in southern California. Broughton then left for England with dispatches. Lieutenant Peter Puget, being promoted to the command of the *Chatham*, accompanied Vancouver westward to winter in the Hawaiian Islands.

Vancouver and Puget resumed their survey in the spring of 1793 from an anchorage in Burke Channel. On July 23 the *Discovery* and *Chatham* were anchored in Observatory Inlet, there to remain until August 17, while Vancouver conducted the boat expedition that surveyed Observatory Inlet, Portland Canal, Pearse Canal and its various inlets, the Boca de Quadra, and Behm Canal. Regarding this excursion, Vancouver writes: "We had traversed seven hundred geographical miles without having advanced our primary object of tracing the continental boundary more than twenty leagues from the station of our vessels. Such were the perplexing, tedious and laborious means by which alone we were enabled by degrees to trace the northwestern limits of the American Continent". Upon leaving Observatory Inlet, Vancouver and Puget continued their work northward, their most northerly anchorage of the season being at Port Protection, at the north end of Prince of Wales Island.

Early in 1794 the two navigators sailed northward from the Hawaiian Islands to Cook Inlet. In Prince William Sound, Vancouver was allowed by the resident Russians to make a copy of a chart executed in 1789-90, from which he adopted for his own chart the configuration from Cape Trinity to Point Banks. There also Vancouver was informed that Port Etches in the sound was the most easterly Russian settlement on the coast. Eastward, in Yakutat Bay, Puget met a hunting party of ten Russians accompanied by fourteen hundred Aleuts in seven hundred kayaks (small skin canoes) in quest of sea otter and other skins. Early in July in Cross Sound the *Arthur*, of Bengal, appeared, under the command of Captain Barber; and, out of consideration for the trader, Vancouver stopped all dealing in furs by his own men. On August 1 the *Discovery* and *Chatham* were anchored at Port Conclusion, at the south end of Baranof Island, from which point Vancouver and Puget concluded their survey of the northwest coast of the continent.

The charts executed by Vancouver's expedition continued to be the most reliable source of information regarding many parts of the coast until some time after the purchase of Alaska by the United States; and furthermore, in addition to respecting the names applied by previous explorers, he added to his charts a mass of new ones, which were so fully described that they remain unchanged to the present day.

We have no records of British Admiralty surveys on the coast from Vancouver's time until 1837, when Sir Edward Belcher made observations for longitude, time, azimuth, etc., in Yakutat Bay, Icy Strait, and Nootka Sound. But in 1846, when the International Boundary was extended



Part of Captain George Vancouver's map of the Northwest Coast of America, published in London, 1798.

across the Rocky Mountains to the Strait of Georgia, Captain Henry Kellett in the surveying ship *Herald*, accompanied by Lieutenant Commander James Wood in the small vessel *Pandora*, commenced charting the coast from Juan de Fuca Strait northward. In the following year Kellett joined Sir Edward Belcher's expedition in search of the missing Arctic explorer, Sir John Franklin, and the work was continued by Wood, to be terminated in 1848 at Drury Inlet in Queen Charlotte Sound. In 1854, George Inskip, master of the paddle-sloop *Virago* under Sir James Prevost, charted some harbours on the north and west coasts of the Queen Charlotte Islands and at Port Simpson. Then, in 1858, 2 years after Prevost had been appointed first British Commissioner for settling the San Juan boundary question, Captain George Richards, appointed second British Commissioner, commenced a survey of the vicinity of San Juan Island in the steam-sloop *Plumper*. Richards continued his work northward; but in 1860 the *Plumper*, proving too small, was replaced by the paddle-sloop *Hecate*. When Richards returned to England in 1863, Daniel Pender, master of the *Hecate*, was placed in command of the hired Hudson's Bay paddle-steamer *Beaver*. Pender terminated his operations in 1870, by which time the coast had been more or less completely surveyed from Juan de Fuca Strait to the head of Portland Canal. In 1898 the steam-screw ship *Egeria*, under Commander Robert Smyth, arrived from England to resurvey and continue the work of Richards and Pender. The *Egeria*, under various commanders, was engaged in hydrographic work along the coast until some time after the Convention of 1903 was signed.

IV. The French

There were few French navigators along the northwest coast during the period we have under review, and they were chiefly concerned with the acquisition of furs. Commander Jean François de la Perouse, however, was interested primarily in exploration. In the course of a journey around the world he arrived off Yakutat Bay in 1786, "to explore the parts of the northwest coasts of America which had not been examined by Cook, and of which Russian accounts gave no idea, in order to obtain information respecting the fur trade; and also to learn whether, in those unknown parts, some river or internal sea might not be found communicating with Hudson's Bay or Baffin's Bay". He named Yakutat Bay "Baie de Monti"; then, sailing southward, he entered and made a survey of Lituya Bay, which he called "Port des Francais". There he lost two boats and twenty-one men in the bore at the entrance. After erecting a monument to the drowned men he sailed southward, not landing until he reached Monterey.

V. The Americans

Captains John Kendrick and Robert Gray were the first American traders to appear on the northwest coast. They anchored in Nootka Sound in the autumn of 1788, and in the following year witnessed the seizure by the Spaniard, Estevan Martinez, of the vessels of Meares' expedition under the command of Captains Colnett and Hudson. In addition to gathering furs, they spent some time in exploration. Gray in the autumn of 1789 carried a cargo of furs in the *Columbia* to sell at Canton, China; there he took on a cargo of tea, with which he entered Boston in the summer of 1790, having carried the flag of the United States around the world for the first time. In 1792 he discovered Columbia River, which Vancouver had passed without seeing. To Kendrick is accredited the first navigation of the straits behind Vancouver Island. But although from that time forward other American traders visited the coast (Baranof complained in 1801 that during the past 2 or 3 years six or eight of them traded on the Russian American coast), little or no further interest was manifested by them in the exploration or charting of the coast until the purchase of Russian America and its change of name to Alaska by the United States in 1867.

The United States commenced surveying operations in the newly acquired territory on a small scale. In the year of the purchase Assistant George Davidson, of the Coast and Geodetic Survey, was employed in triangulation and the determination of latitude, longitude, and magnetic elements at Chilkat Inlet, Sitka, and points on the Northwest Alaska coast. Two years later he observed the total solar eclipse at Pyramid Island in Chilkat River, and determined the latitude and longitude of that point. The second expedition, 1871-73, under Assistant W. H. Dall, accompanied by Marcus Baker, confined its operations to the Northwest Alaska coast. In 1874, however, Dall commenced coast reconnaissance northwesterly from Sitka, checked the charts of some of the early explorers, and determined the heights of Mounts St. Elias, Fairweather, and other peaks.

The successive surveys that were to result in the publication of the Coast and Geodetic Survey charts were commenced in 1881 by officers of the navy. In that year Captain L. A. Beardsley worked in Cross Sound, and from 1881 to 1883 Lieutenant Commander H. E. Nichols, in command of the steamer *Hassler*, made surveys in the Alexander archipelago. In 1884 Lieutenant Commander A. S. Snow assumed command of the *Hassler*; and in that year, also, the Coast and Geodetic Survey Steamer *Carlile P. Patterson* was built for service in Alaskan waters. The surveys were actively carried on along the coast until 1888, when the *Patterson*, under the command of Lieutenant Commander Thomas, and the new steam-launch *Cosmos*, were diverted southward to make preliminary surveys of the International Boundary waters from Cape Muzon to the head of Portland Canal. These surveys were continued until 1891, when they were suspended following the protest of the Canadian Government (*See* page 191). During and after the joint survey of 1893-94-95 the triangulation was continued along the coast, and in 1901 nine different groups of triangulation, based on independent astronomic data, were joined to make a continuous scheme on one datum, known as the Southeast Alaska datum. Eight astronomic longitude stations, all chronometric, were used in determining the adopted geodetic longitude, and the adopted geodetic latitude was based on thirty-two observed latitudes. The triangulation being too weak to carry the azimuth, the azimuths were adjusted to fit the various astronomical azimuth determinations.[1]

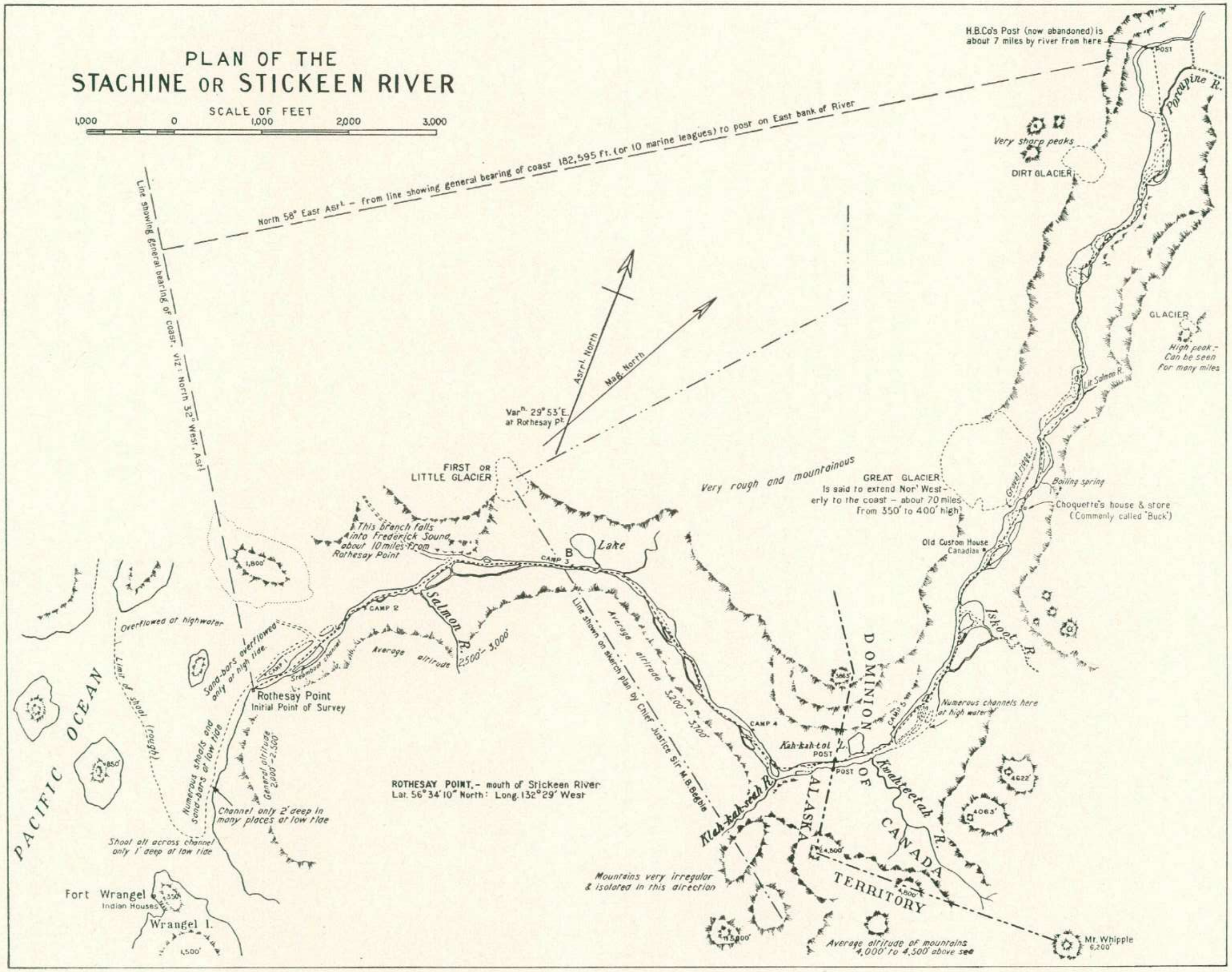
VI. The Interior

The first explorations of the interior have been dealt with in our "Historical Sketch". After the Hudson's Bay Company assumed control of New Caledonia in 1821 their employees travelled immense distances in their search of suitable posts for the fur trade. Between 1823 and 1825 John McLeod followed Liard River and explored far into the Rocky Mountains. In 1824-25 Samuel Black ascended the Finlay, a western branch of Peace River. In 1838 Robert Campbell, after establishing a post on Dease Lake, passed over the height of land to Stikine River; and 2 years later he ascended the north branch of the Liard, discovered Lake Frances, and descended a wide river that he called the Pelly, after the governor of the Hudson's Bay Company. In 1847 Alexander Murray passed down Porcupine River, where he built Fort Yukon. Finally, in 1851, to complete the round of discovery, Campbell descended Pelly and Yukon Rivers to Fort Yukon.

Commencing in 1859, the Royal Engineers made surveys along the rivers in the southern part of the newly formed colony of British Columbia, and subsequently a few road and trail surveys were made by civil engineers. But it was not until 1871, when the first Canadian civil engineers arrived in Victoria to make investigations for a route for the Canadian Pacific Railway, that any extensive surveys were made. On July 20 of that year, the day that union with the Dominion of Canada was formally consummated, the first survey party left Victoria for the mountains. Of the many routes investigated, the most northerly was up the valley of Peace River, across the mountains, and down Skeena River to Port Essington. By 1878 the total length of explorations in connection with the Canadian Pacific Railway exceeded 47,000 miles[2].

The events anteceding the survey of Joseph Hunter on Stikine River have also been noted in our "Historical Sketch". Hunter, a civil engineer on the staff of the Canadian Pacific Railway in British Columbia, went into camp with his party at the mouth of the Stikine on April 2, 1877,

[1] This triangulation was later incorporated in the 1927 North American geodetic datum.
[2] History of British Columbia; Alexander Begg, C.C. Toronto, William Briggs, 1894, p. 413.



Copy of Joseph Hunter's plan of Stikine River, June 30, 1877.

and completed his survey on May 3 of that year. Point Rothesay, on the coast at the delta of the Stikine, was identified, and there an earth mound with a wooden post at the centre was erected to mark the commencement of the survey. A transit and chain traverse was run up the valley of the river, mostly on the ice, for a distance of about 54 miles; the bearings were checked by true azimuths, and the positions and heights of the highest mountains were determined by triangulation and sextant altitude. Although a point was marked that was ten marine leagues from the coast, Hunter found that the line "following the summit of the mountains parallel to the coast" crossed the river at a point 24·74 miles by the river from Point Rothesay, and from the coast in a direction at right angles thereto at a distance of 19·13 miles. This line he concluded to be the boundary line under the terms of the Anglo-Russian Treaty of 1825, and, accordingly, marked it on each side of the river with a wooden post protected by log cribbing. This line, as laid down by Hunter, coincided with the line that was eventually marked as the true boundary under the provisions of the Award of the Alaska Boundary Tribunal.

On March 7, 1871, the Dominion Lands Office, charged with the management of the Northwest Territories, was established. During the next month a system of surveys was submitted to the Government, which received approval. In the following years the surveys of Dominion Lands more or less kept pace with the construction of the Canadian Pacific Railway, and in 1884, a year before the last spike for the railway was driven, they were commenced in the "Railway Belt" of British Columbia. It was in the course of these surveys in the mountainous regions of southern British Columbia that the method of phototopographic surveying, to be extensively used in the surveys of the Southeast Alaska boundary, was first used on this continent, by J. J. McArthur, D.L.S.[1]

Although the Geological Survey of Canada also commenced operations in British Columbia in 1871, for many years their survey parties worked only in the southern areas. In 1879, however, Dr. G. M. Dawson of that organization accompanied as geologist the party investigating the route above mentioned between Peace River and Port Essington.

The first survey by the Geological Survey of Canada of the boundary region was that conducted by Dr. Dawson in 1887. Starting at the mouth he ascended Stikine River to Telegraph Creek, leaving behind his assistant, R. G. McConnell, to make a micrometer survey up the river from Joseph Hunter's line of 1877. From Telegraph Creek his party made a carefully paced traverse to Dease Lake, the centre of the Cassiar mining district; and northward from Dease Lake they made a detailed track survey of Dease, Upper Liard, and Pelly Rivers, connecting their work with William Ogilvie's line at the confluence of Pelly and Lewes Rivers. They then ascended the Lewes and crossed over Chilkoot Pass to the head of Lynn Canal.

While Dr. Dawson was engaged to the eastward, William Ogilvie, D.L.S., of the Canadian Department of the Interior, started a similar survey from the astronomical point established by Professor Davidson on Pyramid Island in 1869. From there he carried a micrometer traverse over the peninsula to Chilkoot Inlet, up Taiya Inlet, over Chilkoot Pass, and down Lewes River At the head of Taiya Inlet, a Captain Moore, who accompanied him, volunteered to investigate the existence of a pass reported by Indians to lie between the head of Skagway River and the headwaters of the Lewes. He incorporated the information obtained from Moore's report in the plan of his survey, naming the pass "White Pass" in honour of the Honourable Thomas White, Minister of the Interior. At the confluence of Lewes and Pelly Rivers, as arranged, Ogilvie met Dr. Dawson, and after spending, he says, "three days' hard work" on "a correspondence designed to satisfy my friends and acquaintances for the ensuing twelve months", he continued his survey to the vicinity of the crossing of the 141st Meridian on Yukon River. Having determined the longitude of a point on the river and marked a temporary boundary line, in the spring of 1888 he crossed over from the Yukon to the Porcupine watershed, descended the Porcupine to the Bell, crossed the divide, and reached Fort McPherson on Peel River. From there he ran a micrometer traverse down the Peel and up the Mackenzie, eventually reaching Edmonton, after

[1] His Britannic Majesty's Commissioner, 1917-1924.

having accomplished as a result of 20 months' work a good determination of the boundary on Yukon and Fortymile Rivers, about 1,900 miles of instrumental survey and nearly 800 miles of track survey.

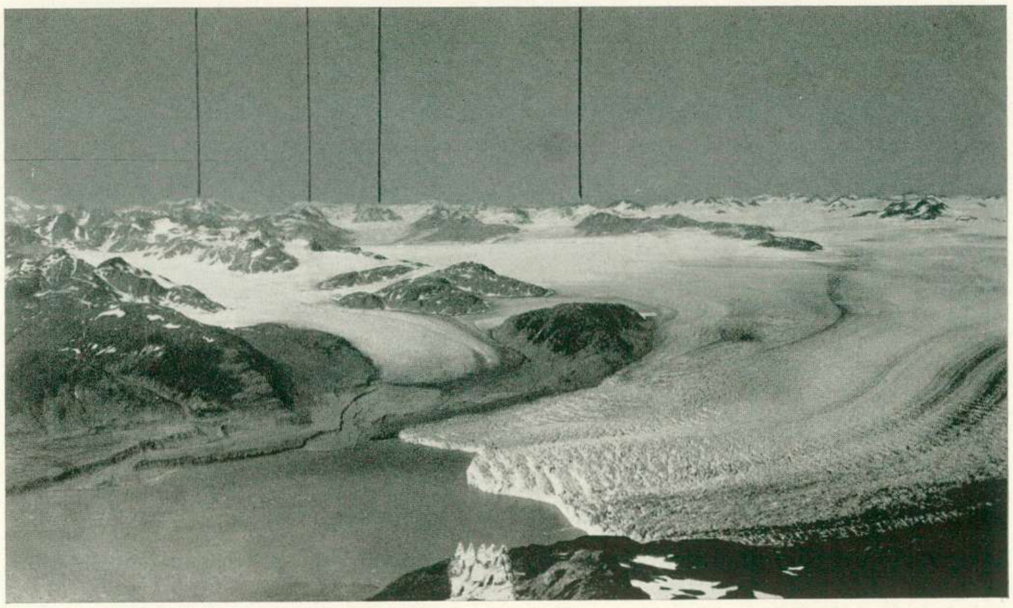
Ogilvie, however, did not make the first survey from the head of Taiya Inlet to the Yukon. This was done in 1883 by Lieutenant Frederick Schwatka of the United States Army, who made a military reconnaissance over Chilkoot Pass (which he named Perrier Pass), and descended Yukon River from its source to its mouth on a raft. In 1886, Schwatka led a New York Times expedition to make explorations in the Mount St. Elias region, and in 1891 another expedition under his leadership was organized by a syndicate of newspapers for exploring parts of the Yukon basin. Schwatka's original plan for this last expedition was to go over Chilkoot Pass once more, but on reaching Juneau he decided, at the request of the citizens, to go in by way of Taku River, in order to determine whether a trail for pack animals could be constructed over that route. At the head of Taku Inlet a track survey was begun and carried continuously by way of Teslin Lake to the confluence of Teslin and Lewes Rivers, where it connected with Ogilvie's line of 1887. From there the survey was continued down the Lewes and Yukon to White River, which was ascended. The party then crossed over Skolai Pass in Alaska and descended Chitina and Copper Rivers to the ocean. In his map Schwatka incorporated Lake Kusawa and the Takhini River regions from data furnished by E. J. Glave in 1890, and the Muir Glacier from a plane-table survey made by Professor H. F. Reid, also in 1890.

E. J. Glave had accompanied the expedition sent north in 1890 by Frank Leslie's Illustrated Newspaper, under the leadership of E. H. Wells. From Pyramid Harbour the party ascended Chilkat and Kelsall Rivers, crossed over Chilkat Pass, and descended Takhini River. At Kusawa Lake, Glave, accompanied by John Dalton, left the main party, crossed to the headwaters of Alsek River, and descended that river in a canoe. The rest of the party completing the survey of the lake and its outlet, floated down the Yukon on a raft, and, entering Alaska, continued their exploration in that territory.

VII. Glaciers

John Muir, a celebrated American naturalist, in 1879-80 made a number of canoe and land explorations in his search for and studies of glaciers. In the former year, accompanied by the Reverend S. Hall Young, he entered Glacier Bay, at the head of which he discovered the Grand Pacific Glacier, so named by him, and the glacier that now bears his name. In the following year he resumed his search for glaciers northerly from Wrangell. To one that he discovered he applied the name of his companion, Young; but some time later Young complained that to this glacier "some late chart-maker substituted the name Dawes, thus committing the larceny of stealing his glacier". Late in the season, having again visited Glacier Bay, Muir turned his canoe toward Sitka. In 1890 he returned to Glacier Bay, this time on the steamer *Queen*, accompanied by Professor H. F. Reid, who made the before mentioned plane-table survey, and Professor H. P. Cushing. On this occasion Muir made a sled trip, alone, up the Muir Glacier, westward to the confluence of the Grand Pacific and Melbern Glaciers, and down the west side of the Grand Pacific to its front. In 1897, Muir accompanied Professor C. S. Sargent and Mr. W. M. Canby on an expedition to study forest trees in British Columbia and Alaska, and in 1899 he was a member of the Harriman Alaska expedition.

Glaciers were an absorbing subject of study during this period, owing to the rapidity with which some were retreating and others apparently advancing. Dr. G. K. Gilbert, in his "Alaska; Glaciers and Glaciation", stated that the Nunatak Glacier between Professor I. C. Russell's visit in 1891 and his own visit in 1899 with the Harriman Expedition retreated fully a mile and possibly twice as much; Muir Glacier between 1880 and 1899 retreated $1\frac{1}{2}$ miles, and after the earthquake of 1899 retreated about 3 miles more. On the other hand, glaciers like the Columbia and La Perouse were then probably at their maximum, having been much smaller during the previous 100 years. But the glacier that showed the greatest amount of change was the Grand



Muir Glacier front 1894. From left to right, Boundary Points 160, 159, 158, 157.

Pacific. When Icy Strait was visited by Vancouver in 1794 the glacier front was within a few miles of the entrance to Glacier Bay; hence the bay was not shown on Vancouver's chart. The first recorded entrance of the bay was made by Lieutenant Charles Wood, of the United States Army, who sailed in 1877 from Portland, Oregon, on an exploratory cruise of the coast; he went up the bay 40 miles in a northwesterly direction and came upon an Indian village, but he does not record that he saw any glaciers. When the bay was visited by Professor John Muir in 1879 the glacier front had receded about 50 miles since Vancouver's time. The first official record of the position of the face of the glacier was that of William Ogilvie during the exploratory survey of 1894, when it was found to be at the westerly and northeasterly shores of the island between Reid and Tarr Inlets, about 52 miles from the entrance of Glacier Bay and 12 miles southerly from the boundary.[1]

VIII. Mount St. Elias

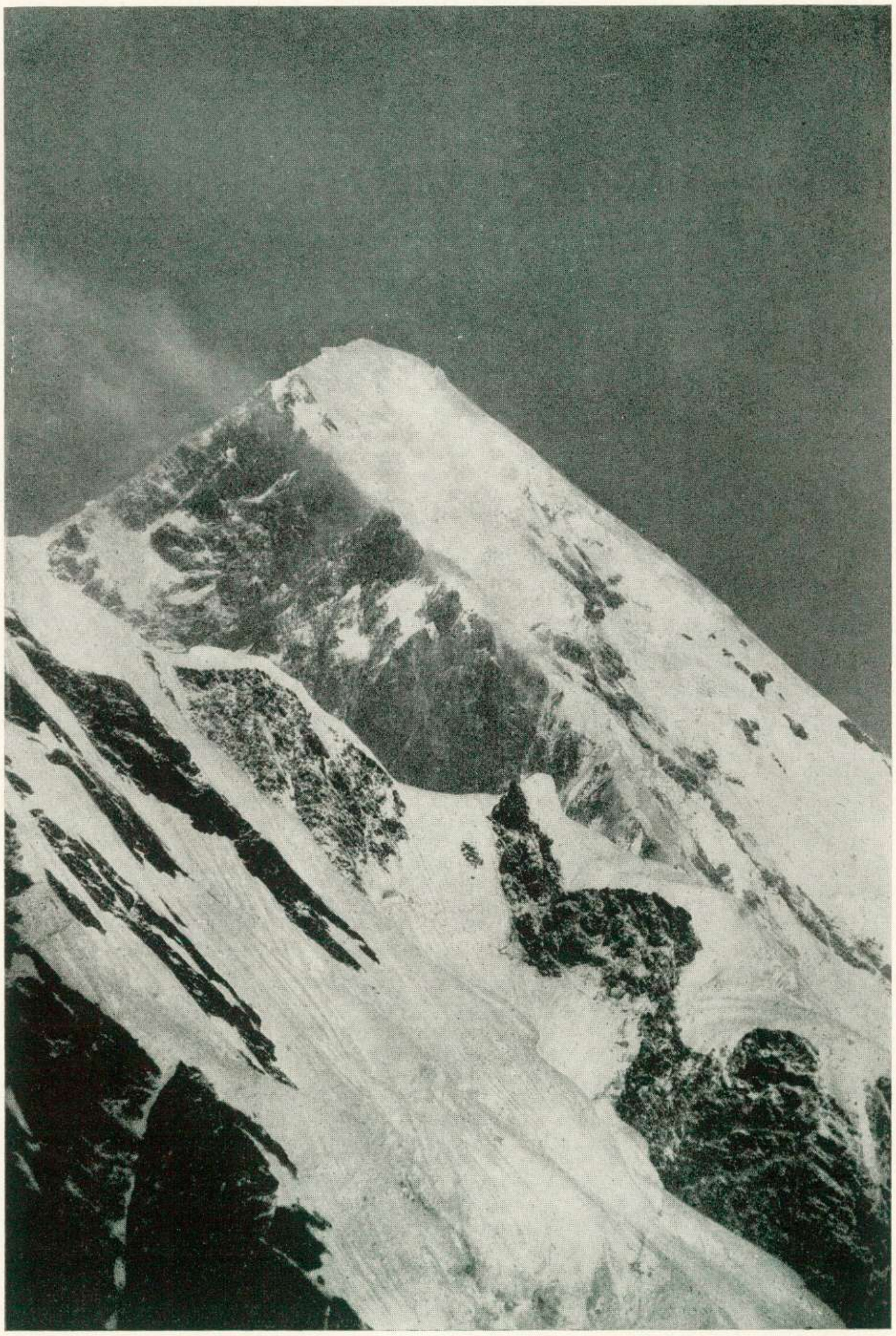
Lieutenant Schwatka's expedition of 1886 made the first of a series of attempts to reach the summit of Mount St. Elias. Landing at Icy Bay, they travelled about 16 miles due north, but were forced to turn back at an elevation of about 7,000 feet. Two years later another attempt was made by an expedition under W. H. and E. Topham, of London. They followed the route of Schwatka's party, but went farther to the southwest flank of the mountain, and succeeded in reaching an altitude of 11,400 feet before they were compelled to retire.

The scientific interest aroused by these two expeditions resulted in the dispatch of a third in 1890 under the auspices of the National Geographic Society and the United States Geological Survey, under the direction of Professor I. C. Russell. Russell spent 3 months on the glaciers below the mountain, and although he attained an altitude of only 8,000 feet, his report contains the best and most complete information of the glacial formation of the region, as well as other valuable scientific data. In the following year, profiting by the experience gained on the glaciers, Russell met with better success, and, although unable to reach the summit, he attained an elevation of 14,500 feet at a point on the northeast shoulder.

In 1892, Mount St. Elias was again a centre of attraction, though for a different reason. The observations by W. H. Dall in 1874 had placed the mountain in United States' territory,

[1] *See* pages 122 and 144.

slightly west of the 141st Meridian. When the boundary between Canada and Alaska was under discussion in the early nineties, it became desirable to confirm this position by a more accurate location of the peak, and in 1892 a party of the United States Coast and Geodetic Survey



The summit of Mount St. Elias from the east (from a photograph by H.R.H., the Duke of the Abruzzi).

under Assistant J. E. McGrath made an extensive trigonometric survey of the vicinity of Yakutat Bay. This survey placed the summit of the mountain in latitude 60° 17′ 35″.10 and longitude 140° 45′ 47″.32, and it thus became one of the boundary peaks for Southeast Alaska, as it was east of the 141st Meridian. At the same time the elevation was determined to be 18,024 feet.

In 1897 the New York Times sent out their second expedition, under Mr. H. S. Bryant, to attempt to reach the summit of Mount St. Elias. Approaching from the south, they were unable to get above 8,000 feet.

Lieutenant H. W. Seton-Karr, R.N., who had accompanied Schwatka's expedition in 1886, predicted that if the mountain was to be ascended at all, it would only be accomplished by experienced Alpinists. The truth of this prediction was proved by the success of the expedition of the celebrated mountaineer, H.R.H. the Duke of the Abruzzi, during the year in which Bryant made his unsuccessful attempt. In the previous year the Duke had decided to make an attempt at the ascent of Nanga Parbat, a giant of the Himalayas, rising 26,000 feet above the sea, but he was forced to abandon this enterprise by a famine and severe plague in one of the provinces through which his caravan would have to pass. As he was not to be denied a climb, Mount St. Elias became his goal. With four picked Italian guides and four other companions he left Turin in April 1897 and proceeded to Alaska by way of London, New York, and Seattle. He landed in Alaska on June 23, near the mouth of Osar River, and after 38 days of exertion and hardship on the glaciers, the gallant little band planted the tricolour of Italy on the summit of Mount St. Elias.

IX. The Preliminary Survey of 1893-94-95

Report of Messrs. Duffield and King, December 31, 1895

THE undersigned, William Ward Duffield, on behalf of the United States of America, and William Frederick King, on behalf of Her Britannic Majesty, duly appointed Commissioners under and by virtue of the First Article of the Convention of July 22nd, 1892, between the United States and the United Kingdom of Great Britain and Ireland, have the honour to submit the following joint report of our proceedings and transactions under the said First Article of the Convention which reads as follows:—

"The High Contracting Parties agree that a coincident or joint survey (as may be found in practice most convenient) shall be made of the territory adjacent to that part of the boundary line of the United States of America and the Dominion of Canada dividing the Territory of Alaska from the Province of British Columbia and the North-West Territory of Canada, from the latitude of 54° 40′ North to the point where the said boundary line encounters the 141st degree of longitude westward from the meridian of Greenwich, by Commissioners to be appointed severally by the High Contracting Parties, with a view to the ascertainment of the facts and data necessary to the permanent delimitation of said boundary line, in accordance with the spirit and intent of the existing Treaties in regard to it between Great Britain and Russia and between United States and Russia.

"Application will be made without delay to the respective legislative bodies for the appropriations necessary for the prosecution of the survey, and the Commissioners to be appointed by the two Governments shall meet at Ottawa within two months after said appropriation shall have been made, and shall proceed as soon as practicable thereafter to the active discharge of their duties.

"The respective Commissions shall complete the survey and submit their final reports thereof within two years from their first meeting.

"The Commissioners shall, so far as they may be able to agree, make a joint report to each of the two Governments, and they shall report, either jointly or severally, to each Government on any points upon which they may be unable to agree.

"Each Government shall pay the expenses of the Commission appointed by it.

"Each Government engages to facilitate in every possible way any operations which, in pursuance of the plan to be agreed upon by the Commissioners, may be conducted within its territory by the Commission of the other.

"The High Contracting Parties agree that, as soon as practicable after the report, or reports, of the Commissioners shall have been received, they will proceed to consider and establish the boundary line in question."

The first meeting of the Commissioners appointed under this Article was held at Ottawa on the 28th day of November, 1892. By the supplementary Convention of the 3rd February, 1894, the time for the completion of the work and the submission by the Commissioners of their joint or separate reports, which, by the former Convention, expired two years from the date of the first meeting of the Commissioners, that is to say, on the 28th November, 1894, was extended to the 31st December, 1895.

The Treaties relating to and defining the international boundary line between Canada and the United States of America in the region in question are the Treaty between Great Britain and Russia, dated 28th February, 1825, and the Treaty between the United States and Russia, dated 30th March, 1867.

Our Commission, under said Article I of the Convention of 1892, applies only to that portion of the boundary described in these Treaties from the southernmost point of Prince of Wales Island to the 141st Meridian.

With a view to the performance of the duty imposed upon the Commissioners under the Convention of ascertaining the facts and data necessary to the permanent delimitation of the boundary line, and under the option allowed them of making either a coincident or joint survey, Dr. Thomas C. Mendenhall, at the time Commissioner for the United States (since replaced by the undersigned, William Ward Duffield), together with the undersigned British Commissioner, having considered the large extent of unknown territory involved and the comparatively short time allowed for the survey, determined that it was advisable to make the survey a joint one; that is, to partition among the officers working under them respectively the territory to be surveyed, arranging at the same time that each Commissioner should detail attachés to accompany the several surveying parties of the other, for the purpose of observing and verifying their work.

The United States Commissioner undertook to make surveys of as precise a nature as practicable of the principal water courses which traverse the coast strip; and the British Commissioner undertook to make a photo-topographical survey of the mountainous regions lying between these various water courses.

A preliminary trigonometrical survey of the principal deep-water passages, including the continental shore line from Portland Canal to Lynn Canal, had already been completed by the United States Coast and Geodetic Survey, and careful determinations of the geographical positions of Mount St. Elias (as hereinafter given) and of various mountain peaks in that region, were made by the same organization in 1892, at which time a partial survey of the shore line of Yakutat Bay was also made. This completed work helped to co-ordinate the detached surveys of the various parties sent out by the two Commissioners.

In pursuance of this plan, during the year 1893, the following gentlemen were given parties on behalf of the United States, namely:—

Mr. Dickins, on the Unuk River.

Mr. Tittmann, on the Stikine River.

Mr. McGrath, on the Taku Inlet.

Mr. Ogden, on the Taku River.

Their duties were to make surveys of these waterways, and to procure as much information as possible as to the topography of the adjacent regions. Mr. Driscoll accompanied Mr. Ogden as attaché appointed by the British Commissioner, and Mr. Robertson accompanied Mr. Tittmann in a like capacity. Mr. Dickins' survey of the Unuk River was made in conjunction with Mr. Saint Cyr, of the British Commission, who, besides making a traverse of the Unuk River, paid particular attention to the mountainous regions on either side of the river.

On behalf of the British Commission, the following gentlemen were placed under instructions to make topographical surveys as full and complete as their means would allow:—

Mr. Saint Cyr, the Unuk River and the mountainous regions on either side of it.
Mr. Klotz, adjoining him to the west and northwest, towards Bradfield Canal.
Mr. Talbot, to the south and east of the Stikine.
Mr. Gibbons, to the west of the Stikine.
Mr. Brabazon, at Holkham Bay, on the east side of Stephen's Passage.
Mr. McArthur, at Snettisham Bay, and thence to Taku Inlet and Taku River.
Mr. Ogilvie, to the north and west of Taku Inlet, and east of Lynn Canal.

The attachés of the United States Commissioner accompanying them were as follows:—

Mr. Flemer with Mr. Talbot.
Mr. Pratt with Mr. Gibbons.
Mr. Ritter with Mr. Brabazon.
Mr. Welker with Mr. McArthur.
Mr. Hodgkins with Mr. Ogilvie.
Mr. Dickins, working with Mr. Saint Cyr, as above stated.

In addition to the above, the United States Commissioner stationed Mr. Morse at Sitka to make astronomical observations for the determination of chronometric differences of longitude between Sitka as a base station and the observatories established by Mr. Dickins at Burroughs Bay with Dr. Edmonds as observer, by Mr. Tittmann at Fort Wrangell with Mr. Putnam as observer, and by Mr. Ogden at the mouth of the Taku River with Mr. French as observer. At each of the above stations latitude and longitude were also determined. The United States steamer *Hassler* was employed throughout the season in making the necessary exchanges of time, the chronometers being in charge of Mr. Lord.

The parties were on the ground and the work begun in the middle of May; and the early snow falls rendering mountain work impossible, it was found necessary to retire from the field in September.

During the following year, 1894, the following parties were placed in the field, on behalf of the United States Commission:—

Mr. Pratt on the Chilkat Inlet and River and on Chilkoot and Taiya Inlets and Taiya River, he being engaged chiefly in triangulation.
Mr. Dickins on Unuk River and Chilkat Inlet.
Mr. Flemer on Chilkoot and Taiya Inlets.
Mr. Ritter on Chilkat Inlet and River.
Mr. McGrath on the coast westward from Yakutat Bay and at Lituya Bay.
Mr. Morse at Sitka longitude station.

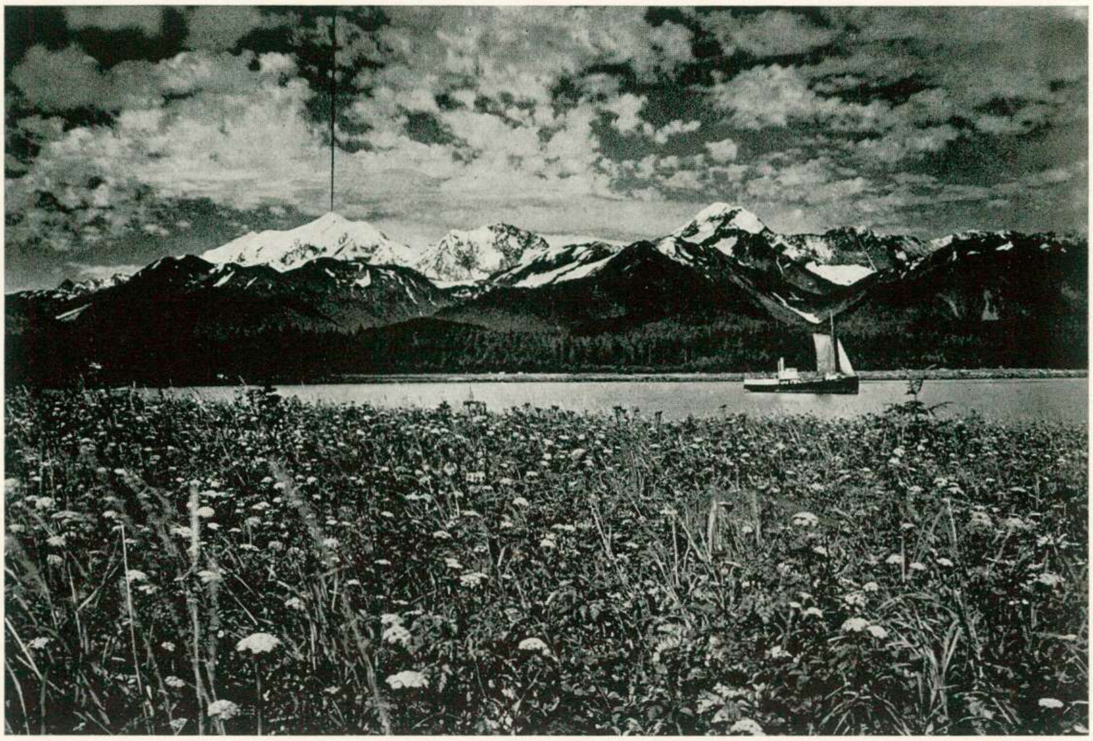
Latitude and longitude were determined at the observatory at Anchorage Point, Pyramid Harbour, the steamer *Hassler* making the necessary chronometer trips as before.

Mr. Hayford made the observations at Pyramid Harbour and Mr. Page had charge of the chronometers on the *Hassler*.

On behalf of the British Commission:—

Mr. Saint Cyr at the head of the Portland Canal and thence to the Chickamin River.
Mr. Klotz around Bradfield Canal.
Mr. Gibbons on the north of Frederick Sound from Horn Cliffs to Port Houghton.
Mr. Ogilvie on the east side of Lynn Canal, also on the outer coast beyond Cape Spencer.
Mr. McArthur at the north end of Lynn Canal and later on the outer coast at Lituya Bay.
Mr. Talbot on the west side of Lynn Canal towards Glacier Bay.

Mr. Robertson accompanied Mr. Pratt's party as attaché for the British Commissioner. Except in this instance the system of attachés was discontinued by mutual consent of the Commissioners.



Mount Fairweather (Boundary Point 164), from Lituya Bay.

During the winter of 1894-95, a party under Mr. Ogilvie ascended the Taku River for the purpose of gaining additional information as to the region extending thence to the vicinity of White and Taiya[1] Passes, which lead from Lynn Canal to the interior, but on account of tempestuous weather the expedition was obliged to return, having accomplished nothing beyond a traverse survey of part of Taku River.

During the season of 1895, Mr. Brabazon was detailed by the British Commissioner to the region lying between the mouth of the Alsek River and Yakutat Bay.

Mr. Welker and Mr. Dickins were sent by the United States Commissioner to connect the surveys made in former years by the United States Coast and Geodetic Survey in Portland Canal with those in Revillagigedo Channel, and to determine more accurately the longitude of the stations along the Canal.

Mr. Dickins and Mr. Welker were placed in charge of parties in Alaska and Mr. Morse was stationed at Seattle as astronomer for the redetermination of the differences of longitude between that point and the observatories at Port Simpson, B.C., at Mary Island, Alaska, and at a station at the head of Portland Canal. The observations for latitude and longitude were made by Mr. French at Port Simpson, by Mr. Dickins at Mary Island, and by Mr. Welker at Lion Point, Portland Canal.

Mr. Young was in charge of the chronometers carried by the steamer *City of Topeka*, between Seattle and the stations at Port Simpson and Mary Island.

Comparisons between Port Simpson and Lion Point were effected by the United States launch *Fuca*.

The results of all these surveys are exhibited in the accompanying Maps, namely, sheets Nos. 1 to 24, made on a scale of $\frac{1}{160.000}$ with contour lines of elevations 250 feet apart, from the surveys of the British Commission; and in Maps Nos. 1 to 12 of the United States Commission, made on the same scale.

[1] The latter pass now bears the name "Chilkoot".

These Maps have been agreed to by us, subject to the limitations hereinafter set forth, as correct representations of the topographical features, and have been signed by us to testify thereto. In submitting two sets of Maps which cover the same ground, and which, to a large extent, have been prepared independently in the offices of the respective Commissioners at Washington and Ottawa, it is understood that wherever there is a difference between the Maps, either from different methods of representing the topography or from discrepancy as to the position of natural features or otherwise, such difference is to be interpreted by reference to the hereinbefore described scheme of partition of the survey work between the respective Commissions; and where the surveys cover the same or nearly the same ground, the Maps are to be taken as mutually explanatory, having regard to the conditions under which each survey was made. The continental shore line, from latitude 54° 40′ to Point Coverden, at the southwesterly entrance to Lynn Canal, having been surveyed by the United States Coast and Geodetic Survey, the United States Map shall, in case of discrepancy, govern as to the shore line; so also from Yakutat Bay to the 141st meridian. But from Point Coverden north-westerly to Yakutat Bay, including Glacier Bay and the other Bays, which, with the exception of the entrance to Lituya Bay, have not been so surveyed, the Maps of the British Commission shall govern. The shore line of the islands of the Alaskan Archipelago have been mapped according to the surveys of the United States Coast and Geodetic Survey, wherever such survey has been made; elsewhere the best information available has been used.

To show the topographical features of the country in another way, we herewith submit photographic views, being contact prints from the photographic negatives of the officers of the British Commission, whose work was largely executed as to the detail or "filling in" by means of these views, according to the method known as photo-topography, the framework being laid out by triangulations which are shown in sheets Nos. 25, 26, 27 and 28 of the British Commission. These views will also serve as a permanent record of the field work. Plans of the triangulation executed by the officers of the United States Commission are submitted herewith on sheet No. 13 of the United States Commission.

Besides the information contained in the Maps, we have to report as to the point of commencement named in the Treaty of 1825, that the latitudes of Capes Muzon and Chacon as determined by the British observers are as follows:—

Cape Muzon 54° 39′ 50″.
Cape Chacon 54° 41′ 25″.

As determined by the United States observers these latitudes are:—

Cape Muzon 54° 39′ 48″.
Cape Chacon 54° 41′ 22″.

These results are so nearly alike that there is no practical discrepancy between them.

Also, the summit of Mount St. Elias is by the best determination in latitude 60° 17′ 35″.10 and longitude 140° 55′ 47″.32, being 28·830 nautical miles from the line of coast west of Yakutat Bay, and 2·41 statute miles east of the 141st meridian.

We conceive it unnecessary for us, having prepared Maps showing so much detail, to enter into a lengthy description of the topography. It may be well, however, to add some remarks upon the mode of occurrence of timber, since this is not shown on the Maps.

Speaking broadly, we may say that the average altitude of the timber line between Burrough's Bay and Lynn Canal is 2,500 feet, being a little higher in the south and a little lower in the north. Timber line is primarily a matter of heat, so that altitude and latitude have similar effects. However, in a country of which so much has but recently been uncovered from glaciers, timber line is affected by another factor, and that is the presence of soil for trees to take root. As the foot of a mountain is first exposed, the forest starts there, and in time, as exposure and consequent disintegration take place, creeps upwards. Now there are many points in the area above referred to where this process of forest creeping has not reached the limit set by climatic conditions, and hence we find timber lines near each other, but varying in altitude by hundreds of feet. This is most noticeable on the west side of Lynn Canal. Naturally we would expect the timber line in the south to be higher than in the north, but as a matter of fact it is the reverse there, being scarcely 2,000 feet for the former, and nearly 3,000 feet for the latter. In general the timber line on the east side of Lynn Canal is somewhat higher than on the west side. Around Juneau the timber line does not reach the 2,000 feet limit. Between the entrance of Glacier Bay across Dundas and Taylor Bays and Cape Spencer the timber line may be put at 2,000 feet above the sea. In Glacier Bay, northward from the entrance, the timber line rapidly descends and in the northern part the forest practically disappears altogether. In fact along many of the smaller bays there, no wood whatever is found. This phenomenon is plainly indicative of the recent recession of the vast complex of glaciers. On the outside, between Lituya Bay and Cape Spencer, the line is barely 2,000 feet, while in Yakutat Bay it is 1,500 feet. Most of the mountains between Yakutat Bay and Lituya Bay are not timbered at all, but this is probaby due—up to 2,000 feet—to the fact already stated, i.e., that the recession of the glaciers is too recent to admit of the necessary disintegration for vegetation to spring up, as well as to the effect upon the temperature of the nearness of the existing glaciers.

The altitude of the timber line at various points is as follows:—

Place	Maximum	Average
Portland Canal	2,600	2,500
Unuk River	2,900	2,600
Burrough's Bay	2,800	2,500
Bradfield's Canal	2,700	2,500
South of Stikine	2,700	2,500
North of Stikine	—	2,500
Thomas Bay	—	2,500
Endicott Arm	2,500	2,300
Snettisham Bay	2,700	2,400
Taku Inlet	—	2,200
East Side Lynn Canal	2,900	2,500
Head of Lynn Canal	3,000	2,500
West Side of Lynn Canal	2,400	2,000
Outside, west of Cape Spencer	1,500	—

It is understood and agreed that in signing this joint report and signing and accepting the Maps they have submitted, it is not therefore affirmed or admitted by the Commissioners that there is authority for the application of the names used to designate the various places, mountains, bays, channels, islands, etc.

In witness whereof we have hereunto set our hands at Albany, New York, this thirty-first day of December, 1895.

(Signed) W. W. DUFFIELD,
United States Commissioner.

(Signed) W. F. KING,
Her Majesty's Commissioner.

X. The Provisional Boundary Survey of 1900

By the *modus vivendi* of October 20, 1899, a provisional boundary line was agreed upon above the head of Lynn Canal and across the Chilkoot and White Passes. Mr. O. H. Tittmann, Superintendent of the United States Coast and Geodetic Survey, and Mr. W. F. King, Chief

Astronomer of the Dominion of Canada, were named commissioners to carry out the wording of the agreement. During the season of 1900 they marked a provisional line along the right bank of Klehini River, beginning at the intersection of the river bank with the line joining a peak north and a peak south of the river, which peaks had been stipulated in the *modus vivendi*, the line joining these peaks being about a mile above the mouth of Porcupine Creek, to the

Provisional Boundary marker, Klehini River.

junction of the Klehini with Chilkat River, and crossing the latter stream about one-half mile above the village of Klukwan to a third stipulated peak a few miles to the eastward. In the same year the commissioners also marked the lines at the summits of the Chilkoot and White Passes. The line marked along Klehini River came within United States territory under the Award of 1903, and hence became obsolete; but at the Chilkoot and White Passes some parts of the lines as then marked were accepted in the final establishment of the international boundary across these passes.

APPENDIX IV

ELEVATIONS AND DESCRIPTIONS OF BENCH MARKS

The rugged mountainous conformation of Southeast Alaska from the coast to the boundary area is not well adapted to precise levelling operations. Two lines of precise levels, however, cross the boundary line in the regions northerly and northwesterly from the head of Lynn Canal.

During the years 1908, 1909, and 1910 the International Boundary Commission extended a line of precise levels along the White Pass and Yukon Railway from Skagway, Alaska, to Whitehorse, Yukon, and thence by wagon road and trail to Monument 126 on the 141st Meridian section of the boundary between Yukon and Alaska. In 1944 the United States Coast and Geodetic Survey re-levelled the section of the line from Skagway to Whitehorse, and from Whitehorse projected the precise levels northwesterly along the course of the Alaska Highway, then under construction, to Fairbanks, Alaska. Later, during the years 1947 and 1948, the Geodetic Survey of Canada, commencing at a bench mark established by the United States Coast and Geodetic Survey on the Alaska Highway at Haines Junction, Yukon, extended a line of precise levels southeasterly along the Haines Cut-off Highway to the coast at Haines, Alaska.

The elevations of the bench marks of these two organizations as listed hereunder extend from tide gauges at Skagway and Haines to the limits of topography shown on sheet No. 9 of the series of thirteen topographical maps that accompany this report.

The bench marks of the United States Coast and Geodetic Survey consist, except where otherwise specified, of a bronze disk $3\frac{5}{8}$ inches in diameter marked with the name of the organization and the elevation of the bench mark.

The bench marks of the Geodetic Survey of Canada are of two types. They consist, unless otherwise specified, of a bronze disk 3 inches in diameter on the White Pass and Yukon Railway and of a brass cap about $2\frac{3}{4}$ inches in diameter screwed and bolted on the top of a wrought iron pipe on the Haines Cut-off Highway. Both types are marked with the name of the organization and the number of the bench mark.

The letters "I.B.C." are placed in brackets after the designation of each bench mark site originally established by the International Boundary Commission.

FIRST ORDER LEVELLING, UNITED STATES COAST AND GEODETIC SURVEY, 1944

SKAGWAY, ALASKA, TO SUMMIT LAKE, BRITISH COLUMBIA

	Elevation (feet)
Tidal 1, Skagway, at the White Pass & Yukon Railway wharves, about 27 yards northeast of bench mark Tidal 2, in line with the southeast end of a large warehouse, directly below the sign "Sopy Smith's Skull" painted on the cliff, 14 feet inshore from the nearest rail, in top of a small ledge at the base of the cliff, and about $4\frac{1}{2}$ feet above the ground. A standard U.S.C. and G.S. bronze disk, stamped "No. 1 1921"	21·201
Tidal 2, Skagway, at the White Pass & Yukon Railway wharves, 31 feet northeast of a fire hydrant, below the sign "S.S. Prince Rupert" painted on the cliff, 6 feet northeast of a ring bolt cemented into the cliff, $12\frac{1}{2}$ feet inshore from the nearest rail, in the top of a small rock shelf, and about 5 feet higher than the ground. A standard U.S.C. and G.S. bronze disk, stamped "No. 2 1921"	21·614
Tidal 3, Skagway, about 35 feet east of the White Pass & Yukon Railway tracks at the wharves, in the face of the natural rock bluff, on the south side of a large eye-bolt carrying a heavy iron ring about a foot in diameter, and about 6 feet higher than the tracks. A chiselled cross	21·758
Tidal 4, Skagway, at the White Pass & Yukon Railway wharves, inshore from the northeast end of a warehouse, west of and below the sign "M.S. Maranite of Juneau" painted on the cliff, about 65 yards north of bench mark Tidal 1, 30 feet southwest of the northeast end of the cliff, 18 feet southwest of a fire hydrant, 24 feet inshore from the nearest rail, in the top of a ledge at the base of the cliff, and about 4 feet higher than the ground. A standard U.S.C. and G.S. bronze disk, stamped "No. 4 1943"	20·656
Tidal 5, Skagway, at the White Pass & Yukon Railway wharves, about 48 yards southeast of bench mark Tidal 2, almost directly below the sign "S.S. Haleakala Totemland Cruise" painted on the cliff, in top of a rock ledge at the base of the cliff, 5·7 feet east of the east rail, and about $4\frac{1}{2}$ feet higher than the ground. A standard U.S.C. and G.S. bronze disk, stamped "No. 5 1943"	20·932

91264—$18\frac{1}{2}$

	Elevation (feet)
Tidal 6, Skagway, at the White Pass & Yukon Railway wharves, near the southwest end of the abrupt rock cliff, just southwest of the sign "Princess Alice–1941" painted on the cliff, 73 yards southeast of bench mark Tidal 3, 7 feet inshore from the nearest rail, in the top of a small ledge at the base of the cliff, about 3½ feet higher than the tracks. A standard U.S.C. and G.S. bronze disk, stamped "No. 6 1943"	19·974
A (I.B.C., 1910), Skagway, about 200 feet west of the centre line of the White Pass & Yukon Railway, at the District Court House, in the foundation wall, about 2 feet north of the southwest corner, about 2½ feet above the ground, and about 6 inches below the water-table. A standard U.S.C. and G.S. bronze disk, set vertically	23·491
A 31, about 2 miles north along the White Pass & Yukon Railway from the dock at Skagway, about 250 feet north of mile-post 2, 45 feet west of the centre line of the main track, 34 feet west of the centre line of a spur track, at the north end of a 400-foot railway warehouse, in the concrete foundation, 15 inches west of the north doorway, and 18 inches higher than the concrete floor. A standard U.S.C. and G.S. bronze disk, stamped "A 31 1944"	67·529
B (I.B.C., 1910), about 2·59 miles north along the White Pass & Yukon Railway from Skagway, about 450 feet south of a switch block for a spur to the east, 202·3 feet west of the centre line of the track, about 40 feet east of a small rock ridge, and in the face of a granite wall about 3 feet high and 6 feet long. A standard U.S.C. and G.S. bronze disk, set vertically	87·720
Top of rail, about 2·6 miles north of Skagway, about 100 feet north of the yard-limit sign, top of west rail at the centre of the White Pass & Yukon Railway bridge	104·5
B 31, about 3 miles north along the White Pass & Yukon Railway from the dock at Skagway, 27 feet northeast of mile-post 3, 42 feet north of pole 39, 93 feet south of pole 40, 15 feet east of the centre line of the track, in bedrock, and about 6 feet higher than the track. A standard U.S.C. and G.S. bronze disk, stamped "B 31 1944"	137·129
B.M. 4 (I.B.C., 1910), about 3·62 miles north along the White Pass & Yukon Railway from Skagway, about 300 feet south of a small bridge marked "3 B", 17·4 feet west of the centre line of the track, about 3 feet higher than the track, and on top of an overhanging rock. South of the rock is a small rock face running parallel with the track for about 20 feet and on top of this (in 1910) were some roots of a tree. The stump is about 8 feet from the bench mark. The bench mark is a circle cut on the upper surface of the rock	147·557
C 31, about 4 miles north along the White Pass & Yukon Railway from the dock at Skagway, about 200 feet northeast of mile-post 4, about 219 feet southeast of the southeast corner of bridge 4 A, about 123 feet east of the centre line of the track, and in the top of a large granite boulder. A standard U.S.C. and G.S. bronze disk, stamped "C 31 1944"	183·153
C (I.B.C., 1910), about 4·57 miles north along the White Pass & Yukon Railway from Skagway, about one-half mile north of a bridge marked "4 A", at the western extremity of the first timbered ridge east of the track and north of bridge 4 A, 91·7 feet east of the centre line of the track, in the vertical face of a rock wall about 150 feet long with a stream running its entire length, and about 4 feet above the stream. A standard U.S.C. and G.S. bronze disk, set vertically	196·939
D 31, about 5·6 miles north along the White Pass & Yukon Railway from the dock at Skagway, about nine rails north of a curve to the left, about three rails north of a small open culvert. One rail south of a curve to the right, 10 feet east of the centre line of the track, and in a ledge at the south end of a small vertical cliff. A standard U.S.C. and G.S. bronze disk, stamped "D 31 1944"	320·951
B.M. 5 (I.B.C., 1910), about 5·78 miles north along the White Pass & Yukon Railway from Skagway, about 285 feet southwest of the end of bridge 5 C at Denver, at the south end of a rock cut, 10·5 feet northwest of the centre line of the track, and about 1 foot lower than the track. A square cut in bedrock	399·544
Top of rail, about 5·9 miles north of Skagway, top of west rail at the centre of White Pass & Yukon Railway bridge 5 A	413·2
E 31, about 6·4 miles north along the White Pass & Yukon Railway from the dock at Skagway, about one-half mile north of the east fork of Skagway River and bridge 5 A, 63 feet southeast of the first stream north of bridge 5 A, 21 feet southwest of the centre line of the track, in the north end of a large granite boulder, and about 4 feet higher than the track. A standard U.S.C. and G.S. bronze disk, stamped "E 31 1944"	492·027
D (I.B.C., 1910), about 7·14 miles north along the White Pass & Yukon Railway from Skagway, about 50 feet south of the south end of bridge 7 A, 8·9 feet west of the centre line of the track, and 2·6 feet north of the south end of a retaining wall. A standard U.S.C. and G.S. bronze disk, stamped "D 1910", set in the top of the retaining wall	640·005
Top of rail, about 7·1 miles north of Skagway, top of west rail at the centre of White Pass & Yukon Railway bridge 7 A	640·9
Top of rail, about 7·6 miles north of Skagway, top of east rail at the centre of White Pass & Yukon Railway bridge 7 C	658·1

	Elevation (feet)
B.M. 6 (I.B.C., 1910), about 7·95 miles north along the White Pass & Yukon Railway from Skagway, about 275 feet south of mile-post 8, 15·4 feet west of the centre line of the track, about 3 feet higher than the track, and in the top of a large granite hump. A $\frac{7}{8}$ inch copper bolt	735·812
E (I.B.C., 1910), about 8·5 miles north along the White Pass & Yukon Railway from Skagway, opposite a point, 16·7 feet north of the north face of the section house at Clifton, 38 feet south of a switch block, about 8 feet east of the centre line of the track, about 2 feet higher than the track, and in the face of a granite wall. A standard U.S.C. and G.S. bronze disk, stamped "E 1910", set vertically	854·913
Clifton, top of west rail opposite White Pass & Yukon Railway station	852·0
B.M. 7 (I.B.C., 1910), about 9·50 miles north along the White Pass & Yukon Railway from Skagway, about 455 feet south of the south end of bridge 9 B, 26·0 feet east of the centre line of the track, and in the top surface of a granite ledge that slopes slightly toward the tracks. A $\frac{7}{8}$ inch copper bolt, stamped "7"	994·247
F (I.B.C., 1910), about 10·45 miles north along the White Pass & Yukon Railway from Skagway, about 540 feet south of the south end of a rock cut, opposite a small fill, 21·0 feet west of the centre line of the track, and in the top of a granite ledge. A standard U.S.C. and G.S. bronze disk, stamped "F 1910"	1,181·084
B.M. 8 (I.B.C., 1910), about 11·38 miles north along the White Pass & Yukon Railway from Skagway, about one-half mile south of a series of waterfalls running into the West Fork of Skagway River from the north, about 658 feet south of section post 2 and 3, opposite a riprap retaining wall about 10 feet high, 17·3 feet east of the centre line of the track, and in an outcrop of granite. The top of the round head of a track bolt cemented into the granite	1,361·810
F 31, about 11·4 miles north along the White Pass & Yukon Railway from the dock at Skagway, about one-half mile east (north?) of a series of waterfalls entering the river from the north, about 132 feet south of a rock retaining wall west of the track, 72 feet north of another rock retaining wall west of the track, 36 feet southeast of pole 278, 18 feet west of the centre line of the track, and in bedrock. A standard U.S.C. and G.S. bronze disk, stamped "F 31 1944"	1,376·795
G (I.B.C., 1910), about 12·38 miles north along the White Pass & Yukon Railway from Skagway, about 652 feet east of a post marked "Heney", about opposite old buildings of White Pass City, which are on White Pass Creek, which leads up to White Pass, 14·0 feet south of the centre line of the track, and about 1 foot higher than the track. A standard U.S.C. and G.S. bronze disk, stamped "G 1910", set in granite rock	1,557·398
Top of rail, about 12·6 miles north of Skagway, top of north rail at the centre of White Pass & Yukon Railway bridge 12 A	1,602·7
B.M. 9 (I.B.C., 1910), about 13·34 miles north along the White Pass & Yukon Railway from Skagway, 10·4 feet south of the centre line of the track, about 8 inches from the outer edge of a small granite ledge, and about 1 foot higher than the track. The top of the round head of a track bolt cemented into the ledge	1,745·511
G 31, about 13·4 miles north along the White Pass & Yukon Railway from the dock at Skagway, 69 feet south of a small stream crossing the track in an open culvert, 40 feet southeast of pole 36, 12 feet east of the centre line of the track, and in a large granite boulder. A standard U.S.C. and G.S. bronze disk, stamped "G 31 1944" and set vertically	1,746·391
H (I.B.C., 1910), about 14·1 miles north along the White Pass & Yukon Railway from Skagway, 155 feet westerly from the southerly end of bridge 14 A, opposite a point 44·8 feet east of the east end of Glacier Section House, opposite the toolhouse, and 9·1 feet south of the centre line of the track. A standard U.S.C. and G.S. bronze disk, stamped "H 1910", set horizontally in the top of a granite ledge	1,873·779
Glacier, top of west rail opposite the White Pass & Yukon Railway station	1,872·6
H 31, about 15·1 miles north along the White Pass & Yukon Railway from the dock at Skagway, 33 feet south of the "Glacier-1-mile" sign 15 feet south of the north end of a rock cut, 20 feet west of the centre line of the track, in a large granite boulder, and about 3 feet higher than the track. A standard U.S.C. and G.S. bronze disk, stamped "H 31 1944"	2,053·729
I (I.B.C., 1910), about 15·11 miles north along the White Pass & Yukon Railway from Skagway, 870 feet easterly from the east end of snow shed 15 A, 10·4 feet north of the centre line of the track, about $2\frac{1}{2}$ feet higher than the track, and in a small ledge projecting from a loose rocky embankment about 15 feet high. A $\frac{7}{8}$ inch copper bolt, set into the granite	2,054·390
Top of rail, about 15·5 miles north of Skagway, top of west rail at the centre of White Pass & Yukon Railway bridge 15 A	2,134·5
J (I.B.C., 1910), about 16·15 miles north along the White Pass & Yukon Railway from Skagway, about 790 feet north of the north end of snow shed 15 C, about 770 feet north of section post 3 and 4, about $\frac{1}{8}$ mile south of a snow fence, 8·2 feet east of the centre line of the track, about 2 feet higher than the track, and in the face of a granite wall. A standard U.S.C. and G.S. bronze disk, stamped "J 1910", set vertically	2,260·553

	Elevation (feet)
K (I.B.C., 1910), about 17·21 miles north along the White Pass & Yukon Railway from Skagway, about 300 feet south of a snow fence above the track, 11·0 feet east of the centre line of the track, and about 2 feet higher than the track. The top of the round head of a track bolt, cemented into a granite ledge	2,475·418
Top of rail, about 17·6 miles north of Skagway, top of east rail at the centre of White Pass & Yukon Railway bridge 17 A	2,558·9
J 31, about 18·2 miles north along the White Pass & Yukon Railway from the dock at Skagway, about 820 feet south of the south end of bridge 18 A, 27 feet north of pole 400, 14 feet east of the centre line of the track, in the top of a flat-topped granite boulder about 10 feet square, and about 2 feet higher than the track. A standard U.S.C. and G.S. bronze disk, stamped "J 31 1944"	2,671·294
L (I.B.C., 1910), about 18·23 miles north along the White Pass & Yukon Railway from Skagway, 805 feet south of the south end of bridge 18 E, 12·2 feet east of the centre line of the track, and in a granite ledge. A standard U.S.C. and G.S. bronze disk set horizontally	2,672·042
Top of rail, about 18·4 miles north of Skagway, top of north rail at the centre of White Pass & Yukon Railway bridge 18 A	2,714·7
M (I.B.C., 1910), about 19·44 miles north along the White Pass & Yukon Railway from Skagway, 162 feet south of the south end of snow shed 19 A, 10·7 feet west of the centre line of the track, about 3 feet higher than the track, and in the top of immense granite rock. A $\frac{7}{8}$ inch copper bolt, set in the rock	2,799·348
Boundary Point 117, White Pass (I.B.C., 1910), a square bronze post 4 feet 6 inches in height, 6 inches square on top and 9 inches square at base, standing on a concrete pyramid 4 feet 6 inches square at base and 2 feet 2 inches in height. The monument is located 30 feet west of centre line of track and about 30 feet above track level. The bench mark is a chiselled cross on west side of post $3\frac{3}{4}$ inches above base	2,916·576
Chisel Mark, in bedrock, a cross 2 inches wide is located on top 6 feet south of Boundary Point 117	2,915·450
P-42-R (I.B.C., 1908), in bedrock, 36 feet north of north end of station shed, 11 feet east of centre line of track and 25 feet west of telephone pole No. 460. A standard G.S.C. bronze disk in top of rock, about 18 inches above track level	2,889·286
M-4, in rock cliff, $\frac{1}{4}$ mile north of station, 88 feet south of switch at north end of siding and 16 feet east of centre line of track. A standard G.S.C. bronze disk in top of small ledge, about 2 feet above track level	2,890·122
L-4, in bedrock, about 1 mile north of station, 5 rail lengths north of north end of snow shed "S-20-B", 26 feet east of centre line of track and 64 feet south of telephone pole 481. A standard G.S.C. bronze disk in top of rock, about 2 feet above track level	2,912·770
K-4, in bedrock, about 2 miles north of station, 215 feet north of mile-post 22, 14 feet east of centre line of track and 32 feet west of telephone pole 512. A standard G.S.C. bronze disk in top of rock, about 3 feet above track level	2,913·387
J-4, in bedrock, about 3 miles north of station, at north end of a rock cut, 8 rail lengths south of mile-post 23, 12 feet east of centre of track and 55 feet north of telephone pole 543. A standard G.S.C. bronze disk in top of small ledge, at track level	2,939·030
H-4, in bedrock, about 4 miles north of station, opposite mile-post 24, 35 feet east of centre line of track and 45 feet northwest of telephone pole 576. A standard G.S.C. bronze disk in top of rock, at track level	2,932·973
White Pass, South Base, in bedrock, about $3\frac{3}{4}$ miles north of station, 160 feet north of railway trestle No. 23-A and 160 feet east of centre line of track. A standard G.S.C. bronze triangulation disk stamped "White Pass S. Base", in top of rock, about 12 feet above track level	2,959·397
South Base R.M. 1, a standard G.S.C. bronze reference disk in top of bedrock, 55 feet south of triangulation station "White Pass, South Base"	2,962·596
South Base R.M. 2, a standard G.S.C. bronze reference disk in top of bedrock, 43 feet west of triangulation station "White Pass, South Base"	2,959·718
G-4, in bedrock, about 5 miles north of station, at south end of a curve, $4\frac{1}{2}$ rail lengths north of mile-post 25, 10 feet west of centre line of track and 41 feet east of telephone pole 614. A standard G.S.C. bronze disk in top of rock, about 1 foot below track level	2,931·320
F-4, in bedrock, $5\frac{1}{2}$ miles north of station, 70 feet south of north end of a cut, 10 feet west of centre line of track and 50 feet north of telephone pole 630. A standard G.S.C. bronze disk in top of ledge of rock, at track level	2,916·247
White Pass, North Base, in bedrock, on top of a prominent hill, about $5\frac{1}{2}$ miles north of station, 330 feet east of telephone pole 632. A standard G.S.C. bronze triangulation disk, stamped "White Pass N. Base 1943", in top of rock	2,972·494

	Elevation (feet)
North Base R.M. 1, a standard G.S.C. bronze reference disk in top of bedrock, 26 feet east of triangulation station "White Pass, North Base"	2,972·061
North Base R.M. 2, a standard G.S.C. bronze reference disk in top of bedrock, 41 feet south of triangulation station "White Pass, North Base"	2,972·104

FIRST ORDER LEVELLING, GEODETIC SURVEY OF CANADA, 1948

HAINES, ALASKA, TO THE BRITISH COLUMBIA-YUKON BOUNDARY

Tidal 2 (1921), Haines, 200 feet south of the south edge of the old city dock (not in use in 1948), on the shoreline between the high-water line and a gravel road that parallels the beach and leads to Port Chilkoot, 26 feet east of the centre line of the road, 15 feet east of a pole, in the top of a 3-foot boulder, about 18 inches above the ground. A standard U.S.C. and G.S. bronze disk	17·180
Tidal 3 (1890), Haines, at the end of the main east-west street of the town, at a building at the inshore end of the old city dock (not in use in 1948), at a large granite boulder projecting out from under the building and forming a part of its support, in the east face of the boulder that has "July 1890" cut in the rock together with some other symbols illegible due to weathering. The centre of a rough circle cut in the rock	20·288
Tidal 5 (1943), Haines, 270 yards north along the shoreline from the wharf at Port Chilkoot Barracks, 57·4 feet northeast of the centre line of the road leading to the wharf, on the storm high-water line, at the largest boulder in the locality, about 6 feet above ground. A standard U.S.C. and G.S. bronze disk, stamped "No. 5 1943" and set on the highest point of the boulder	18·259
Tidal 6 (1943), Haines, on U.S. Army property (Port Chilkoot Barracks), on the west side of a road paralleling the beach, 186 feet west of the near corner of the wharf approach, at the second small building north of the approach to the wharf, in the east face of the foundation, 2½ feet north of the southeast corner and 1½ feet above ground. A standard U.S.C. and G.S. bronze disk, stamped "No. 6 1943" and set vertically	23·919
525 F, Haines, at the public school, in the front (northeast) face of the concrete foundation, 8½ feet from the east corner, midway between two basement windows, and 8 inches below the water-table. A standard G.S.C. bronze disk, set vertically	66·395
524 F, 3·3 miles northwest along the Haines Cut-off Highway from Haines, opposite a flight strip, 63 feet northeast of the centre line of the road, and 20 feet west of the west fence of a cemetery. A standard G.S.C. cap fastened to the top of an iron pipe	22·268
523 F, 5·7 miles northwest along the Haines Cut-off Highway from Haines, at the first rock cliff northwest of the town, 70 feet northwest of the end of the cliff, 22 feet northeast of the centre line of the road, in the southwest face of the cliff, and about 2 feet above road level. A standard G.S.C. bronze disk, set vertically	26·196
522 F, 7·9 miles northwest along the Haines Cut-off Highway from Haines, at a cliff surmounted by a small log cabin, 91 feet from the southeast end of the cliff, 30 feet northeast of the centre line of the road, in the southwest face of the cliff, and about 3½ feet above road level. A standard G.S.C. bronze disk, set vertically	37·499
521 F, 10·7 miles northwest along the Haines Cut-off Highway from Haines, 100 feet from the southeast end of a cliff, 22 feet northeast of the centre line of the road, in the southwest face of a rock cut, and about 3 feet above road level. A standard G.S.C. bronze disk, set vertically	41·004
520 F, 12·2 miles northwest along the Haines Cut-off Highway from Haines, 11·5 miles southeast of Wells, 0·1 mile south of a small log cabin, 375 feet from the north end of a cliff, 43 feet northeast of the centre line of the road, in the face of a rock cut, and level with the road. A standard G.S.C. bronze disk, set vertically	48·383
519 F, 14·7 miles northwest along the Haines Cut-off Highway from Haines, 9 miles southeast of Wells, 500 feet southeast of a whirlpool in Chilkat River, 245 feet northwest of a stream, in the southwest face of a rock cut, underneath a religious sign, 30 feet northeast of the centre line of the road, and about 2½ feet above road level. A standard G.S.C. bronze disk, set vertically	56·906
518 F, 18·1 miles northwest along the Haines Cut-off Highway from Haines, 5·75 miles southeast of Wells, 59 feet southeast of the edge of a clearing, in an old glacier bed midway up a long curve, and 61 feet northeast of the centre line of the road. A standard G.S.C. brass cap fastened to the top of an iron pipe	119·635
517 F, 20·7 miles northwest along the Haines Cut-off Highway from Haines, 3 miles southeast of Wells, 250 feet from the point where the road begins to curve outward into the Chilkat River basin, 73 feet northeast of the centre line of the road, and about 10 feet higher than the road. A standard G.S.C. brass cap fastened to the top of an iron pipe	121·442
516 F, 23·2 miles northwest along the Haines Cut-off Highway from Haines, 0·5 mile southeast of Wells, 0·6 mile southeast of Chilkat River, 180 feet southeast of the beginning of a curve, and 60 feet northeast of the centre line of the road. A standard G.S.C. brass cap fastened to the top of an iron pipe	225·507

	Elevation (feet)
515 F, 26·2 miles northwest along the Haines Cut-off Highway from Haines, 2·5 miles west of Wells, 200 feet from the beginning of a curve, 27 feet northeast of the centre line of the road, in the southwest face of a rock cut, and about 4 feet above road level. A standard G.S.C. bronze disk, set vertically	182·781
514 F, 28·2 miles northwest along the Haines Cut-off Highway from Haines, 4·5 miles west of Wells, 350 feet northwest of the beginning of a curve, 75 feet southeast of a white frame house owned by F. Young, and 51 feet northeast of the centre line of the road. A standard G.S.C. brass cap fastened to the top of an iron pipe	254·251
513 F, 30·2 miles northwest along the Haines Cut-off Highway from Haines, 6·5 miles west of Wells, 0·3 mile west of a small creek, 175 feet east of the top of a hill, 58 feet north of the centre line of the road, and about 10 feet higher than the road. A standard G.S.C. brass cap fastened to the top of an iron pipe	286·939
512 F, 33·1 miles northwest along the Haines Cut-off Highway from Haines, 9 miles east of the International Boundary, opposite a large clearing (on the south side of the road) with several frame buildings owned by F. Young, 50 feet east of an iron culvert, 90 feet west of an old road leading north-east, 60 feet north of the centre line of the road, and about 10 feet higher than the road. A standard G.S.C. brass cap fastened to the top of an iron pipe	390·626
511 F, 35·0 miles northwest along the Haines Cut-off Highway from Haines, 7 miles east of the International Boundary, 0·2 mile east of Yokeak Creek, 385 feet east of mile-post 35, 160 feet east of an old road (detour), 41 feet south of the centre line of the road, and level with the road. A standard G.S.C. brass cap fastened to the top of an iron pipe	456·138
510 F, 37·5 miles northwest along the Haines Cut-off Highway from Haines, 4·5 miles east of the International Boundary, at a side cut on the road, on the top of a small knoll, 40 feet south of the centre line of the road, and about 10 feet higher than the road. A standard G.S.C. brass cap fastened to the top of an iron pipe	612·026
509 F, 39·2 miles northwest along the Haines Cut-off Highway from Haines, 2·8 miles east of the International Boundary, in a small gravel clearing between two side cuts, 54 feet north of the centre line of the road, and at the centre line of an old road. A standard G.S.C. brass cap fastened to the top of an iron pipe	611·377
508 F (I.B.C., 1904), 42·0 miles northwest along the Haines Cut-off Highway from Haines, at the International Boundary, 100 feet north of the Canadian Customs office, 72 feet southwest of the centre line of the road, at Boundary Point 146, in the top of the concrete base of the monument (on the Canadian side), and about 5 feet lower than the road. A standard G.S.C. bronze disk	811·604
507 F, 43·3 miles from Haines and 1¼ miles northwest of the International Boundary, 150 feet northwest of beginning of curve, 150 feet southeast of beginning of curve and 250 feet northwest of an iron culvert, 46 feet southwest of centre line of road, on a gravel bank about 5 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	993·648
506 F, 46·4 miles from Haines and 4½ miles north of the International Boundary, 400 feet west of the beginning of curve and 250 feet west of sand side cut on north side of road, 42 feet south of centre line of road, on inside of long curve. A standard G.S.C. brass cap fastened to the top of an iron pipe	1,228·804
505 F, 48·8 miles from Haines and 6¾ miles north of the International Boundary, 470 feet east of wooden bridge over creek, at east end of a gravel cut and 52 feet south of centre line of road. A standard G.S.C. brass cap fastened to the top of an iron pipe	1,348·430
504 F, 52·1 miles from Haines and 10 miles north of the International Boundary, 300 feet north of entrance to an old army camp, 200 feet south of an iron culvert, 86 feet east of centre line of road, in a small clearing. A standard G.S.C. brass cap fastened to the top of an iron pipe	1,688·624
503 F, 54·5 miles from Haines and 12½ miles north of the International Boundary, 330 feet south of one iron culvert and 180 feet north of another, 100 feet south of a lone spruce near the road, 61 feet southeast of centre line of road, on a bare gravel knoll about 3 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	2,513·065
502 F, 56·7 miles from Haines and 14¾ miles north of the International Boundary, on a large grey rock projection 75 feet north of a small gravel pit on west side of road, 250 feet north of top of a hill, 40 feet west of centre line of road and about 6 feet above road level. A standard G.S.C. bronze disk set in rock marked "B.M." in white paint	3,077·441
501 F, 59·7 miles from Haines and 17¾ miles north of the International Boundary, in a flat gravel cut at top of a steep hill 350 feet south of an iron culvert, 170 feet north of centre side cut on east side of road and 75 feet northwest of centre line of road. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,036·769
500 F, 62·4 miles from Haines and 20½ miles north of the International Boundary, 170 feet north of a square wooden culvert, 120 feet south of an iron culvert, 72 feet northeast of centre line of road and on a small gravel knoll about 5 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,139·774

	Elevation (feet)
499 F, 64·0 miles from Haines and 22 miles north of the International Boundary, 270 feet north of mile-post 64 from Haines, 85 feet north of a shelter hut, 65 feet south of an iron culvert, 71 feet northeast of centre line of road and about 2 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,214·133
498 F, 67·0 miles from Haines and 25 miles north of the International Boundary, 165 feet south of mile-post 67 from Haines, 240 feet north of an iron culvert opposite a small lake on west side of road, 47 feet northeast of centre line of road and about 3 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,304·108
497 F, 69·7 miles from Haines and 24½ miles south of the Yukon-British Columbia boundary, 875 feet south of a wooden bridge, 60 feet south of a small bank projecting out near road, 90 feet southwest of centre line of road and about 5 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,297·857
496 F, 73·0 miles from Haines and 21¼ miles south of the Yukon-British Columbia boundary, 235 feet north of mile-post 73 from Haines, on top of a small side cut, 510 feet south of an iron culvert, 165 feet north of a wooden culvert, 45 feet west of centre line of road and about 5 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	2,996·911
495 F, 75·2 miles from Haines and 19 miles south of the Yukon-British Columbia boundary, 950 feet northwest of a wooden culvert, 360 feet southeast of an iron culvert, 50 feet southwest of centre line of road and at the same level. A standard G.S.C. brass cap fastened to the top of an iron pipe	2,897·740
494 F, 78·2 miles from Haines and 16 miles south of the Yukon-British Columbia boundary, 420 feet north of sign "shelter hut one mile", 830 feet north of a wooden culvert, 440 feet north of an old trail and 41 feet east of centre line of road. A standard G.S.C. brass cap fastened to the top of an iron pipe	2,916·051
493 F, 81·0 miles from Haines and 13¼ miles south of the Yukon-British Columbia boundary, 50 feet east of mile-post 81 from Haines, 140 feet north of a metal culvert, about 0·2 mile north of two small lakes on west side of road, 50 feet northeast of centre line of road and at the same level. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,116·956
492 F, 83·7 miles from Haines and 10½ miles south of the Yukon-British Columbia boundary, 85 feet southeast of a shelter hut that is opposite a ravine through the hills, and 45 feet southwest of centre line of road. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,059·448
491 F, 86·0 miles from Haines and 8¼ miles south of the Yukon-British Columbia boundary, opposite mile-post 86 from Haines, on top of a small bare knoll about 0·2 mile north of top of a hill, 60 feet west of centre line of road and about 2 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,012·893
490 F, 88·1 miles from Haines and 6¼ miles south of the Yukon-British Columbia boundary, 100 feet south of a culvert and 300 feet south of a curve, 64 feet east of centre line of road and about 10 feet above road level. A standard G.S.C. brass cap fastened to the top of an iron pipe	3,021·762
489 F, 91·4 miles from Haines and 3 miles south of the Yukon-British Columbia boundary, on first step down (south) from top of hill, 150 feet north of a curve, 56 feet west of centre line of road and at the same level. A standard G.S.C. brass cap fastened to the top of an iron pipe	2,997·790
488 F, 93·8 miles from Haines and ½ mile south of the Yukon-British Columbia boundary, in a clearing about 0·1 mile north of Blanchard River and 49 feet northeast of centre line of road. A standard G.S.C. brass cap fastened to the top of an iron pipe	2,755·429

APPENDIX V

GEOGRAPHIC POSITIONS AND DESCRIPTIONS OF TRIANGULATION STATIONS

Explanation of Tables

These tables consist of the triangulation stations used in determining the positions of the boundary points, reference monuments, and turning points. The latitudes and longitudes of the stations are given on the 1927 North American datum (*See* p. xiv). Along with the latitude and longitude of each station, the azimuths and distances are given of the lines from that station to other stations of the triangulation net. No azimuths or distances are repeated, and for a given line the azimuth and distance will be found opposite the position of the last mentioned of the two stations involved.

The azimuths are reckoned clockwise from the south.

The distances are all reduced to sea-level (*See* p. 147).

To facilitate the use of the tables, a column is given of the logarithms of the distances. It should be noted that the logarithm is derived from the computations and that the distances are derived from the corresponding logarithms.

The latitudes and longitudes of the stations in the nets used for the principal control are given to thousandths of seconds, and to hundredths of seconds in the other nets. In the columns giving azimuths, distances, and logarithms of distances, the accuracy is indicated to a certain extent by the number of decimal places given.

These tables may be conveniently consulted by using as finders the triangulation sketches at end of report, and the index to the geographic positions beginning on page 351.

The following abbreviations have been used throughout the tables: "B.P." for boundary point; "T.P." for turning point; "R.M." for reference monument; and "ecc." for eccentric station.

GEOGRAPHIC POSITIONS OF TRIANGULATION STATIONS, DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
FIRST-ORDER NET	° ′ ″	° ′ ″	° ′ ″			
Muzon (G.S.C.)	54 40 51·428 132 41 50·204					
North Island (G.S.C.)	54 14 09·683 132 59 54·534	201 24 10·64	21 38 52·95	Muzon	53,240·28	4·7262403
Chacon (G.S.C.)	54 43 35·109 132 11 07·496	44 19 27·92 81 29 19·89	223 39 45·50 261 04 15·92	North Island Muzon	75,876·88 33,384·18	4·8801095 4·5235407
Tow Hill (G.S.C.)	54 04 29·290 131 47 49·443	103 21 51·70 139 26 24·34 160 59 01·52	282 23 25·70 318 42 29·95 340 40 04·73	North Island Muzon Chacon	80,516·87 89,299·00 76,793·54	4·9058869 4·9508466 4·8853247
Dundas (G.S.C.)	54 31 16·100 130 54 54·739	49 29 21·86 106 04 49·57	228 46 23·76 285 02 41·03	Tow Hill Chacon	75,927·00 85,169·18	4·8803962 4·9302824
Stephens (G.S.C.)	54 07 39·332 130 40 09·081	85 54 13·65 124 43 35·10 160 01 36·29	264 59 24·50 303 29 35·21 359 49 36·84	Tow Hill Chacon Dundas	74,017·45 118,857·09 46,639·55	4·8693341 5·0750251 4·6687543
Simpson (G.S.C.)	54 31 49·073 130 24 56·004	20 18 45·76 88 23 53·98	200 06 23·99 267 59 29·13	Stephens Dundas	47,766·78 32,367·79	4·6791260 4·5101131

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET	° ′ ″	° ′ ″	° ′ ″			
Whitly (U.S.C. and G.S.)	54 37 23·803 130 45 24·102					
Garnet (U.S.C. and G.S.)	54 43 06·523 130 41 05·861	23 37 16·7	203 33 46·0	Whitly	11,564·1	4·063111
Boston (U.S.C. and G.S.)	54 41 54·897 130 34 08·092	55 24 13·3 106 32 26·7	235 15 01·9 286 26 45·8	Whitly Garnet	14,735·2 7,801·3	4·168355 3·892168
Pointers (1913)	54 36 18·756 130 32 08·764	98 06 38·9 142 41 45·4 168 22 54·3	277 55 50·5 322 34 27·3 348 21 16·9	Whitly Garnet Boston	14,414·9 15,864·4 10,612·0	4·158811 4·200425 4·025796
Thirty	54 47 14·313 130 40 15·521	16 52 18·0 28 06 50·1 326 18 49·6 329 56 46·4 336 40 23·6	196 48 06·1 207 54 52·7 146 23 49·5 150 09 16·3 156 47 00·8	Whitly Dundas Boston Simpson Pointers (1913)	19,077·6 33,562·0 11,864·5 33,019·2 22,066·4	4·280523 4·525848 4·074249 4·518767 4·343731
Des Brisay	54 47 09·077 130 30 00·518	6 31 51·9 42 26 43·1 42 31 38·8 90 54 49·7 349 06 09·0	186 30 07·3 222 06 24·1 222 19 05·0 270 46 27·3 169 10 17·3	Pointers (1913) Dundas Whitly Thirty Simpson	20,240·0 39,825·8 24,516·6 10,991·9 28,967·2	4·306210 4·600164 4·389460 4·041074 4·461907
Thirty-one	54 44 56·708 130 35 48·202	131 42 31·2 236 35 52·4	311 38 52·9 56 40 36·4	Thirty Des Brisay	6,399·1 7,443·0	3·806119 3·871746
Twenty-eight	54 51 13·094 130 29 41·624	2 33 44·1 29 24 23·9 56 57 15·4	182 33 28·6 209 19 24·3 236 48 37·3	Des Brisay Thirty-one Thirty	7,553·2 13,354·7 13,514·3	3·878129 4·125633 4·130794
Twenty-nine	54 48 29·968 130 29 13·815	46 57 17·0 78 52 54·1 174 22 56·7	226 51 54·8 258 43 53·4 354 22 34·0	Thirty-one Thirty Twenty-eight	9,653·1 12,051·4 5,068·6	3·984668 4·081036 3·704892
Twenty-seven	54 51 26·830 130 25 23·070	37 00 39·1 84 46 05·5	216 57 30·5 264 42 34·1	Twenty-nine Twenty-eight	6,846·6 4,632·3	3·835475 3·665794
Twenty-six	54 54 06·074 130 24 44·711	7 54 42·2 24 49 27·8 44 44 18·7	187 54 10·8 204 45 47·8 224 40 15·9	Twenty-seven Twenty-nine Twenty-eight	4,971·6 11,448·6 7,526·0	3·696493 4·058754 3·876565
Twenty-four	54 59 24·710 130 18 36·872	26 07 51·4 33 38 49·4 37 59 17·9	206 02 19·0 213 33 48·3 217 50 13·9	Twenty-seven Twenty-six Twenty-eight	16,453·4 11,830·5 19,269·1	4·216255 4·073002 4·284860
Twenty-five	54 58 11·781 130 12 25·640	45 04 58·6 47 58 12·5 60 04 56·3 108 54 02·0	224 51 14·0 227 47 36·4 239 54 51·4 288 48 58·0	Twenty-nine Twenty-seven Twenty-six Twenty-four	25,429·5 18,671·5 15,195·3 6,977·1	4·405338 4·271180 4·181708 3·843676
Twenty-two	55 06 05·550 130 13 40·863	23 00 44·0 354 46 51·2	202 56 41·4 174 47 52·8	Twenty-four Twenty-five	13,463·8 14,711·5	4·129168 4·167657
Twenty-three	55 04 48·003 130 05 02·678	32 45 43·3 55 26 07·6 104 40 57·5	212 39 40·3 235 15 00·4 284 33 52·6	Twenty-five Twenty-four Twenty-two	14,562·2 17,580·4 9,498·6	4·163226 4·245029 3·977658
Center Point (1)	55 09 04·462 130 05 58·317	56 02 01·5 352 54 18·2	235 55 42·0 172 55 03·8	Twenty-two Twenty-three	9,889·2 7,991·9	3·995163 3·902648
Twenty	55 14 30·667 130 04 11·395	2 53 26·5 10 37 54·2 32 53 58·3	182 52 44·4 190 36 26·4 212 46 10·9	Twenty-three Center Point (1) Twenty-two	18,041·4 10,263·5 18,590·5	4·256270 4·011297 4·269290

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Twenty-one	55 12 58·520	22 20 01·2	202 15 13·1	Twenty-three	16,394·3	4·214694
	129 59 11·531	44 53 17·5	224 47 43·5	Center Point (1)	10,208·1	4·008945
		50 25 04·5	230 13 11·1	Twenty-two	20,000·8	4·301047
		118 17 55·2	298 13 48·9	Twenty	6,017·7	3·779430
Eighteen	55 17 14·904	31 58 25·1	211 55 57·7	Twenty	5,986·0	3·777136
	130 01 12·006	344 57 39·5	164 59 18·5	Twenty-one	8,209·3	3·914306
Nineteen	55 16 00·820	25 40 32·5	205 38 26·6	Twenty-one	6,254·3	3·796178
	129 56 38·269	70 50 51·9	250 44 39·6	Twenty	8,475·7	3·928177
		115 23 46·7	295 20 01·7	Eighteen	5,348·1	3·728203
Sixteen	55 21 39·515	322 35 14·4	142 41 27·1	Nineteen	13,177·9	4·119847
	130 04 11·662	338 49 00·7	158 51 28·4	Eighteen	8,774·9	3·943244
Seventeen	55 22 04·310	14 15 30·4	194 13 44·4	Eighteen	9,233·8	3·965380
	129 59 03·150	82 00 15·2	261 56 01·4	Sixteen	5,488·4	3·739443
		347 10 38·6	167 12 37·7	Nineteen	11,527·7	4·061744
Fourteen	55 26 54·190	323 02 34·4	143 07 49·4	Seventeen	11,212·3	4·049694
	130 05 25·863	352 20 58·0	172 21 59·1	Sixteen	9,818·7	3·992054
Fifteen	55 26 27·126	0 42 06·1	180 42 01·5	Seventeen	8,128·4	3·910003
	129 58 57·499	31 54 06·4	211 49 47·9	Sixteen	10,472·9	4·020069
		97 02 00·7	276 56 40·9	Fourteen	6,878·4	3·837489
Twel	55 30 52·605	306 13 55·0	126 22 39·1	Fifteen	13,866·7	4·141973
	130 09 33·703	329 24 56·2	149 28 20·5	Fourteen	8,562·2	3·932588
Thur	55 33 01·258	10 16 58·0	190 15 21·5	Fourteen	11,536·8	4·062085
	130 03 28·706	58 10 56·9	238 05 56·0	Twel	7,537·9	3·877249
		338 37 51·6	158 41 35·1	Fifteen	13,086·0	4·116807
Dix	55 34 57·241	294 52 52·8	114 58 55·9	Thur	8,509·2	3·929888
	130 10 48·992	350 05 38·6	170 06 40·7	Twel	7,680·0	3·885362
Leven	55 34 40·341	37 30 21·7	217 26 07·8	Twel	8,874·1	3·948123
	130 04 25·818	94 29 45·4	274 24 29·3	Dix	6,733·3	3·828226
		341 54 12·0	161 54 59·1	Thur	3,223·6	3·508345
Ate	55 36 33·467	295 02 12·5	115 08 04·6	Leven	8,251·9	3·916555
	130 11 32·552	345 37 03·0	165 37 38·9	Dix	3,072·1	3·487442
Neuf	55 38 51·188	15 26 18·0	195 24 37·1	Leven	8,047·7	3·905674
	130 02 23·543	50 46 55·6	230 39 58·3	Dix	11,429·0	4·058009
		66 09 06·1	246 01 32·9	Ate	10,508·4	4·021536
Sex	55 41 33·678	8 58 51·3	188 57 42·1	Ate	9,399·6	3·973108
	130 10 08·736	301 39 49·6	121 46 13·8	Neuf	9,558·8	3·980404
Seben	55 41 21·924	1 24 38·9	181 24 33·5	Neuf	4,663·2	3·668687
	130 02 16·978	47 30 23·7	227 22 45·0	Ate	13,190·5	4·120262
		92 34 46·5	272 28 16·8	Sex	8,249·6	3·916433
Fore	55 48 22·528	326 28 36·9	146 35 24·4	Seben	15,593·4	4·192942
	130 10 29·909	358 19 28·2	178 19 45·8	Sex	12,650·1	4·102092
Sank	55 48 02·332	31 28 40·2	211 22 52·2	Sex	14,086·8	4·148814
	130 03 07·670	94 41 10·1	274 35 04·3	Fore	7,729·0	3·888124
		355 54 34·1	175 55 16·0	Seben	12,415·1	4·093950
Tray	55 50 25·758	21 02 08·3	201 00 47·3	Sank	4,752·2	3·676894
	130 01 29·755	68 00 06·6	247 52 39·7	Fore	10,147·5	4·006359
Tew	55 51 40·724	43 28 48·3	223 24 12·3	Fore	8,442·3	3·926463
	130 04 56·404	302 47 34·1	122 50 25·1	Tray	4,278·2	3·631257
		344 19 59·0	164 21 28·9	Sank	7,014·6	3·846001

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Won	55 53 37·277	20 30 05·2	200 29 01·1	Tew	3,848·3	3·585266
	130 03 38·919	339 12 59·9	159 14 46·8	Tray	6,334·9	3·801742
"A"	55 53 59·130	32 42 32·3	212 39 10·8	Tray	7,840·4	3·894336
	129 57 26·312	61 22 16·8	241 16 04·3	Tew	8,919·3	3·950333
		84 05 02·9	263 59 54·4	Won	6,510·4	3·813607
Lion Point astronomical station (U.S.C. and G.S.)	55 52 56·234	113 30 20·8	293 28 01·5	Won	3,185·2	3·503136
	130 00 50·853	241 17 23·9	61 20 13·2	"A"	4,052·5	3·607720
Salmon River south-west base (U.S.C. and G.S.)	55 54 13·510 130 01 37·401	341 17 38·8	161 18 17·4	Lion Point astronomical station	2,523·2	3·401951
East R.M.	55 54 43·835 129 59 20·690	25 13 21·4	205 12 06·8	Lion Point astronomical station	3,678·3	3·565646
		68 28 02·3	248 26 09·1	Salmon River south-west base	2,553·6	3·407149
Salmon River north-east base (U.S.C. and G.S.)	55 54 45·465 130 00 49·059	0 31 44·6	180 31 43·1	Lion Point astronomical station	3,378·5	3·528718
		40 21 45·3	220 21 05·2	Salmon River south-west base	1,296·97	3·112929
Law (U.S.C. and G.S.)	55 53 43·137 129 59 56·088	33 16 44·9	213 15 59·6	Lion Point astronomical station	1,735·1	3·239313
		118 05 42·5	298 04 18·6	Salmon River south-west base	1,995·4	3·300036
		154 29 04·2	334 28 20·4	Salmon River north-east base	2,136·1	3·329625
B.P. 1	55 54 43·850	4 05 22·7	184 04 55·4	Tray	8,002·6	3·903231
	130 00 56·962	36 49 36·3	216 49 02·8	Salmon River south-west base	1,172·2	3·069012
		53 49 36·9	233 47 22·8	Won	3,486·9	3·542435
		270 00 18·4	90 01 38·1	East R.M.	1,672·4	3·223331
		290 40 41·0	110 43 35·4	"A"	3,912·5	3·592450
		358 10 21·0	178 10 26·1	Lion Point astronomical station	3,330·1	3·522451
"B"	55 54 42·227	269 06 47·1	89 09 25·6	B.P. 1	3,325·6	3·521872
	130 04 08·382	280 45 22·8	100 50 55·7	"A"	7,111·6	3·851970
		313 39 30·1	133 42 13·7	Lion Point astronomical station	4,746·5	3·676376
MINOR NETS						
Cape Muzon Mon. 1	54 39 51·20	23 08 44	202 53 30	North Island	51,788·1	4·71423
	132 41 10·69	257 41 47	78 06 18	Chacon	33,031·1	4·51892
Cape Muzon Mon. 2	54 39 46·05	128 25 53	308 25 44	Cape Muzon Mon. 1	256·5	2·40912
	132 40 59·48	257 21 10	77 45 32	Chacon	32,869·3	4·51679
Station 2	54 39 48·91	28 19 24	208 19 22	Cape Muzon Mon. 2	100·68	2·00292
	132 40 56·81	105 53 43	285 53 32	Cape Muzon Mon. 1	258·6	2·41262
Sunday	54 44 23·49	166 30 02	346 29 04	Thirty	5,432·4	3·73499
	130 39 04·56	218 23 19	38 30 59	Twenty-eight	16,173·5	4·20880
		234 06 54	54 14 56	Twenty-nine	13,023·5	4·11473
		242 10 46	62 18 10	Des Brisay	10,993·5	4·04114
		253 40 48	73 43 28	Thirty-one	3,659·8	3·56346
R.M. S-1 & 2	54 43 47·87	232 36 43	52 38 50	Thirty-one	3,507·1	3·54494
	130 38 23·98	235 17 51	55 24 42	Des Brisay	10,944·4	4·03919

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
R.M. C-1	54 43 12·42	123 06 46	303 05 29	R.M. S-1 & 2	2,007·0	3·30255
	130 36 50·05	132 24 35	312 22 45	Sunday	3,259·6	3·51316
		153 51 27	333 48 39	Thirty	8,333·9	3·92085
		198 56 01	18 56 52	Thirty-one	3,409·4	3·53267
		224 58 49	45 04 24	Des Brisay	10,353·9	4·01511
R.M. C-2	54 44 29·50	47 40 37	227 39 33	R.M. S-1 & 2	1,911·6	3·28141
	130 37 05·00	85 03 03	265 01 25	Sunday	2,147·1	3·33185
		146 15 42	326 13 06	Thirty	6,130·1	3·78747
		353 35 27	173 35 39	R.M. C-1	2,398·4	3·37992
R.M. S-3	54 45 53·35	247 47 27	67 56 31	Twenty-nine	12,853·9	4·10903
	130 40 20·07	257 59 29	78 07 55	Des Brisay	11,319·9	4·05384
		289 46 51	109 50 33	Thirty-one	5,167·9	3·71332
		306 35 50	126 38 30	R.M. C-2	4,346·9	3·63818
R.M. C-3	54 45 42·90	13 00 48	193 00 22	Sunday	2,520·1	3·40141
	130 38 32·84	99 34 55	279 33 27	R.M. S-3	1,944·3	3·28877
		147 00 54	326 59 30	Thirty	3,370·4	3·52768
		325 17 50	145 19 02	R.M. C-2	2,760·4	3·44097
		338 25 18	158 26 42	R.M. C-1	5,003·4	3·69926
		357 26 50	177 26 57	R.M. S-1 & 2	3,560·5	3·55151
R.M. S-4	54 47 25·03	55 04 17	235 01 11	R.M. S-3	4,948·1	3·69444
	130 36 33·19	273 58 36	94 03 57	Des Brisay	7,034·5	3·84723
R.M. C-4	54 46 34·07	111 51 14	291 48 52	Thirty	3,345·9	3·52451
	130 37 21·75	208 50 20	28 51 00	R.M. S-4	1,799·0	3·25503
		223 33 01	43 39 17	Twenty-eight	11,914·9	4·07609
		262 08 03	82 14 04	Des Brisay	7,960·3	3·90093
R.M. S-5	54 47 53·82	19 20 49	199 19 21	Thirty-one	5,804·0	3·76373
	130 34 00·71	55 33 25	235 30 41	R.M. C-4	4,357·6	3·63925
		71 55 18	251 53 13	R.M. S-4	2,866·2	3·45730
		216 51 53	36 55 25	Twenty-eight	7,705·1	3·88678
		257 39 48	77 43 43	Twenty-nine	5,245·5	3·71979
		287 50 25	107 53 41	Des Brisay	4,509·4	3·65412
R.M. C-5	54 47 11·95	72 10 47	252 08 01	R.M. C-4	3,822·3	3·58233
	130 33 58·18	90 39 53	270 34 45	Thirty	6,743·8	3·82891
		98 19 37	278 17 30	R.M. S-4	2,799·4	3·44707
		178 00 02	358 00 00	R.M. S-5	1,295·6	3·11247
		211 32 07	31 35 37	Twenty-eight	8,751·7	3·94209
		271 10 11	91 13 25	Des Brisay	4,248·2	3·62821
Skid (2)	54 53 27·91	60 13 40	240 08 07	Twenty-eight	8,383·6	3·92343
	130 22 53·75	202 29 03	22 32 33	Twenty-four	11,943·7	4·07714
Chess	54 54 03·80	10 22 33	190 21 52	Twenty-seven	4,934·6	3·69325
	130 24 33·25	25 54 00	205 50 11	Twenty-nine	11,472·6	4·05966
		46 12 12	226 08 00	Twenty-eight	7,622·3	3·88209
		108 59 24	288 59 15	Twenty-six	216·0	2·33436
		302 01 57	122 03 18	Skid (2)	2,092·1	3·32058
R.M. S-6	54 50 17·58	8 10 10	188 09 48	Twenty-nine	3,361·8	3·52657
	130 28 47·07	226 55 04	46 59 53	Skid (2)	8,622·8	3·93565
		239 30 38	59 33 25	Twenty-seven	4,223·3	3·62565
R.M. C-6	54 50 08·66	151 08 01	331 07 54	R.M. S-6	315·0	2·49837
	130 28 38·55	211 00 21	31 03 42	Chess	8,485·9	3·92870
R.M. S-7	54 51 16·90	21 08 08	201 06 37	Twenty-nine	5,533·8	3·74302
	130 27 22·10	32 53 28	212 52 25	R.M. C-6	2,512·7	3·40014
		39 35 14	219 34 05	R.M. S-6	2,379·7	3·37653
		229 43 12	49 46 51	Skid (2)	6,270·0	3·79726
		261 45 28	81 47 05	Twenty-seven	2,145·7	3·33156

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
R.M. C-7	54 50 54·67	59 40 29	239 38 59	R.M. S-6	2,270·3	3·35608
	130 26 57·28	101 00 58	280 58 44	Twenty-eight	2,987·3	3·47527
		203 41 26	23 43 24	Chess	6,387·7	3·80534
R.M. S-8	54 52 35·58	28 24 40	208 21 32	Twenty-nine	8,632·9	3·93616
	130 25 23·85	37 25 18	217 22 39	R.M. C-6	5,718·8	3·75731
		40 22 24	220 19 38	R.M. S-6	5,599·3	3·74814
		238 49 22	58 51 25	Skid (2)	3,127·2	3·49515
		359 37 27	179 37 28	Twenty-seven	2,126·0	3·32756
R.M. C-8	54 52 14·96	43 58 46	223 55 54	R.M. C-6	5,425·3	3·73442
	130 25 07·48	47 12 36	227 09 36	R.M. S-6	5,340·6	3·72759
		53 13 45	233 11 55	R.M. S-7	2,998·3	3·47687
		68 39 52	248 36 08	Twenty-eight	5,250·9	3·72024
		155 24 18	335 24 05	R.M. S-8	701·2	2·84586
		190 16 24	10 16 52	Chess	3,420·6	3·53410
		226 34 24	46 36 13	Skid (2)	3,282·3	3·51617
R.M. S-9	54 55 24·30	29 04 54	209 03 22	Skid (2)	4,118·1	3·61470
	130 21 01·46	240 30 59	60 38 01	Twenty-five	10,541·6	4·02291
R.M. C-9	54 54 45·55	49 19 47	229 17 39	Skid (2)	3,682·7	3·56616
	130 20 17·05	53 43 13	233 39 02	R.M. S-8	6,786·3	3·83163
		74 14 22	254 10 52	Chess	4,744·0	3·67615
		146 34 40	326 34 04	R.M. S-9	1,436·0	3·15716
		191 39 30	11 40 52	Twenty-four	8,814·8	3·94521
R.M. S-10	54 58 38·77	26 16 42	206 13 58	R.M. C-9	8,041·8	3·90535
	130 16 57·20	227 56 44	48 06 30	Twenty-three	17,072·7	4·23230
		279 46 22	99 50 04	Twenty-five	4,902·2	3·69040
R.M. C-10	54 58 15·91	47 19 48	227 15 23	R.M. S-9	7,824·0	3·89343
	130 15 38·46	50 45 08	230 37 50	Chess	12,306·3	4·09013
		116 47 39	296 46 34	R.M. S-10	1,569·0	3·19562
		123 51 42	303 49 16	Twenty-four	3,820·3	3·58210
R.M. S-11	55 03 47·79	257 27 33	77 34 01	Twenty-three	8,611·9	3·93510
	130 12 56·51	356 58 28	176 58 53	Twenty-five	10,405·0	4·01724
R.M. C-11	55 03 46·68	40 25 30	220 19 17	R.M. S-10	12,498·1	4·09684
	130 09 21·56	50 40 16	230 32 41	Twenty-four	12,765·1	4·10602
		90 32 23	270 29 27	R.M. S-11	3,815·3	3·58153
		133 03 40	313 00 07	Twenty-two	6,293·2	3·79887
R.M. S-12	55 05 20·02	223 40 40	43 51 09	Twenty-one	19,633·4	4·29300
	130 11 58·39	277 35 54	97 41 35	Twenty-three	7,440·6	3·87161
		316 01 46	136 03 55	R.M. C-11	4,009·3	3·60306
R.M. C-12	55 05 39·02	39 58 35	219 51 08	Twenty-four	15,091·2	4·17873
	130 09 31·59	46 36 35	226 33 47	R.M. S-11	5,005·0	3·69940
		77 17 47	257 15 47	R.M. S-12	2,669·2	3·42638
		100 32 33	280 29 09	Twenty-two	4,495·9	3·65282
R.M. S-13	55 07 15·11	29 22 05	209 20 32	R.M. S-12	4,083·4	3·61102
	130 10 05·49	204 54 30	24 59 21	Twenty	14,855·7	4·17189
		227 23 36	47 32 33	Twenty-one	15,709·7	4·19617
		310 14 12	130 18 20	Twenty-three	7,037·5	3·84742
		348 33 44	168 34 12	R.M. C-12	3,031·5	3·48166
R.M. C-13	55 07 44·12	22 52 09	202 50 53	R.M. C-12	4,198·5	3·62309
	130 07 59·59	35 48 22	215 44 18	R.M. S-11	9,007·8	3·95462
		43 33 29	223 30 13	R.M. S-12	6,146·8	3·78865
		63 17 41	243 13 01	Twenty-two	6,773·9	3·83084
		68 06 15	248 04 32	R.M. S-13	2,404·8	3·38108

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
R.M. S-14	55 08 54·49	0 49 51	180 49 47	R.M. C-12	6,045·4	3·78142
	130 09 26·65	235 11 49	55 20 14	Twenty-one	13,245·3	4·12206
		265 11 53	85 14 44	Center Point (1)	3,702·5	3·56850
		324 39 43	144 40 55	R.M. C-13	2,667·1	3·42604
		328 25 30	148 29 06	Twenty-three	8,944·0	3·95153
R.M. C-14	55 08 15·97	19 48 02	199 46 41	R.M. C-12	5,158·2	3·71250
	130 07 53·07	38 39 36	218 36 15	R.M. S-12	6,965·6	3·84296
		51 16 47	231 14 58	R.M. S-13	3,008·1	3·47829
		56 50 36	236 45 51	Twenty-two	7,366·5	3·86726
		125 42 36	305 41 19	R.M. S-14	2,041·2	3·30989
R.M. S-15	55 12 02·32	208 27 50	28 29 46	Twenty	5,219·1	3·71759
	130 06 32·17	257 22 39	77 28 41	Twenty-one	7,983·9	3·90222
		353 46 46	173 47 14	Center Point (1)	5,532·8	3·74294
R.M. C-15	55 11 06·38	42 46 34	222 39 56	Twenty-two	12,662·6	4·10252
	130 05 35·88	45 04 25	225 01 15	R.M. S-14	5,772·7	3·76138
		150 04 58	330 04 12	R.M. S-15	1,996·2	3·30021
		193 17 41	13 18 50	Twenty	6,491·8	3·81237
R.M. S-16 & 17	55 17 27·88	183 37 00	3 37 25	Seventeen	8,565·7	3·93276
	129 59 33·83	310 57 44	131 00 08	Nineteen	4,105·3	3·61335
		357 17 26	177 17 44	Twenty-one	8,339·2	3·92113
R.M. C-16	55 16 39·43	59 53 19	239 48 00	Twenty	7,926·7	3·89909
	129 57 43·33	127 32 44	307 31 13	R.M. S-16 & 17	2,459·4	3·39083
		143 37 08	323 31 49	Sixteen	11,533·5	4·06196
R.M. C-17	55 18 26·04	46 47 34	226 46 05	R.M. S-16 & 17	2,626·4	3·41936
	129 57 45·35	58 55 16	238 52 26	Eighteen	4,258·6	3·62927
		131 20 46	311 15 28	Sixteen	9,065·2	3·95738
		359 22 49	179 22 50	R.M. C-16	3,297·1	3·51813
R.M. S-18	55 20 06·51	195 45 15	15 47 50	Fifteen	12,231·4	4·08748
	130 02 06·39	221 31 50	41 34 21	Seventeen	4,867·9	3·68734
		303 59 21	124 02 56	R.M. C-17	5,553·7	3·74458
		322 39 28	142 43 58	Nineteen	9,552·2	3·98010
		324 02 29	144 06 05	R.M. C-16	7,908·6	3·89810
R.M. C-18	55 20 28·38	9 51 54	189 51 06	Eighteen	6,072·8	3·78339
	130 00 13·06	71 18 54	251 17 21	R.M. S-18	2,109·0	3·32408
		117 38 54	297 35 38	Sixteen	4,745·3	3·67627
		155 15 51	335 11 34	Fourteen	13,140·7	4·11862
		352 55 47	172 56 19	R.M. S-16 & 17	5,624·5	3·75009
R.M. S-19	55 26 30·42	271 17 53	91 21 19	Fifteen	4,400·0	3·64345
	130 03 07·70	332 21 59	152 25 20	Seventeen	9,286·9	3·96787
		344 37 35	164 39 59	R.M. C-18	11,610·8	4·06486
R.M. C-19	55 27 43·85	13 39 46	193 37 38	Sixteen	11,594·5	4·06425
	130 01 36·21	35 18 52	215 17 36	R.M. S-19	2,782·6	3·44445
		69 11 40	249 08 31	Fourteen	4,318·5	3·63534
		124 53 58	304 47 25	Twel	10,216·8	4·00932
		310 21 58	130 24 09	Fifteen	3,662·2	3·56374
		345 36 00	165 38 06	Seventeen	10,840·2	4·03504
R.M. S-20	55 29 37·71	204 31 30	24 33 45	Thur	6,920·2	3·84012
	130 06 12·54	305 55 39	125 59 27	R.M. C-19	5,996·6	3·77790
		307 35 11	127 41 09	Fifteen	9,652·1	3·98462
C-20	55 30 08·47	10 41 58	190 41 05	Fourteen	6,114·4	3·78635
	130 04 21·28	64 02 52	244 01 20	R.M. S-20	2,172·5	3·33697
		339 28 39	159 33 01	Seventeen	15,983·8	4·20368
		349 08 21	169 09 22	R.M. S-19	6,866·1	3·83671
R.M. C-20	55 30 09·58	63 12 54	243 11 22	R.M. S-20	2,186·0	3·33965
	130 04 21·40	356 39 39	176 39 39	C-20	34·42	1·53687

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
R.M. S-21	55 34 51·40	135 38 56	315 36 30	Ate	4,416·1	3·64504
	130 08 36·21	208 44 15	28 49 28	Seben	13,780·1	4·13925
		221 17 33	41 22 41	Neuf	9,876·7	3·99461
		274 25 38	94 29 05	Leven	4,400·1	3·64346
		302 15 31	122 19 45	Thur	6,375·4	3·80451
R.M. C-21	55 34 53·89	87 59 17	267 57 34	R.M. S-21	2,184·3	3·33932
	130 06 31·60	120 19 57	300 15 49	Ate	6,104·1	3·78562
		162 56 48	342 53 49	Sex	12,934·4	4·11175
Deer (U.S.C. and G.S.)	55 40 39·45	40 27 45	220 22 39	Ate	9,992·8	3·99969
	130 05 22·13					
R.M. C-22	55 40 39·47	79 46	259 46	Deer	3·37	0·52763
	130 05 21·94					
Pack (U.S.C. and G.S.)	55 41 27·83	33 09 09	213 04 29	Ate	10,869·0	4·03619
	130 05 53·02	340 09 19	160 09 45	Deer	1,590·5	3·20155
R.M. S-22	55 41 19·24	262 30 07	82 31 43	Pack	2,040·7	3·30977
	130 07 48·84	269 08 25	89 12 59	Seben	5,798·4	3·76331
		295 37 16	115 39 17	Deer	2,843·4	3·45384
Whip (2)	55 42 03·84	32 53 41	212 52 59	R.M. S-22	1,642·7	3·21556
	130 06 57·77	314 32 58	134 33 52	Pack	1,587·2	3·20063
		321 09 17	141 13 04	Neuf	7,646·5	3·88347
		327 21 31	147 22 50	Deer	3,098·8	3·49120
Mid (U.S.C. and G.S.)	55 42 10·67	275 45 13	95 46 52	Whip (2)	2,102·5	3·32274
	130 08 57·54	282 06 47	102 12 18	Seben	7,157·5	3·85476
		322 57 27	142 58 24	R.M. S-22	1,992·7	3·29944
R.M. C-23	55 42 40·70	8 11 23	188 11 06	R.M. S-22	2,545·5	3·40578
	130 07 28·08	59 16 33	239 15 19	Mid	1,817·6	3·25949
Yam (2)	55 42 28·67	259 15 49	79 17 22	R.M. C-23	2,000·9	3·30122
	130 09 20·66	285 32 11	105 38 01	Seben	7,682·8	3·88552
		287 05 12	107 07 10	Whip (2)	2,611·0	3·41680
		323 13 51	143 15 07	R.M. S-22	2,680·2	3·42817
		324 02 17	144 02 36	Mid	687·6	2·83735
R.M. S-23	55 43 08·43	287 36 44	107 38 52	R.M. C-23	2,830·8	3·45190
	130 10 02·60	291 59 50	112 06 15	Seben	8,773·4	3·94317
		327 32 18	147 33 12	Mid	2,116·8	3·32569
		329 13 27	149 14 02	Yam (2)	1,431·1	3·15568
Hall (2)	55 49 08·93	14 34 20	194 31 27	Sex	14,546·2	4·16275
	130 06 39·23	70 22 03	250 18 52	Fore	4,266·0	3·63002
Don (2)	55 48 06·56	6 53 11	186 52 02	Sex	12,238·8	4·08774
	130 08 44·73	228 33 21	48 35 05	Hall (2)	2,915·3	3·46468
Rat (2)	55 48 24·42	81 07 12	261 04 24	Don (2)	3,569·8	3·55265
	130 05 22·27	89 24 31	269 20 16	Fore	5,358·9	3·72908
		135 46 20	315 45 16	Hall (2)	1,921·3	3·28360
		184 14 18	4 14 40	Tew	6,087·8	3·78446
		190 30 58	10 32 24	Won	9,841·6	3·99306
R.M. S-24	55 45 52·71	201 04 50	21 06 06	Don (2)	4,436·8	3·64707
	130 10 16·34	207 19 58	27 24 23	Tew	12,120·0	4·08350
		211 54 49	31 57 48	Hall (2)	7,151·2	3·85438
		314 58 20	135 04 56	Seben	11,838·0	4·07328
R.M. C-24	55 46 06·37	80 45 29	260 43 26	R.M. S-24	2,625·5	3·41920
	130 07 47·73	146 09 01	326 06 47	Fore	5,071·6	3·70514
		165 02 34	345 01 47	Don (2)	3,847·6	3·58520
		196 04 28	16 06 50	Tew	10,762·6	4·03192

91264—19

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
R.M. S-25	55 48 49·81	251 17 41	71 19 04	Hall (2)	1,845·5	3·26612
	130 08 19·62	284 14 23	104 16 50	Rat (2)	3,187·1	3·50340
R.M. C-25	55 47 52·63	47 21 45	227 18 34	R.M. S-24	5,472·8	3·73821
	130 06 25·45	100 04 48	280 02 53	Don (2)	2,464·5	3·39173
		102 16 36	282 13 14	Fore	4,357·8	3·63927
		131 39 11	311 37 37	R.M. S-25	2,661·2	3·42507
		174 11 28	354 11 16	Hall (2)	2,371·9	3·37510
		192 22 58	12 24 12	Tew	7,222·6	3·85869
		228 13 02	48 13 54	Rat (2)	1,475·7	3·16901
R.M. S-26	55 49 38·84	17 58 50	197 55 00	Sex	15,772·4	4·19790
	130 05 30·03	52 29 46	232 28 49	Hall (2)	1,519·1	3·18158
		65 42 48	245 38 40	Fore	5,730·7	3·75821
		356 38 28	176 38 34	Rat (2)	2,305·5	3·36277
R.M. C-26	55 48 59·26	80 05 58	260 00 50	Fore	6,578·5	3·81813
	130 04 17·86	86 03 24	266 00 04	R.M. S-25	4,220·3	3·62534
		96 56 48	276 54 51	Hall (2)	2,479·9	3·39443
		134 15 49	314 14 49	R.M. S-26	1,754·3	3·24410
		172 21 15	352 20 43	Tew	5,038·7	3·70232
		184 30 03	4 30 35	Won	8,625·2	3·93577
Debt (U.S.C. and G.S.)	55 52 57·01	213 45 37	33 46 23	Law	1,716·2	3·23457
	130 00 50·97					
Keen	55 52 50·43	240 09 31	60 11 47	Law	3,278·0	3·51562
	130 02 39·70	263 50 33	83 52 03	Debt	1,901·3	3·27904
		264 33 57	84 35 27	Lion Point astronomical station	1,900·8	3·27895
Boundary tablet No. 1	55 54 43·85	90 00 22	270 00 18	B.P. 1	70·87	1·85044
	130 00 52·88					
Boundary tablet No. 2	55 54 44·76	4 57 06	184 57 06	B.P. 1	28·09	1·44861
	130 00 56·82					
B.P. 2	55 55 07·24	77 09 26	257 06 45	"B"	3,474·9	3·54094
	130 00 53·35	300 19 58	120 22 50	"A"	4,168·3	3·61996
		359 23 07	179 23 09	Lion Point astronomical station	4,052·1	3·60768
B.P. 3	55 55 48·28	4 54 42	184 54 34	B.P. 1	2,000·1	3·30106
	130 00 47·10	323 00 48	143 02 00	East R.M.	2,495·1	3·39709
B.P. 4	55 56 49·26	1 48 30	181 48 19	Lion Point astronomical station	7,210·6	3·85797
	130 00 37·77					
		4 54 16	184 54 03	B.P. 2	3,166·7	3·50061
		42 58 21	222 55 26	"B"	5,367·5	3·72977
		327 41 22	147 44 01	"A"	6,224·2	3·79408
B.P. 8	56 00 29·96	21 23 32	201 20 11	"B"	11,548·6	4·06253
	130 00 05·90	347 04 43	167 06 55	"A"	12,401·0	4·09346
Dilly	56 00 13·46	195 48 09	15 48 16	B.P. 8	530·6	2·72478
	130 00 14·24					
B.P. 7	56 00 05·21	155 50 42	335 50 37	Dilly	279·7	2·44667
	130 00 07·63	182 14 57	2 14 58	B.P. 8	766·3	2·88442
B.P. 6	56 00 04·11	184 55 35	4 55 35	B.P. 7	34·15	1·53343
	130 00 07·80					
B.P. 5	55 59 35·65	178 15 08	358 15 06	Dilly	1,169·7	3·06809
	130 00 12·18	183 42 24	3 42 29	B.P. 8	1,683·3	3·22616
		184 55 31	4 55 35	B.P. 7	917·4	2·96257

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Texas	56 01 48·79	289 40 55	109 46 21	B.P. 8	7,222·4	3·85868
	130 06 38·35	326 32 26	146 40 03	"A"	17,398·5	4·24051
		348 49 45	168 51 50	"B"	13,446·8	4·12862
Center	56 04 32·57	308 49 42	128 57 08	B.P. 8	11,951·7	4·07743
	130 09 03·21	333 39 01	153 41 01	Texas	5,652·3	3·75222
B.P. 15	56 07 22·97	3 00 20	182 59 54	Texas	10,350·2	4·01495
	130 06 07·01	30 02 47	210 00 21	Center	6,087·2	3·78442
		333 53 36	153 58 36	B.P. 8	14,220·1	4·15290
		335 16 49	155 21 42	Dilly	14,619·8	4·16494
B.P. 9	56 01 03·05	153 58 12	333 53 36	B.P. 15	13,081·4	4·11665
	130 00 34·74					
Dally	56 01 16·31	158 18 25	338 14 48	B.P. 15	12,207·4	4·08662
	130 01 45·84	288 24 26	108 25 25	B.P. 9	1,298·2	3·11334
B.P. 10	56 02 39·51	153 57 02	333 53 36	B.P. 15	9,760·9	3·98949
	130 01 58·91	333 57 02	153 58 12	B.P. 9	3,320·5	3·52120
		354 58 20	174 58 31	Dally	2,583·3	3·41217
Oatmeal	56 04 36·69	148 13 48	328 11 15	B.P. 15	6,050·8	3·78182
	130 03 02·61					
Bacon	56 05 06·85	19 21 39	199 21 23	Oatmeal	988·9	2·99516
	130 02 43·66	140 09 52	320 07 03	B.P. 15	5,484·5	3·73914
Salmon Glacier north base	56 04 10·64	216 37 09	36 37 38	Oatmeal	1,003·9	3·00170
	130 03 37·23					
Salmon Glacier south base	56 04 02·75	190 26 38	10 26 40	Salmon Glacier north base	248·00	2·39446
	130 03 39·83	211 31 17	31 31 48	Oatmeal	1,231·4	3·09038
B.P. 11 ecc.	56 04 00·22	98 23 28	278 23 03	Salmon Glacier south base	536·1	2·72921
	130 03 09·18					
B.P. 11	56 03 59·38	162 20 06	342 20 06	11 ecc.	27·30	1·43614
	130 03 08·70					
B.P. 12	56 04 12·79	47 14 09	227 13 53	Salmon Glacier south base	457·3	2·66020
	130 03 20·42	77 05 52	257 05 38	Salmon Glacier north base	298·3	2·47462
B.P. 13 ecc.	56 04 42·31	234 57 07	54 57 59	Bacon	1,322·2	3·12128
	130 03 46·25	282 58 05	102 58 41	Oatmeal	774·6	2·88905
		333 46 06	153 46 37	11 ecc.	1,451·1	3·16169
		333 55 33	153 55 54	B.P. 12	1,016·4	3·00707
		333 55 33	153 56 04	B.P. 11	1,478·1	3·16970
		350 57 05	170 57 12	Salmon Glacier north base	991·9	2·99648
		354 48 49	174 48 54	Salmon Glacier south base	1,228·5	3·08938
B.P. 13	56 04 42·32	333 56	153 56	13 ecc.	0·40	9·5980–10
	130 03 46·26					
B.P. 14	56 05 57·10	305 02 50	125 04 36	Bacon	2,705·4	3·43224
	130 04 51·73	322 48 02	142 49 33	Oatmeal	3,122·0	3·49443
B.P. 16	56 05 48·00	291 48 28	111 53 07	Center	6,269·5	3·79723
	130 14 39·71	302 56 19	123 08 24	B.P. 8	18,041·8	4·25628
		311 33 31	131 40 10	Texas	11,140·8	4·04692

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
White-Fraser	56 05 58·47	72 16 14	252 15 26	B.P. 16	1,062·6	3·02638
	130 13 41·17	251 31 50	71 38 07	B.P. 15	8,272·4	3·91763
		303 47 07	123 57 59	B.P. 9	16,392·4	4·21464
		305 06 05	125 15 58	Dally	15,145·7	4·18029
		305 39 43	125 50 59	B.P. 8	17,387·9	4·24025
B.P. 15A	56 05 58·86	349 41 50	169 41 50	White-Fraser	12·28	1·08932
	130 13 41·29					
B.P. 17	56 07 43·68	272 17 33	92 29 49	B.P. 15	15,330·2	4·18555
	130 20 53·63	293 28 47	113 34 46	White-Fraser	8,151·1	3·91121
		298 55 44	119 00 55	B.P. 16	7,386·2	3·86842
B.P. 18 R.M.	56 08 30·47	275 49 35	96 05 37	B.P. 15	20,106·2	4·30333
	130 25 24·77	287 08 30	107 12 15	B.P. 17	4,901·5	3·69033
		291 03 41	111 13 25	White-Fraser	13,034·1	4·11508
		294 11 37	114 20 32	B.P. 16	12,226·1	4·08729
		298 03 43	118 24 19	B.P. 9	29,252·3	4·46616
		299 19 09	119 40 09	B.P. 8	30,185·9	4·47980
		300 17 34	120 38 27	Dilly	30,317·4	4·48169
B.P. 18	56 08 30·56	274 25 25	94 25 27	B.P. 18 R.M.	37·3	1·57159
	130 25 26·92	275 49 24	96 05 27	B.P. 15	20,143·5	4·30413
		291 00 51	111 10 37	White-Fraser	13,069·9	4·11627
		299 17 20	119 38 22	B.P. 8	30,219·7	4·48029
London	56 01 37·17	139 36 26	319 27 43	B.P. 18	16,806·0	4·22546
	130 14 56·25	151 26 13	331 21 17	B.P. 17	12,911·8	4·11099
		182 06 40	2 06 54	B.P. 16	7,763·4	3·89005
		220 30 07	40 37 26	B.P. 15	14,078·5	4·14856
		228 21 40	48 26 33	Center	8,171·5	3·91230

BURROUGHS BAY AND UNUK RIVER

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET	° ′ ″	° ′ ″	° ′ ″			
Mab (2) (U.S.C. and G.S.)	56 00 21·704					
	131 13 35·413					
Deed (2) (U.S.C. and G.S.)	55 59 31·655	140 53 40·7	320 52 40·5	Mab (2)	1,995·1	3·299956
	131 12 22·798					
Feat (U.S.C. and G.S.)	56 00 21·015	48 46 03·3	228 44 40·0	Deed (2)	2,315·7	3·364673
	131 10 42·341	90 25 38·4	270 23 14·9	Mab (2)	2,999·3	3·477021
Jane (2) (U.S.C. and G.S.)	56 00 41·084	286 48 16·9	106 49 55·2	Feat	2,145·3	3·331479
	131 12 40·848	351 42 33·4	171 42 48·4	Deed (2)	2,170·0	3·336460
Bight (2) (U.S.C. and G.S.)	56 01 41·725	20 56 49·3	200 55 35·7	Deed (2)	4,307·3	3·634203
	131 10 53·970	44 38 30·5	224 37 01·9	Jane (2)	2,635·4	3·420854
		355 23 04·1	175 23 13·8	Feat	2,504·4	3·398699
Oak (U.S.C. and G.S.)	56 02 04·798	22 22 52·0	202 21 48·8	Feat	3,471·2	3·540475
	131 09 26·072	52 31 07·6	232 28 26·1	Jane (2)	4,252·8	3·628680
Tab (U.S.C. and G.S.)	56 01 47·619	55 30 24·4	235 27 18·0	Feat	4,726·7	3·674561
	131 06 57·535	70 57 09·6	250 52 24·9	Jane (2)	6,293·1	3·798863
		87 28 41·5	267 25 25·4	Bight (2)	4,098·9	3·612664
		101 41 17·2	281 39 14·0	Oak	2,626·6	3·419392

BURROUGHS BAY AND UNUK RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Dick (U.S.C. and G.S.)	56 03 08·070	29 36 55·9	209 34 35·4	Feat	5,942·1	3·773939
	131 07 52·892	338 55 40·8	158 56 26·7	Tab	2,666·5	3·425936
Unuk (U.S.C. and G.S.)	56 02 54·670	23 10 54·1	203 10 11·6	Tab	2,255·8	3·353310
	131 06 06·260	45 12 28·6	225 08 39·7	Feat	6,741·6	3·828764
		65 59 31·4	245 56 45·7	Oak	3,787·7	3·578376
		102 40 05·1	282 38 36·7	Dick	1,891·7	3·276852
MINOR NET						
Hollow (I.B.C.) (U.S.C. and G.S.)	56 01 51·48	98 29 09	278 26 56	Oak	2,798·1	3·44686
	131 06 46·25	154 02 25	334 01 30	Dick	2,635·0	3·42077
		199 30 15	19 30 48	Unuk	2,073·5	3·31671
Burroughs Bay astronomical station	56 02 16·23	52 06 22	232 05 35	Hollow	1,246·4	3·09566
	131 05 49·46	126 53 42	306 51 59	Dick	2,671·5	3·42675
Pole	56 03 04·02	14 29 00	194 28 32	Hollow	2,317·2	3·36496
	131 06 12·79	18 09 27	198 08 50	Tab	2,486·7	3·39562
		61 19 31	241 17 01	Oak	3,814·7	3·58146
		94 08 58	274 07 35	Dick	1,737·2	3·23984
		344 42 40	164 42 59	Burroughs Bay astronomical station	1,532·1	3·18530
Rock	56 03 28·68	40 19 19	220 18 48	Pole	1,000·5	3·00021
	131 05 35·39	75 01 12	254 59 18	Dick	2,463·7	3·39159
Unuk south base	56 04 49·55	3 09 18	183 09 11	Rock	2,505·1	3·39883
	131 05 27·42	13 31 39	193 31 01	Pole	3,357·2	3·52598
		38 44 33	218 42 32	Dick	4,023·4	3·60459
Goose	56 04 02·28	42 27 05	222 26 19	Rock	1,408·0	3·14861
	131 04 40·47	150 57 27	330 56 48	Unuk south base	1,672·7	3·22342
Unuk north base	56 05 15·04	5 20 00	185 19 50	Goose	2,260·4	3·35418
	131 04 28·33	19 25 58	199 25 02	Rock	3,488·2	3·54260
		52 21 41	232 20 52	Unuk south base	1,290·67	3·11082
Ooli	56 05 13·64	269 19 04	89 22 05	Unuk north base	3,773·4	3·57673
	131 08 06·52	301 44 50	121 47 41	Goose	4,192·3	3·62245
		321 08 08	141 10 14	Rock	4,168·3	3·61996
Cubs	56 06 04·20	77 08 51	257 03 32	Unuk north base	6,812·6	3·83331
	130 58 04·24	81 31 44	261 23 24	Ooli	10,530·1	4·02243
Can	56 07 37·87	36 39 29	216 36 50	Ooli	5,559·1	3·74501
	131 04 54·59	292 10 29	112 16 10	Cubs	7,660·2	3·88424
		354 07 48	174 08 10	Unuk north base	4,440·9	3·64747
Blank	56 10 17·84	33 25 31	213 22 54	Can	5,926·9	3·77283
	131 01 45·60	333 59 34	154 02 38	Cubs	8,726·9	3·94086
Lake	56 11 33·90	37 58 11	217 51 49	Cubs	12,925·7	4·11145
	130 50 24·21	64 11 03	243 59 00	Can	16,702·8	4·22279
		78 45 44	258 36 18	Blank	11,987·4	4·07872
Jes	56 09 07·36	129 42 25	309 38 02	Lake	7,100·0	3·85126
	130 45 07·48	273 03 33	93 19 53	B.P. 18	20,415·4	4·30996
Hop	56 10 23·32	105 32 30	285 26 10	Lake	8,173·8	3·91243
	130 42 47·57					
Glacier	56 12 53·19	34 06 47	214 04 10	Blank	5,801·7	3·76356
	130 58 37·03	286 02 35	106 09 25	Lake	8,843·5	3·94662
Snow	56 13 03·02	52 08 15	232 05 24	Lake	4,488·7	3·65212
	130 46 58·72	71 37 53	251 25 36	Blank	16,124·7	4·20749
		88 38 01	268 28 21	Glacier	12,039·3	4·08060

BURROUGHS BAY AND UNUK RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Bluvue	56 17 44·06	325 16 14	145 25 07	Jes	19,428·5	4·28844
	130 55 48·61	333 57 02	154 01 32	Lake	12,739·7	4·10516
Dickens	56 15 54·42	43 13 42	223 09 42	Snow	7,272·2	3·86167
	130 42 09·72	71 52 13	251 38 32	Glacier	17,906·0	4·25300
Net	56 17 15·50	9 47 56	189 45 50	Jes	15,320·9	4·18528
	130 42 36·44	30 04 14	210 00 36	Snow	9,021·1	3·95526
		37 22 52	217 16 23	Lake	13,287·2	4·12343
		63 58 58	243 45 39	Glacier	18,423·4	4·26537
		93 48 03	273 37 04	Bluvue	13,654·9	4·13529
		312 20 22	132 34 37	B.P. 18	24,051·6	4·38114
		349 36 17	169 36 39	Dickens	2,549·5	3·40646
B.P. 23	56 14 35·93	60 20 15	240 05 59	Jes	20,460·5	4·31092
	130 27 57·62	63 06 51	242 54 31	Hop	17,216·5	4·23594
		108 10 17	287 58 06	Net	15,911·9	4·20172
		347 01 51	167 03 56	B.P. 18	11,595·6	4·06430
Goat	56 09 25·19	181 08 14	1 08 23	B.P. 23	9,613·0	3·98286
	130 28 08·70					
Ralf	56 12 30·29	179 41 52	359 41 51	B.P. 23	3,886·1	3·58951
	130 27 56·43	340 47 58	160 50 02	B.P. 18	7,850·5	3·89490
Leduc	56 13 17·98	10 20 18	190 19 00	B.P. 18	9,036·2	3·95599
	130 23 53·01	70 39 20	250 35 58	Ralf	4,447·3	3·64810
Al	56 11 42·19	117 46 45	297 44 29	Ralf	3,194·2	3·50436
	130 25 12·50	152 06 54	332 04 37	B.P. 23	6,080·8	3·78396
		204 48 30	24 49 36	Leduc	3,264·4	3·51381
B.P. 19	56 10 29·24	44 32 19	224 30 45	Goat	2,779·0	3·44388
	130 26 15·78	167 03 16	347 01 51	B.P. 23	7,829·3	3·89372
Leduc south bolt	56 11 55·83	230 25 26	50 27 54	Leduc	3,990·2	3·60099
	130 26 51·49					
B.P. 20	56 11 55·84	347 03	167 03	Leduc south bolt	0·21	9·3263–10
	130 26 51·49					
B.P. 21	56 12 12·03	13 16 32	193 15 33	Goat	5,301·8	3·72442
	130 26 58·17	167 02 40	347 01 51	B.P. 23	4,567·2	3·65965
		296 51 01	116 52 29	Al	2,042·5	3·31016
Leduc north bolt	56 12 51·87	47 12 32	227 11 57	Ralf	982·3	2·99225
	130 27 14·62					
B.P. 22	56 12 55·18	7 58 33	187 57 49	Goat	6,558·2	3·81678
	130 27 15·98	42 10 31	222 09 57	Ralf	1,038·6	3·01643
		167 02 25	347 01 51	B.P. 23	3,197·8	3·50485
		316 39 52	136 41 35	Al	3,103·0	3·49178
		347 02 25	167 03 56	B.P. 18	8,397·8	3·92417
		347 02 25	167 02 40	B.P. 21	1,369·4	3·13655
B.P. 24	56 14 51·77	51 17 02	231 06 24	Jes	16,998·8	4·23042
	130 32 19·20	112 46 42	292 38 09	Net	11,516·5	4·06132
		276 10 35	96 14 13	B.P. 23	4,531·5	3·65624
		328 51 45	148 57 27	B.P. 18	13,768·3	4·13888
B.P. 28	56 16 01·72	292 49 54	112 54 02	B.P. 24	5,567·8	3·74568
	130 37 17·19	318 39 00	138 48 50	B.P. 18	18,565·0	4·26870
Peak 5800	56 17 44·16	22 28 59	202 27 12	B.P. 24	5,770·0	3·76117
	130 30 11·08	63 29 41	243 15 43	Snow	19,405·8	4·28793
		66 40 36	246 34 42	B.P. 28	7,986·9	3·90238
		67 17 33	246 51 18	Blank	35,436·7	4·54945
		73 09 44	252 46 05	Glacier	30,720·2	4·48742
		86 07 53	265 57 33	Net	12,851·8	4·10897

BURROUGHS BAY AND UNUK RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Smith	56 15 10·12 130 34 50·99	282 14 13	102 16 19	B.P. 24	2,674·7	3·42727
Gracey Creek monument	56 15 13·29 130 34 00·73	83 32 48 290 50 00	263 32 06 110 51 24	Smith B.P. 24	870·9 1,870·7	2·93996 3·27201
B.P. 25	56 15 17·34 130 34 08·00	73 13 31 315 00 41	253 12 55 135 00 47	Smith Gracey Creek monument	773·1 177·0	2·88824 2·24809
B.P. 26	56 15 27·18 130 34 49·93	228 31 35 292 51 56	48 35 27 112 52 31	Peak 5800 B.P. 25	6,401·1 783·4	3·80626 2·89400
B P. 27	56 15 55·09 130 36 48·90	112 50 17	292 49 54	B.P. 28	528·4	2·72294
B.P. 40	56 22 01·60 130 46 48·40	0 36 41 10 51 08 35 47 01 49 25 43 305 12 14 311 33 18 333 53 53 355 50 19	180 36 33 190 48 09 215 37 11 229 18 13 125 27 55 131 45 21 153 57 22 175 51 43	Snow Lake Glacier Bluvue B.P. 23 B.P. 24 Net Jes	16,659·4 19,766·8 20,888·0 12,232·0 23,834·5 20,002·7 9,851·7 24,010·3	4·22166 4·29594 4·31990 4·08750 4·37721 4·30109 3·99351 4·38040
Tom	56 15 57·75 130 37 06·05	29 40 45 33 13 57 284 56 24 292 25 09 302 20 27 318 50 55	209 36 01 213 07 17 105 04 00 112 29 08 122 22 19 139 00 36	Hop Jes B.P. 23 B.P. 24 Smith B.P. 18	11.901·1 15,165·6 9,776·0 5,343·6 2,752·5 18,346·4	4·07559 4·18086 3·99016 3·72784 3·43973 4·26355
B.P. 29	56 16 09·56 130 37 29·60	84 29 07 138 38 49	264 25 14 318 31 04	Dickens B.P. 40	4,844·2 14,519·9	3·68522 4·16196
Lake Creek west bolt	56 16 56·73 130 38 44·24	19 02 23 318 37 47	198 59 01 138 38 59	Hop B.P. 28	12,870·2 2,267·1	4·10958 3·35547
B.P. 30	56 16 52·24 130 38 37·13	25 07 10 138 37 53	205 01 45 318 31 04	Jes B.P. 40	15.874·9 12,761·1	4·20071 4·10589
B.P. 31	56 16 56·73 130 38 44·24	138 38	318 38	Lake Creek west bolt	0·05	8·6902–10
B.P. 32	56 17 42·59 130 39 56·87	269 39 23 303 48 00 318 36 47	89 47 30 123 54 21 138 39 00	Peak 5800 B.P. 24 B.P. 28	10,075·5 9,484·5 4,157·3	4·00327 3·97701 3·61881
B.P. 39	56 21 06·90 130 45 21·32	138 32 17 338 22 48	318 31 04 158 25 05	B.P. 40 Net	2,258·0 7,697·9	3·35373 3·88637
Boulder	56 20 25·12 130 41 43·37	8 50 57 109 04 09	188 50 13 289 01 08	Net B.P. 39	5,935·6 3,960·4	3·77346 3·59774
Camp south base	56 20 25·45 130 44 24·61	270 11 28	90 13 42	Boulder	2,770·0	3·44249
Camp north base	56 20 30·00 130 44 15·28	48 44 58	228 44 50	Camp south base	213·28	2·32895
Bar	56 20 22·72 130 44 10·42	109 04 31 159 39 44 268 18 09	289 04 19 339 39 40 88 20 11	Camp south base Camp north base Boulder	257·9 239·8 2,527·4	2·41140 2·37994 3·40268
B P. 33	56 18 24·45 130 41 03·25	169 32 12	349 31 39	Boulder	3,795·5	3·57926

BURROUGHS BAY AND UNUK RIVER—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B P 34	56 19 18·68	138 34 40	318 32 17	B.P. 39	4,465·4	3·64986
	130 42 29·29	201 00 06	21 00 44	Boulder	2,201·4	3·34270
		318 34 40	138 35 52	B.P. 33	2,236·3	3·34953
B.P. 35	56 19 41·87	138 34 09	318 32 17	B.P. 39	3,508·6	3·54513
	130 43 06·13	226 44 30	46 45 39	Boulder	1,952·3	3·29055
B.P. 36	56 20 06·83	138 33 36	318 32 17	B.P. 39	2,479·0	3·39428
	130 43 45·78	254 55 41	74 57 23	Boulder	2,177·9	3·33804
		318 33 36	138 34 09	B.P. 35	1,029·6	3·01265
B.P. 37	56 20 19·47	119 53 13	299 52 57	Camp south base	371·2	2·56955
	130 44 05·88	153 37 28	333 37 20	Camp north base	363·4	2·56037
B.P. 38	56 20 37·88	277 35 58	97 38 21	Boulder	2,977·4	3·47383
	130 44 35·16	305 32 27	125 32 44	Camp north base	419·7	2·62297
		317 48 55	137 49 16	Bar	632·8	2·80125
		318 32 55	138 33 19	B.P. 37	759·9	2·88073
		334 46 28	154 46 37	Camp south base	425·2	2·62856
Twin John	56 32 08·11	12 36 41	192 30 54	B.P. 24	32,843·2	4·51644
	130 25 22·26	17 30 33	197 22 41	B.P. 26	32,453·9	4·51127
		32 49 58	212 35 36	Net	32,813·7	4·51606
		44 00 55	223 33 14	Glacier	49,480·2	4·69443
		45 16 00	224 59 21	B.P. 39	28,988·0	4·46222
Ray	56 20 00·58	2 10 05	182 09 36	Lake	15,683·0	4·19543
	130 49 49·80	55 38 49	235 33 50	Bluvue	7,475·2	3·87362
		304 22 24	124 28 25	Net	9,032·4	3·95580
		346 26 08	166 30 03	Jes	20,781·1	4·31767
Carol	56 19 40·71	263 56 33	84 01 15	Ray	5,863·0	3·76812
	130 55 29·12	288 35 22	108 46 05	Net	14,024·0	4·14687
Lava	56 21 39·56	308 16 30	128 19 38	Ray	4,939·2	3·69366
	130 53 35·47	350 00 48	170 03 27	Lake	19,020·0	4·27921
Albert	56 23 12·18	2 40 36	182 40 21	Carol	6,548·1	3·81611
	130 55 11·32	3 36 58	183 36 27	Bluvue	10,169·1	4·00728
		310 17 54	130 28 22	Net	17,026·9	4·23114
		316 59 31	137 03 59	Ray	8,099·3	3·90845
		330 07 17	150 08 37	Lava	3,303·8	3·51901
		347 05 09	167 09 08	Lake	22,155·6	4·34548
B.P. 41	56 22 37·75	37 07 28	217 04 07	Carol	6,865·2	3·83666
	130 51 28·01	50 34 29	230 32 43	Lava	2,833·2	3·45228
B.P. 42	56 22 47·01	24 34 42	204 33 56	Lava	2,294·1	3·36061
	130 52 39·90					
B.P. 43	56 23 03·32	283 02 06	103 03 52	B.P. 42	2,234·1	3·34911
	130 54 46·72	317 54 50	137 58 57	Ray	7,611·8	3·88149
		334 43 15	154 44 14	Lava	2,865·0	3·45712
B.P. 44	56 23 06·96	3 18 02	183 17 34	Bluvue	10,004·1	4·00018
	130 55 15·13	315 51 54	135 56 25	Ray	8,027·3	3·90457
B.P. 45	56 23 15·92	351 47 50	171 48 37	Carol	6,725·4	3·82772
	130 56 24·96					
B.P. 46	56 23 26·85	340 52 36	160 54 34	Carol	7,402·3	3·86937
	130 57 50·23					
B.P. 47	56 24 22·60	281 56 59	102 05 16	Albert	10,460·6	4·01956
	131 05 07·76	297 06 41	117 19 25	Ray	17,719·6	4·24846
		311 12 28	131 20 30	Carol	13,217·5	4·12115
		322 00 58	142 08 43	Bluvue	15,626·1	4·19385

BRADFIELD RIVER

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET	° ′ ″	° ′ ″	° ′ ″			
Tyee	56 12 24·36					
	131 26 15·37					
Bradfield south base	56 13 08·22	289 23 31	109 26 36	Tyee	4,080·3	3·61069
	131 29 58·63					
Bradfield north base	56 14 05·25	46 37 49	226 36 19	Bradfield south base	2,568·27	3·40964
	131 28 10·30	327 35 04	147 36 39	Tyee	3,696·0	3·56773
First	56 14 55·22	290 15 13	110 18 35	Bradfield north base	4,458·1	3·64915
	131 32 13·08	307 05 08	127 10 05	Tyee	7,730·3	3·88820
		324 59 45	145 01 37	Bradfield south base	4,039·4	3·60632
Daws	56 19 40·95	29 42 41	209 38 38	First	10,172·2	4·00741
	131 27 20·31	248 59 54	69 18 23	B.P. 47	24,479·0	4·38879
		355 15 38	175 16 32	Tyee	13,549·9	4·13194
Cloud	56 19 52·52	31 16 06	211 09 20	Tyee	16,207·6	4·20972
	131 18 07·38	57 48 00	237 36 17	First	17,210·4	4·23579
		87 54 23	267 46 43	Daws	9,508·3	3·97810
		237 56 18	58 07 07	B.P. 47	15,776·7	4·19802
Forks	56 23 55·10	36 38 55	216 34 12	Daws	9,793·0	3·99091
	131 21 40·16	267 01 26	87 15 13	B.P. 47	17,042·4	4·23153
		334 00 56	154 03 53	Cloud	8,345·1	3·92143
B.P. 53	56 33 10·60	337 08 17	157 16 41	Cloud	26,776·0	4·42775
	131 28 12·78	338 35 27	158 40 54	Forks	18,450·0	4·26600
		357 56 16	177 57 00	Daws	25,059·4	4·39897
B.P. 48	56 26 59·27	31 27 07	211 20 36	Cloud	15,464·0	4·18932
	131 10 17·81	52 25 18	232 11 06	Daws	22,171·7	4·34580
		64 06 41	243 57 13	Forks	13,010·0	4·11428
		122 06 45	301 51 48	B.P. 53	21,681·6	4·33609
Bob	56 27 31·92	131 36 49	311 27 12	B.P. 53	15,799·1	4·19863
	131 16 41·36	278 41 43	98 47 03	B.P. 48	6,646·6	3·82260
Alex	56 29 33·45	47 35 29	227 32 09	Bob	5,570·8	3·74592
	131 12 41·18	112 58 23	292 45 26	B.P. 53	17,286·1	4·23770
		332 44 52	152 46 52	B.P. 48	5,363·6	3·72946
Dick	56 35 23·34	7 03 27	187 01 59	Bob	14,692·4	4·16709
	131 14 55·95	347 58 14	168 00 07	Alex	11,064·8	4·04394
Benno	56 32 26·48	21 16 58	201 15 16	Alex	5,743·2	3·75915
	131 10 39·36	34 14 49	214 09 47	Bob	11,016·5	4·04204
		141 19 56	321 16 22	Dick	7,009·3	3·84567
Line north	56 29 55·65	240 42 10	60 48 57	Benno	9,550·8	3·98004
	131 18 46·75	301 59 41	122 06 45	B.P. 48	10,279·7	4·01198
		334 12 52	154 14 36	Bob	4,936·6	3·69343
Line south	56 29 37·86	122 00 24	301 59 41	Line north	1,038·7	3·01649
	131 17 55·27	234 58 03	55 04 07	Benno	9,097·6	3·95893
		302 00 24	122 06 45	B.P. 48	9,241·0	3·96572
		341 59 52	162 00 54	Bob	4,095·5	3·61231
B.P. 50	56 29 33·95	122 00 33	302 00 24	Line south	228·0	2·35793
	131 17 43·97					
B.P. 49	56 29 31·31	122 00 39	302 00 33	B.P. 50	154·0	2·18752
	131 17 36·33					
B.P. 51	56 29 50·94	121 59 52	301 59 41	Line north	274·8	2·43902
	131 18 33·13					
B.P. 52	56 30 01·78	301 59 26	121 59 41	Line north	358·0	2·55388
	131 19 04·50					

STIKINE RIVER

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET	° ′ ″	° ′ ″	° ′ ″			
B.P. 62 (I.B.C.) (U.S.C. and G.S.)	56 35 58·270 131 50 01·028					
B.P. 66 (I.B.C.) (U.S.C. and G.S.)	56 42 11·883 131 51 32·295	352 19 31·5	172 20 47·7	B.P. 62	11,660·8	4·066727
MINOR NETS						
Iskut (I.B.C.) (U.S.C. and G.S.)	56 41 20·44 131 41 23·24	41 35 08 98 47 55	221 27 55 278 39 26	B.P. 62 B.P. 66	13,310·8 10,487·0	4·12420 4·02065
B.P. 53	56 33 10·60 131 28 12·78	103 13 25 125 13 07	282 55 13 304 53 38	B.P. 62 B.P. 66	22,930·1 29,149·3	4·36041 4·46463
Raven	56 37 19·38 131 36 52·87	79 31 16 121 13 59 310 51 39	259 20 18 301 01 44 130 58 53	B.P. 62 B.P. 66 B.P. 53	13,676·2 17,500·6 11,747·9	4·13597 4·24305 4·06996
B.P. 54	56 36 45·04 131 34 45·37	84 48 53 116 02 47	264 36 09 296 01 01	B.P. 62 Raven	15,687·8 2,420·0	4·19556 3·38381
B.P. 55	56 36 35·70 131 37 51·30	84 46 18 126 43 28	264 36 09 306 32 02	B.P. 62 B.P. 66	12,503·0 17,429·2	4·09702 4·24128
B.P. 56	56 36 30·88 131 39 26·62	84 44 58 130 33 12	264 36 09 310 23 06	B.P. 62 B.P. 66	10,870·4 16,251·7	4·03624 4·21090
B.P. 57	56 36 22·29 131 42 15·46	264 42 37 292 18 05	84 48 53 112 29 49	B.P. 54 B.P. 53	7,710·0 15,559·9	3·88706 4·19201
B.P. 58	56 36 16·40 131 44 10·44	84 41 01 145 39 12	264 36 09 325 33 03	B.P. 62 B.P. 66	6,007·8 13,326·0	3·77872 4·12470
B.P. 59	56 36 13·93 131 44 58·60	84 40 21 148 50 14	264 36 09 328 44 45	B.P. 62 B.P. 66	5,182·5 12,945·6	3·71454 4·11212
B.P. 60	56 36 11·68 131 45 42·25	264 39 45	84 40 21	B.P. 59	747·95	2·87387
B.P. 61	56 36 04·56 131 48 00·08	84 37 50 162 22 15	264 36 09 342 19 18	B.P. 62 B.P. 66	2,072·9 11,923·6	3·31657 4·07641
Boulder	56 39 31·56 131 43 04·88	47 07 46 119 54 57	227 01 58 299 47 53	B.P. 62 B.P. 66	9,688·5 9,961·4	3·98626 3·99832
Stikine east base	56 40 09·16 131 49 50·26	1 21 21 155 25 32	181 21 12 335 24 07	B.P. 62 B.P. 66	7,762·6 4,174·7	3·89001 3·62062
Stikine west base	56 40 09·17 131 51 02·26	172 19 57 270 00 51 278 05 13 352 19 57	352 19 32 90 01 51 98 11 52 172 20 48	B.P. 66 Stikine east base Boulder B.P. 62	3,830·0 1,226·24 8,214·4 7,830·8	3·58320 3·08857 3·91457 3·89381
Ridge	56 40 24·51 131 51 06·02	172 19 53 281 14 49 290 12 18 352 19 54 352 19 54	352 19 31 101 21 31 110 13 21 172 20 48 172 19 57	B.P. 66 Boulder Stikine east base B.P. 62 Stikine west base	3,351·2 8,357·1 1,374·7 8,309·6 478·8	3·52520 3·92205 3·13822 3·91958 2·68015
Line	56 39 41·34 131 50 55·46	172 20 02 272 06 26 288 08 21 352 20 02	352 19 31 92 12 59 108 21 51 172 20 48	B.P. 66 Boulder B.P. 54 B.P. 62	4,698·6 8,022·2 17,412·0 6,962·2	3·67196 3·90429 4·24085 3·84275
B.P. 63 (1938)[1]	56 39 22·43 131 50 50·84	172 20 07	352 20 02	Line	590·2	2·77100

[1] Reported lost in 1948.

STIKINE RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 62A	56 37 59·65	172 20 23	352 20 07	B.P. 63 (1938)	2,583·8	3·41226
	131 50 30·62					
B.P. 64	56 39 43·65	352 20 02	172 20 02	Line	71·92	1·85688
	131 50 56·02					
B.P. 65	56 40 16·14	352 19 55	172 20 02	Line	1,086·1	3·03587
	131 51 03·97	352 19 55	172 19 57	Stikine west base	217·54	2·33754
B.P. 67	56 45 14·36	313 35 41	133 44 47	Boulder	15,356·2	4·18629
	131 53 57·71	336 19 37	156 21 38	B.P. 66	6,162·4	3·78975
		346 47 11	166 50 29	B.P. 62	17,667·0	4·24716
B.P. 69 (I.B.C.) (U.S.C. and G.S.)	56 52 26·24	307 46 00	128 07 41	Iskut	33,490·9	4·52493
	132 07 18·56	319 40 48	139 53 59	B.P. 66	24,884·1	4·39592
Peak 4770	56 46 49·44	5 16 25	185 15 46	B.P. 66	8,622·0	3·93561
	131 50 45·72	121 51 38	301 37 47	B.P. 69	19,800·6	4·29668
		316 42 56	136 50 46	Iskut	13,965·1	4·14504
B.P. 68	56 48 22·63	16 31 49	196 30 24	B.P. 67	6,074·3	3·78350
	131 52 16·00	356 17 22	176 17 59	B.P. 66	11,492·2	4·06040
Knob	56 50 53·20	27 56 02	207 49 02	B.P. 66	18,242·5	4·26108
	131 43 10·07	45 46 01	225 39 40	Peak 4770	10,798·8	4·03338
		96 51 21	276 31 09	B.P. 69	24,712·2	4·39291
		354 08 22	174 09 52	Iskut	17,809·7	4·25066
Ice	56 54 05·48	79 12 07	258 58 59	B.P. 69	16,224·1	4·21016
	131 51 37·71	304 36 49	124 43 54	Knob	10,455·2	4·01933
		356 15 20	176 16 04	Peak 4770	13·516·7	4·13087
Eagle Crag	56 54 58·53	23 25 49	203 17 24	B.P. 66	25,832·0	4·41216
	131 41 28·64	35 11 26	215 00 59	B.P. 67	22,087·3	4·34414
		41 55 35	221 46 33	B.P. 68	16,440·7	4·21592
River	56 55 07·94	2 07 58	182 07 43	Knob	7,885·3	3·89682
	131 42 52·76	77 47 28	257 40 08	Ice	9,091·0	3·95861
Mud	56 56 33·70	286 19 38	106 27 05	River	9,401·7	3·97321
	131 51 46·06	320 16 11	140 23 23	Knob	13,683·6	4·13620
		358 14 03	178 14 10	Ice	4,587·0	3·66153
Saddle	57 07 46·64	12 58 47	192 54 19	River	24,081·4	4·38168
	131 37 33·06	34 44 49	214 32 53	Mud	25,304·1	4·40319
Lynx	57 07 02·02	11 58 37	191 55 13	Mud	19,866·8	4·29813
	131 47 42·22	262 15 30	82 24 01	Saddle	10,342·1	4·01461
		347 29 53	167 33 56	River	22,622·7	4·35454
B.P. 70 (I.B.C.) (U.S.C. and G.S.)	57 02 43·20	343 28 26	163 37 42	B.P. 66	39,713·9	4·59894
	132 02 36·18					
Alpha	57 09 03·66	44 23 11	224 13 39	B.P. 70	16,446·3	4·21607
	131 51 13·90	279 41 44	99 53 14	Saddle	14,009·1	4·14641
		316 33 22	136 36 20	Lynx	5,180·5	3·71437
Stikine base A	57 11 40·70	36 59 06	216 56 03	Alpha	6,079·7	3·78388
	131 47 36·36	305 27 25	125 35 52	Saddle	12,460·0	4·09552
Stikine base D	57 12 50·62	20 03 09	200 01 01	Alpha	7,473·5	3·87352
	131 48 41·49	333 10 34	153 11 29	Stikine base A	2,423·88	3·38451
Grizzly	57 14 33·07	15 05 04	195 01 56	Lynx	14,449·2	4·15984
	131 43 58·77	35 41 37	215 35 31	Alpha	12,539·2	4·09827
Tough	57 13 20·24	18 24 45	198 19 18	B.P. 70	20,764·1	4·31731
	131 56 07·21	276 55 46	97 02 01	Stikine base D	7,536·4	3·87716
		289 41 29	109 48 39	Stikine base A	9,111·9	3·95961
		328 08 13	148 12 20	Alpha	9,342·0	3·97044

STIKINE RIVER—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Thimble	57 17 12·68	287 14 06	107 27 20	Grizzly	16,562·0	4·21911
	131 59 41·92	307 58 27	128 17 04	Saddle	28,359·4	4·45270
		327 18 35	147 28 40	Lynx	22,425·0	4·35073
		330 32 08	150 39 15	Alpha	17,364·9	4·23967
Cornice	57 08 42·70	184 03 17	4 03 47	Tough	8,607·0	3·93485
	131 56 43·48	263 17 27	83 22 04	Alpha	5,579·5	3·74660
Summit	57 08 26·44	238 17 26	58 29 45	Tough	17,341·6	4·23909
	132 10 46·36	266 31 17	86 47 42	Alpha	19,749·3	4·29555
		267 52 07	88 03 55	Cornice	14,183·7	4·15179
		322 04 50	142 11 42	B.P. 70	13,448·9	4·12869
Bill	57 11 29·84	18 32 32	198 30 57	Summit	5,983·5	3·77696
	132 08 53·22	284 07 48	104 22 38	Alpha	18,366·4	4·26402
		292 46 28	112 56 41	Cornice	13,309·0	4·12414
Dominion	57 08 36·52	6 55 53	186 54 47	B.P. 70	11,010·0	4·04179
	132 01 17·38	88 11 56	268 03 58	Summit	9,573·9	3·98109
		210 39 37	30 43 58	Tough	10,206·7	4·00888
		238 09 21	58 19 56	Stikine base D	14,935·3	4·17422
		265 12 05	85 20 32	Alpha	10,182·2	4·00784
B.P. 71	57 05 30·53	229 56 51	50 07 54	Bill	17,306·2	4·23820
	132 22 01·98	244 20 44	64 30 11	Summit	12,605·1	4·10055
		257 48 52	78 14 44	Alpha	31,788·3	4·50227
B.P. 72	57 12 41·48	240 56 01	61 08 41	Thimble	17,326·3	4·23871
	132 14 45·96	263 25 45	83 51 38	Grizzly	31,185·3	4·49395
		285 41 32	106 01 19	Alpha	24,660·4	4·39200
		290 51 23	111 14 07	Lynx	29,241·3	4·46600

ENDICOTT ARM

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET	° ′ ″	° ′ ″	° ′ ″			
Ben (I.B.C.) (U.S.C. and G.S.)	57 39 35·923 133 23 21·684					
N (I.B.C.) (U.S.C. and G.S.)	57 39 51·189 133 19 42·166	82 37 55·8	262 34 50·3	Ben	3,670·3	3·564701
MINOR NET						
Endicott east base	57 37 35·32	123 14 29	303 09 39	Ben	6,814·0	3·83340
	133 17 37·99	153 54 30	333 52 45	N	4,681·1	3·67035
Endicott west base	57 38 28·80	202 18 17	22 19 10	N	2,755·3	3·44016
	133 20 45·24	298 00 51	118 03 29	Endicott east base	3,520·15	3·54656
O	57 41 00·68	29 17 14	209 15 59	Ben	3,006·0	3·47798
	133 21 53·00	314 43 58	134 45 49	N	3,053·6	3·48481
		326 19 12	146 22 47	Endicott east base	7,632·1	3·88264
		346 32 36	166 33 33	Endicott west base	4,831·1	3·68405
Clot	57 40 55·26	268 29 03	88 34 36	O	6,531·6	3·81502
	133 28 27·02	282 46 25	102 53 48	N	8,922·9	3·95050
		295 50 04	115 54 22	Ben	5,625·3	3·75014

ENDICOTT ARM—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Windham	57 37 05·52	168 51 05	348 49 52	O	7,415·1	3·87012
	133 20 26·48	188 09 29	8 10 06	N	5,177·7	3·71414
Station 86	57 37 08·34	219 39 03	39 44 07	O	9,341·3	3·97041
	133 27 52·71	238 10 54	58 17 49	N	9,571·5	3·98098
		270 37 16	90 43 33	Windham	7,408·2	3·86971
Station 87	57 42 52·29	11 34 11	191 32 19	Windham	10,949·8	4·03941
	133 18 14·19	40 01 18	219 56 58	Ben	7,928·7	3·89920
		42 05 52	221 57 43	86	14,325·4	4·15611
Bird	57 42 58·07	61 39 39	241 22 34	Windham	22,871·5	4·35929
	133 00 13·86	68 43 06	248 19 44	86	29,552·8	4·47060
		89 33 13	269 18 00	87	17,887·4	4·25255
Stung	57 36 19·70	116 21 58	296 01 00	87	27,517·6	4·43961
	132 53 25·08	151 14 16	331 08 31	Bird	14,065·6	4·14816
Station 85	57 33 41·70	112 34 39	292 21 34	86	16,727·2	4·22342
	133 12 22·30	128 08 57	308 02 08	Windham	10,220·9	4·00949
		147 28 37	327 22 26	N	13,564·7	4·13241
		161 07 17	341 02 20	87	18,006·4	4·25543
Station 84	57 33 45·69	89 21 06	269 12 46	85	9,848·9	3·99339
	133 02 29·98	242 10 55	62 18 35	Stung	10,231·5	4·00994
Divide	57 30 09·13	123 54 39	303 38 15	86	23,328·3	4·36788
	133 08 26·46	157 36 37	337 28 21	87	25,547·3	4·40734
		198 55 02	19 01 58	Bird	25,155·6	4·40063
		221 28 48	41 33 49	84	8,948·1	3·95173
		232 29 11	52 41 52	Stung	18,871·4	4·27580
B.P. 73	57 21 00·05	110 25 23	289 46 19	Divide	49,432·9	4·69402
	132 22 04·69	120 38 26	300 04 22	84	46,866·3	4·67086
		132 27 23	312 00 57	Stung	42,324·6	4·62659
B.P. 74	57 29 48·39	91 17 22	270 47 34	Divide	35,310·2	4·54790
	132 33 06·70	104 15 08	283 50 21	84	30,247·4	4·48069
		120 59 50	300 42 42	Stung	23,604·0	4·37299
B.P. 75	57 37 01·25	66 20 44	245 56 21	Divide	31,521·6	4·49861
	132 39 32·69	75 21 06	255 01 43	84	23,668·3	4·37417
		84 47 04	264 35 21	Stung	13,880·6	4·14241
B.P. 76	57 41 46·50	39 50 52	219 43 43	Stung	13,157·5	4·11917
	132 44 57·41	47 29 39	227 09 49	Divide	31,830·5	4·50284
		98 24 28	278 11 33	Bird	15,337·8	4·18576
B.P. 77	57 50 23·94	2 58 36	182 57 27	Stung	26,153·9	4·41754
	132 52 03·29	30 30 16	210 23 21	Bird	16,000·7	4·20414
Spit	57 44 09·74	278 14 47	98 28 40	87	16,477·4	4·21689
	133 34 39·10	306 58 16	127 07 49	Ben	14,059·7	4·14798
		314 16 32	134 21 47	Clot	8,611·9	3·93510
Powers	57 44 36·98	10 51 29	190 49 13	86	14,132·1	4·15021
	133 25 12·34	25 11 32	205 08 47	Clot	7,579·2	3·87962
		84 55 52	264 47 53	Spit	9,415·0	3·97382
		295 01 55	115 07 49	87	7,641·0	3·88315
		341 13 48	161 17 50	Windham	14,748·6	4·16875
		348 51 15	168 52 49	Ben	9,492·7	3·97739
Sumdum	57 48 25·09	291 17 56	111 39 51	Bird	27,627·5	4·44134
	133 26 08·61	322 38 24	142 45 05	87	12,944·2	4·11208
Trail	57 50 47·43	68 40 47	248 31 11	Sumdum	12,068·5	4·08165
	133 14 47·85	271 41 17	92 00 32	B.P. 77	22,524·4	4·35265
		315 02 58	135 15 17	Bird	20,481·2	4·31136

ENDICOTT ARM—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 78	58 00 02·24	23 48 06	203 36 08	87	34,800·1	4·54158
	133 04 05·95	353 05 07	173 08 23	Bird	31,916·1	4·50401
Tracy	57 55 32·07	6 11 47	186 10 58	Trail	8,858·0	3·94734
	133 13 49·89	42 45 48	222 35 22	Sumdum	17,968·0	4·25450
		329 53 52	150 05 23	Bird	26,937·6	4·43036
Baird	57 57 29·54	21 55 56	201 50 08	Sumdum	18,152·0	4·25892
	133 19 18·07	252 24 03	72 36 56	B.P. 78	15,718·3	4·19641
		303 54 11	123 58 49	Tracy	6,508·6	3·81349
		324 51 45	145 07 54	Bird	32,914·7	4·51739
		357 46 06	177 47 00	87	27,160·7	4·43394

STEPHENS PASSAGE AND WHITING RIVER

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET	° ′ ″	° ′ ″	° ′ ″			
Celt (U.S.C. and G.S.)	58 14 05·070					
	134 03 20·133					
Mood (U.S.C. and G.S.)	58 12 51·874	214 41 15·9	34 42 37·6	Celt	2,754·6	3·440056
	134 04 56·196					
Zinc (U.S.C. and G.S.)	58 01 06·670					
	134 05 53·350					
MINOR NET						
Odd (U.S.C. and G.S.)	58 14 09·96	273 09 40	93 12 02	Celt	2,729·3	3·43603
	134 06 07·13	334 23 18	154 24 18	Mood	2,679·2	3·42801
Hat (U.S.C. and G.S.)	58 12 04·75	214 29 29	34 31 48	Odd	4,701·4	3·67223
	134 08 50·28	235 19 49	55 24 30	Celt	6,550·6	3·81628
		249 05 48	69 09 07	Mood	4,091·4	3·61187
Man (U.S.C. and G.S.)	58 11 07·12	116 30 47	296 27 41	Hat	3,998·0	3·60184
	134 05 11·26	170 50 43	350 49 55	Odd	5,730·3	3·75817
Sap (U.S.C. and G.S.)	58 12 47·32	3 56 45	183 56 34	Man	3,107·4	3·49240
	134 04 58·17	70 52 09	250 48 52	Hat	4,012·9	3·60346
He (U.S.C. and G.S.)	58 09 32·76	198 50 19	18 51 43	Hat	4,969·3	3·69629
	134 10 28·51	206 26 08	26 29 50	Odd	9,580·9	3·98141
		221 50 43	41 55 24	Sap	8,085·6	3·90771
		240 35 07	60 39 37	Man	5,951·7	3·77464
Joy (U.S.C. and G.S.)	58 09 35·21	89 16 51	269 11 54	He	5,723·0	3·75762
	134 04 38·59	138 23 26	318 19 52	Hat	6,191·0	3·79176
Tie (U.S.C. and G.S.)	58 07 46·41	187 41 59	7 42 55	Hat	8,066·0	3·90666
	134 09 56·44	237 02 42	57 07 12	Joy	6,194·6	3·79201
Bed (U.S.C. and G.S.)	58 07 17·85	99 56 38	279 52 16	Tie	5,134·6	3·71051
	134 04 47·44	126 49 59	306 45 09	He	6,968·9	3·84316
		155 55 36	335 52 10	Hat	9,724·3	3·98786
Bar (U.S.C. and G.S.)	58 05 51·80	11 43 35	191 42 00	Zinc	9,009·4	3·95469
	134 04 01·82	121 27 06	301 22 05	Tie	6,803·6	3·83274
		164 19 57	344 19 18	Bed	2,765·1	3·44171

STEPHENS PASSAGE AND WHITING RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Block (U.S.C. and G.S.)	58 03 40·16	173 03 25	353 02 37	Tie	7,675·2	3·88509
	134 08 59·75	180 34 05	0 34 13	Hat	15,612·7	4·19348
		230 07 58	50 12 11	Bar	6,358·8	3·80338
		327 11 36	147 14 14	Zinc	5,648·4	3·75193
Act (U.S.C. and G.S.)	58 03 45·07	30 27 13	210 24 44	Zinc	5,683·8	3·75464
	134 02 57·88	88 34 30	268 29 23	Block	5,935·9	3·77349
Limestone south base (U.S.C. and G.S.)	57 57 58·76	159 11 54	339 10 00	Zinc	6,219·7	3·79377
	134 03 38·81	183 35 03	3 35 38	Act	10,735·5	4·03082
Aim (U.S.C. and G.S.)	57 58 26·01	11 25 25	191 25 16	Limestone south base	860·1	2·93453
	134 03 28·45	154 25 40	334 23 37	Zinc	5,511·2	3·74125
		177 43 49	357 43 21	Bar	13,803·3	4·13998
		182 54 24	2 54 50	Act	9,884·1	3·99494
Arm (U.S.C. and G.S.)	57 59 07·66	75 11 43	255 04 49	Limestone south base	8,311·1	3·91966
	133 55 30·11	80 44 50	260 38 04	Aim	7,966·9	3·90129
		139 28 29	319 22 09	Act	11,300·1	4·05308
Gage	57 56 54·61	97 09 50	276 56 03	Limestone south base	16,172·0	4·20876
	133 47 22·90	113 16 08	293 00 27	Zinc	19,845·5	4·29766
Grouse	58 00 23·91	64 18 44	244 10 44	Limestone south base	10,335·1	4·01432
	133 54 12·35	96 38 19	276 28 24	Zinc	11,586·7	4·06396
		313 50 51	133 56 38	Gage	9,339·4	3·97032
Tom	57 59 43·52	59 03 33	238 56 04	Gage	10,145·1	4·00626
	133 38 33·94	94 44 46	274 31 30	Grouse	15,464·9	4·18935
Wilson	58 03 04·21	4 57 17	184 56 49	Tom	6,232·5	3·79466
	133 38 01·17	38 58 03	218 50 07	Gage	14,693·4	4·16712
		72 49 55	252 36 11	Grouse	16,693·8	4·22255
Snowy	58 05 10·88	65 25 36	245 06 39	Tom	24,208·9	4·38398
	133 16 13·80	79 47 35	259 29 05	Wilson	21,789·5	4·33825
Genesis	58 05 32·58	52 10 50	231 58 53	Tom	17,573·7	4·24486
	133 24 28·93	71 04 26	250 52 57	Wilson	14,084·7	4·14875
		274 40 29	94 47 29	Snowy	8,140·6	3·91065
Friday	58 08 49·96	33 17 52	213 08 19	Tom	20,208·9	4·30554
	133 27 18·62	301 50 00	121 59 24	Snowy	12,823·0	4·10799
		335 31 03	155 33 27	Genesis	6,708·9	3·82665
Cook	58 09 10·24	47 54 01	227 47 35	Genesis	10,034·1	4·00148
	133 16 54·52	50 41 36	230 23 13	Tom	27,589·1	4·44074
		61 31 19	241 13 24	Wilson	23,636·9	4·37359
		86 33 24	266 24 34	Friday	10,228·1	4·00980
		354 51 08	174 51 43	Snowy	7,435·7	3·87132
B.P. 79	58 09 14·28	38 04 42	217 59 36	Snowy	9,561·5	3·98053
	133 10 13·94	63 59 32	243 47 26	Genesis	15,586·4	4·19275
		87 33 01	267 18 31	Friday	16,777·9	4·22474
		88 57 12	268 51 32	Cook	6,553·0	3·81644
Snow Tower	58 12 58·02	7 47 44	187 46 01	Snowy	14,587·4	4·16398
	133 14 13·06	20 32 42	200 30 25	Cook	7,525·1	3·87651
		59 13 20	239 02 12	Friday	14,957·6	4·17486
		330 31 40	150 35 03	B.P. 79	7,949·0	3·90031
B.P. 83	58 13 38·66	0 29 32	180 29 25	Snowy	15,711·2	4·19621
	133 16 05·57	5 30 25	185 29 43	Cook	8,343·2	3·92133
		304 23 03	124 24 39	Snow Tower	2,225·9	3·34750
		324 52 32	144 57 31	B.P. 79	9,995·7	3·99981
Whiting upper base	58 11 21·70	44 50 26	224 46 56	Cook	5,733·1	3·75839
	133 12 47·36	327 31 04	147 33 14	B.P. 79	4,672·3	3·66953

STEPHENS PASSAGE AND WHITING RIVER—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*cont'd.*	° ′ ″	° ′ ″	° ′ ″			
Whiting lower base	58 11 02·88	32 02 08	212 00 15	Cook	4,110·2	3·61387
	133 14 41·22	252 36 28	72 38 05	Whiting upper base	1,949·60	3·28995
		307 31 30	127 35 17	B.P. 79	5,512·0	3·74131
Boundary post	58 11 25·84	290 12 31	110 12 49	Whiting upper base	371·6	2·57004
	133 13 08·70	324 55 03	144 57 31	B.P. 79	4,973·0	3·69662
B.P. 82	58 11 25·86	324 55	144 55	Boundary post	0·40	9·6046–10
	133 13 08·71					
B.P. 81	58 10 54·59	144 55 38	324 55 03	B.P. 82	1,182·02	3·07262
	133 12 27·14					
B.P. 80	58 10 29·57	144 56 06	324 55 38	B.P. 81	945·89	2·97584
	133 11 53·89					
Peak 6550	58 10 22·15	231 32 49	51 39 28	B.P. 83	9,788·6	3·99072
	133 23 55·21	243 02 40	63 10 55	Snow Tower	10,663·5	4·02790
		278 47 25	98 59 03	B.P. 79	13,592·1	4·13329
B.P. 84	58 16 35·90	317 02 38	137 08 05	Snow Tower	9,204·3	3·96399
	133 20 37·21	321 01 53	141 05 44	B.P. 83	7,050·1	3·84820
		323 14 53	143 23 43	B.P. 79	17,036·8	4·23139
		345 12 04	165 15 13	Cook	14,260·0	4·15412
B.P. 85	58 23 16·93	15 18 45	195 09 53	Wilson	38,888·6	4·58982
	133 27 35·07	326 48 46	147 03 31	B.P. 79	31,109·3	4·49289
		338 11 27	158 20 32	Cook	28,201·2	4·45027
		341 36 49	161 46 28	Snowy	35,393·5	4·54892

TAKU RIVER

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET	° ′ ″	° ′ ″	° ′ ″			
Azimuth (I.B.C.) (U.S.C. and G.S.)	58 28 29·832					
	133 42 51·189					
Twin (I.B.C.) (U.S.C. and G.S.)	58 36 11·880	317 27 50·6	137 39 19·8	Azimuth	19,372·3	4·287182
	133 56 19·211					
MINOR NET						
B.P. 92	58 36 45·30	1 56 09	181 55 42	Azimuth	15,339·4	4·18581
	133 42 19·22	85 44 22	265 32 25	Twin	13,602·8	4·13363
Wayhut	58 34 25·81	116 04 07	295 58 12	Twin	7,481·5	3·87399
	133 49 23·07	237 43 24	57 49 26	B.P. 92	8,093·7	3·90815
		330 01 04	150 06 38	Azimuth	12,710·3	4·10416
Cushoo	58 33 53·58	100 18 41	280 13 51	Wayhut	5,593·7	3·74770
	133 43 42·57	194 12 42	14 13 53	B.P. 92	5,481·5	3·73890
		355 14 50	175 15 34	Azimuth	10,051·6	4·00224
Taku base 1	58 34 46·05	69 42 30	249 38 39	Cushoo	4,674·4	3·66973
	133 39 11·38	140 35 37	320 32 57	B.P. 92	4,777·2	3·67917

TAKU RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Taku base 2	58 33 02·18	17 13 04	197 10 46	Azimuth	8,821·3	3·94554
	133 40 10·09	114 51 39	294 48 38	Cushoo	3,786·0	3·57819
		163 11 53	343 10 03	B.P. 92	7,212·2	3·85807
		196 26 49	16 27 39	Taku base 1	3,350·97	3·52517
Carter	58 34 49·87	38 00 25	217 52 22	Azimuth	14,910·2	4·17348
	133 33 24·75	63 05 44	242 59 58	Taku base 2	7,351·5	3·86638
		88 49 51	268 44 55	Taku base 1	5,602·8	3·74841
		112 32 22	292 24 46	B.P. 92	9,342·6	3·97047
Peshack	58 31 05·24	54 21 11	234 15 19	Azimuth	8,241·1	3·91598
	133 35 58·01	115 34 35	295 23 08	Wayhut	14,425·5	4·15913
		124 46 44	304 40 07	Cushoo	9,144·0	3·96114
		131 36 23	311 32 48	Taku base 2	5,452·5	3·73660
		155 25 32	335 22 47	Taku base 1	7,514·0	3·87587
		199 36 39	19 38 50	Carter	7,379·3	3·86802
Wright	58 27 33·94	130 20 17	310 07 03	Wayhut	19,732·7	4·29519
	133 33 52·48	162 44 02	342 42 15	Peshack	6,847·0	3·83550
Nita	58 29 00·27	63 37 12	243 32 29	Wright	6,003·5	3·77840
	133 28 20·80	86 17 00	266 04 38	Azimuth	14,137·3	4·15037
		117 37 34	297 31 04	Peshack	8,354·0	3·92190
Queen	58 23 28·04	133 05 00	312 57 52	Wright	11,150·9	4·04731
	133 25 30·23	164 57 05	344 54 40	Nita	10,645·5	4·02717
B.P. 87	58 31 24·40	59 42 50	239 34 44	Azimuth	10,688·7	4·02893
	133 33 21·74	114 39 08	294 33 20	Taku base 2	7,266·8	3·86135
		137 51 15	317 46 17	Taku base 1	8,420·5	3·92534
		179 33 41	359 33 38	Carter	6,357·8	3·80330
Rock	58 34 59·22	30 10 42	210 07 00	Peshack	8,372·3	3·92284
	133 31 38·03	42 11 58	222 02 24	Azimuth	16,243·2	4·21067
		66 25 56	246 18 39	Taku base 2	9,035·4	3·95595
		107 39 41	287 30 34	B.P. 92	10,864·0	4·03599
George	58 34 49·20	25 49 56	205 46 59	Peshack	7,697·5	3·88635
	133 32 30·82	81 04 20	260 54 47	Cushoo	10,993·3	4·04113
		91 22 11	271 21 25	Carter	871·7	2·94035
		110 46 32	290 38 10	B.P. 92	10,160·3	4·00690
B.P. 86	58 25 51·09	104 05 36	283 48 17	Azimuth	20,375·3	4·30910
	133 22 31·94	126 44 36	306 33 09	Peshack	16,284·5	4·21177
		136 37 37	316 20 45	B.P. 92	27,912·2	4·44579
		152 31 35	332 23 49	Rock	19,127·0	4·28165
Tseepie	58 20 18·20	131 12 08	310 58 37	Wright	20,513·1	4·31203
	133 18 00·68	138 59 39	318 44 21	Peshack	26,580·5	4·42456
		148 08 07	327 59 19	Nita	19,034·7	4·27955
B.P. 88	58 33 06·06	220 00 13	40 02 35	Carter	4,194·4	3·62267
	133 36 11·60	318 50 08	138 52 33	B.P. 87	4,177·1	3·62087
B.P. 89	58 34 47·07	138 47 44	318 44 54	B.P. 92	4,864·3	3·68702
	133 39 00·74	269 02 42	89 07 29	Carter	5,430·4	3·73483
B.P. 90	58 35 06·56	274 54 38	94 59 52	Carter	5,979·8	3·77668
	133 39 33·43	318 47 16	138 52 33	B.P. 87	9,131·5	3·96054
B.P. 91	58 35 35·80	281 50 22	101 56 18	Carter	6,897·1	3·83866
	133 40 22·47	318 46 34	138 52 33	B.P. 87	10,333·9	4·01426
Turn	58 37 38·89	310 57 12	131 02 30	Carter	7,971·6	3·90155
	133 39 37·31	343 44 54	163 48 01	Peshack	12,685·3	4·10330
B.P. 93	58 43 47·10	22 25 29	202 20 22	Twin	15,233·0	4·18278
	133 50 19·38	329 16 31	149 23 21	B.P. 92	15,173·3	4·18108
		357 00 00	177 00 48	Wayhut	17,391·0	4·24033

TAKU RIVER—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 94	58 46 03·43	318 11 48	138 25 24	B.P. 92	23,126·3	4·36411
	133 58 14·03	335 20 03	155 33 11	Azimuth	35,842·1	4·55439
		354 12 55	174 14 33	Twin	18,397·2	4·26475
Alah	58 41 28·67	1 38 31	181 38 12	Carter	12,344·7	4·09148
	133 33 02·86	8 21 45	188 19 15	Peshack	19,496·4	4·28995
		41 51 32	221 45 55	Turn	9,539·4	3·97952
Canoe	58 42 52·35	2 41 10	182 40 33	Carter	14,945·2	4·17450
	133 32 41·41	7 36 10	187 35 51	Alah	2,612·1	3·41699
		34 41 57	214 36 02	Turn	11,790·3	4·07152
		95 48 26	275 33 22	B.P. 93	17,111·6	4·23329
Stump	58 43 23·33	4 55 49	184 55 00	Turn	10,697·3	4·02927
	133 38 40·34	279 22 43	99 27 50	Canoe	5,856·4	3·76763
		303 06 02	123 10 50	Alah	6,489·5	3·81221
		342 11 59	162 16 29	Carter	16,682·7	4·22227
Pillar	58 44 57·10	23 51 54	203 46 37	Turn	14,821·9	4·17090
	133 33 25·72	60 12 55	240 08 26	Stump	5,834·2	3·76598
		82 33 14	262 18 48	B.P. 93	16,449·4	4·21615
		356 43 55	176 44 14	Alah	6,459·7	3·81021
Snake	58 46 05·65	58 30 26	238 24 15	B.P. 93	8,194·9	3·91355
	133 43 05·11	282 45 36	102 53 51	Pillar	9,553·6	3·98017
		300 43 44	120 52 37	Canoe	11,680·2	4·06745
		319 40 34	139 44 20	Stump	6,584·9	3·81855
Peak 7850B	58 46 41·75	321 23 11	141 43 29	Peshack	36,997·9	4·56818
	133 59 44·28	334 03 23	154 17 48	Azimuth	37,534·0	4·57442
		350 21 19	170 24 14	Twin	19,767·4	4·29595
Bear	58 47 38·74	27 46 06	207 42 46	B.P. 93	8,098·5	3·90840
	133 46 24·90	291 40 48	111 51 54	Pillar	13,484·5	4·12983
		311 52 42	131 55 33	Snake	4,312·9	3·63477
Cache	58 52 18·14	5 37 11	185 35 48	B.P. 93	15,889·1	4·20110
	133 48 42·68	312 43 25	132 56 30	Pillar	20,073·3	4·30262
		318 28 35	138 42 17	Canoe	23,342·6	4·36815
		329 37 12	149 45 47	Stump	19,168·3	4·28258
		334 47 00	154 51 49	Snake	12,735·6	4·10502
		345 38 27	165 40 25	Bear	8,923·5	3·95053
Nanny	58 50 52·37	11 36 00	191 34 55	Bear	6,115·9	3·78646
	133 45 08·33	127 42 26	307 39 22	Cache	4,342·0	3·63769
		347 24 53	167 26 39	Snake	9,089·5	3·95854
Mutt	58 53 25·83	285 46 26	105 53 01	Cache	7,678·8	3·88529
	133 56 23·80	316 38 59	136 50 22	Snake	18,701·2	4·27187
		318 07 08	138 15 40	Bear	14,408·9	4·15863
Peak 7800	58 51 53·88	245 19 35	65 25 07	Mutt	6,827·4	3·83425
	134 02 51·16	266 44 23	86 56 29	Cache	13,619·0	4·13415
		321 11 48	141 22 31	B.P. 93	19,303·8	4·28564
Scrub	58 50 33·76	107 56 02	287 49 12	Peak 7800	8,076·6	3·90723
	133 54 51·75	241 19 34	61 24 50	Cache	6,741·0	3·82873
Pussy	58 54 13·58	36 22 48	216 19 58	Peak 7800	5,367·6	3·72978
	133 59 32·52	288 51 49	109 01 06	Cache	11,005·0	4·04159
		326 29 00	146 33 00	Scrub	8,155·6	3·91145
Fly	58 48 23·52	161 09 25	341 07 26	Peak 7800	6,878·5	3·83749
	134 00 32·55	203 03 54	23 07 27	Mutt	10,169·3	4·00729
		237 23 41	57 33 49	Cache	13,504·0	4·13046
		310 52 49	131 01 33	B.P. 93	13,049·5	4·11559

LYNN CANAL

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
FIRST-ORDER NET	° ′ ″	° ′ ″	° ′ ″			
Riley (U.S.C. and G.S.)	59 11 16·513					
	135 22 55·847					
Kabe (I.B.C.) (U.S.C. and G.S.)	59 01 05·401					
	135 20 29·293					
MAJOR NET						
Dave	59 06 17·932	216 53 33·3	36 59 48·5	Riley	11,560·6	4·062979
	135 30 12·905	316 02 48·2	136 11 08·7	Kabe	13,417·9	4·127686
Gump	59 04 12·705	180 25 06·2	0 25 11·4	Riley	13,114·8	4·117761
	135 23 01·878	337 12 35·5	157 14 46·3	Kabe	6,285·9	3·798367
Seduction (U.S.C. and G.S.)	59 04 56·541	15 51 05·7	195 49 16·6	Kabe	7,434·6	3·871255
	135 18 22·035	73 06 36·4	253 02 36·4	Gump	4,659·9	3·668374
Middle	59 02 14·371	60 59 25·4	240 55 58·9	Kabe	4,396·9	3·643142
	135 16 28·326	120 19 03·4	300 13 26·1	Gump	7,264·1	3·861179
		160 09 22·8	340 07 45·3	Seduction	5,335·4	3·727166
Pat (I.B.C.) (U.S.C. and G.S.)	59 05 32·773	26 43 18·7	206 40 32·5	Middle	6,872·0	3·837085
	135 13 14·576	75 14 08·4	255 05 44·7	Gump	9,677·3	3·985752
		77 08 22·3	257 03 58·5	Seduction	5,023·2	3·700977
		139 04 49·5	318 56 30·6	Riley	14,091·5	4·148958
Flow (U.S.C. and G.S.)	59 01 44·197	81 34 08·3	261 26 56·2	Kabe	8,130·4	3·910113
	135 12 05·296	102 34 41·0	282 30 55·3	Middle	4,298·2	3·633282
		113 46 47·2	293 37 24·2	Gump	11,432·2	4·058129
		134 47 20·0	314 41 56·9	Seduction	8,455·1	3·927118
		149 45 53·9	329 36 35·7	Riley	20,514·5	4·312060
		171 08 07·5	351 07 08·0	Pat	7,158·7	3·854835
Villard	59 16 19·274	4 29 01·6	184 27 02·3	Kabe	28,365·4	4·452789
	135 18 10·330	25 49 45·6	205 45 40·3	Riley	10,405·7	4·017273
		31 44 36·4	211 34 15·8	Dave	21,861·1	4·339672
B.P. 105	59 14 57·579	71 04 58·7	250 23 31·1	Dave	48,742·0	4·687903
	134 41 56·040	94 27 22·8	273 56 14·0	Villard	34,544·4	4·538378
Garrett	59 11 40·877	75 06 58·2	254 33 46·4	Dave	38,211·3	4·582192
	134 51 32·805	108 58 18·9	288 35 26·2	Villard	26,758·0	4·427453
		236 17 45·4	56 26 00·9	B.P. 105	10,989·0	4·040960
Selby	59 01 02·665	90 29 11·8	270 18 11·9	Kabe	12,282·5	4·089288
	135 07 39·619	114 29 56·8	294 10 36·1	Dave	23,671·8	4·374232
		142 35 27·9	322 22 21·7	Riley	23,948·5	4·379278
		160 36 17·5	340 27 16·1	Villard	30,084·2	4·478339
		217 48 39·7	38 02 29·4	Garrett	25,036·5	4·398574
		223 21 12·8	43 43 17·8	B.P. 105	35,639·2	4·551928
Damp (U.S.C. and G.S.)	58 55 25·413	149 39 36·1	329 28 59·2	Dave	23,416·7	4·369526
	135 17 49·788	222 58 56·5	43 07 39·4	Selby	14,281·9	4·154785
Phoebe	58 53 42·373	105 11 28·1	285 00 56·1	Damp	12,236·5	4·087658
	135 05 31·785	134 51 00·0	314 29 50·5	Dave	33,253·7	4·521840
		171 29 04·6	351 27 15·1	Selby	13,776·5	4·139140
Wm. Henry	58 44 38·452	162 39 29·8	342 28 13·9	Dave	42,146·5	4·624762
	135 17 03·668	177 53 19·9	357 52 40·3	Damp	20,032·5	4·301735
		196 27 36·2	16 35 39·1	Selby	31,767·0	4·501976
		213 20 01·3	33 29 53·2	Phoebe	20,163·5	4·304567
Hose (U.S.C. and G.S.)	58 51 12·607	132 45 51·9	312 38 18·8	Damp	11,534·7	4·062006
	135 09 00·567					
Hill (U.S.C. and G.S.)	58 47 37·643	169 41 17·0	349 38 56·1	Damp	14,712·7	4·167693
	135 15 05·196	221 17 40·7	41 22 52·7	Hose	8,859·0	3·947387

LYNN CANAL—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Crag (U.S.C. and G.S.)	58 41 41·788	163 27 45·4	343 24 51·4	Hill	11,487·6	4·060229
	135 11 41·611	166 59 09·7	346 53 54·7	Damp	26,161·6	4·417665
		186 08 08·6	6 11 35·7	Selby	36,129·8	4·557866
		188 19 00·9	8 21 18·6	Hose	17,851·2	4·251668
		194 52 21·9	14 57 38·2	Phoebe	23,074·4	4·363130
Berner	58 45 46·108	68 10 01·6	247 53 26·4	Crag	20,205·8	4·305477
	134 52 17·109	85 10 17·3	264 49 06·4	Wm. Henry	23,995·3	4·380126
		126 16 55·3	305 55 03·7	Damp	30,423·4	4·483207
		136 35 10·8	316 02 41·5	Dave	52,708·3	4·721879
		139 13 39·4	319 02 19·5	Phoebe	19,487·4	4·289753
		152 35 27·2	332 22 17·4	Selby	31,979·2	4·504868
		180 50 14·9	0 50 52·9	Garrett	48,115·3	4·682283
Dean	58 42 42·763	85 18 03·2	264 58 26·3	Crag	22,257·0	4·347467
	134 48 44·424	97 39 36·5	277 15 24·1	Wm. Henry	27,577·1	4·440548
		130 19 04·7	309 54 11·3	Damp	36,628·3	4·563817
		138 00 08·1	317 24 37·0	Dave	59,198·1	4·772308
		141 43 22·1	321 29 00·3	Phoebe	26,042·3	4·415680
		148 55 49·7	328 52 47·7	Berner	6,625·1	3·821191
		152 00 17·3	331 44 05·6	Selby	38,592·8	4·586506
		177 09 16·5	357 06 52·2	Garrett	53,850·5	4·731190
MINOR NET						
B.P. 95	58 51 40·84	62 51 59	242 23 27	Dean	36,213·5	4·55887
	134 15 22·56	78 02 13	257 09 27	Wm. Henry	60,849·1	4·78425
		94 49 03	274 06 07	Phoebe	48,360·9	4·68449
		109 29 00	288 44 13	Selby	53,100·2	4·72510
B.P. 96	58 54 05·53	54 21 55	233 55 57	Dean	36,071·6	4·55716
	134 18 23·38	64 53 55	244 24 55	Berner	36,102·7	4·55754
		73 09 50	252 19 38	Wm. Henry	59,154·9	4·77199
		89 25 48	268 45 26	Phoebe	45,296·6	4·65607
B.P. 97	58 55 25·40	49 40 31	229 16 00	Dean	36,313·5	4·56007
	134 20 04·75	70 21 22	249 32 37	Wm. Henry	58,387·2	4·76632
		103 13 31	282 32 45	Selby	46,797·9	4·67023
		107 14 03	286 13 56	Dave	70,128·1	4·84589
		150 13 30	329 54 45	B.P. 105	41,854·4	4·62174
B.P. 98	58 57 44·96	46 13 07	225 47 25	Dean	40,190·3	4·60412
	134 18 42·03	55 41 14	235 12 29	Berner	39,218·5	4·59349
		80 51 16	260 11 10	Phoebe	45,575·2	4·65873
		97 46 45	297 04 47	Selby	47,312·1	4·67497
		103 34 05	282 32 46	Dave	70,256·6	4·84669
		145 23 25	325 03 29	B.P. 105	38,901·7	4·58997
B.P. 99	58 58 46·27	38 25 06	218 04 12	Dean	37,960·5	4·57933
	134 24 19·21	48 16 59	227 53 03	Berner	36,135·7	4·55794
		76 55 10	256 19 52	Phoebe	40,651·2	4·60907
		96 06 50	275 29 41	Selby	41,733·7	4·62049
		102 58 11	282 01 41	Dave	64,577·0	4·81008
		150 53 51	330 38 45	B.P. 105	34,441·6	4·53708
B.P. 100	59 02 20·65	34 33 50	214 11 38	Dean	44,161·2	4·64504
	134 22 48·21	42 50 08	222 24 53	Berner	41,823·9	4·62142
		68 55 39	248 19 02	Phoebe	43,995·9	4·64341
		87 06 14	266 27 46	Selby	43,003·3	4·63350
		142 12 48	321 56 23	B.P. 105	29,692·8	4·47265
B.P. 101	59 05 22·31	26 51 22	206 32 31	Dean	47,089·1	4·67292
	134 26 43·09	34 10 40	213 48 46	Berner	43,898·1	4·64245
		51 50 03	231 06 56	Wm. Henry	61,792·7	4·79094
		60 03 39	239 30 23	Phoebe	43,035·2	4·63382
		78 41 55	258 06 48	Selby	39,975·5	4·60179
		92 04 46	271 10 18	Dave	60,679·5	4·78304
		140 56 10	320 43 06	B.P. 105	22,962·4	4·36102

LYNN CANAL—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 102	59 07 54·88	22 17 58	202 00 58	Dean	50,520·8	4·70347
	134 28 53·67	28 47 34	208 27 31	Berner	46,842·3	4·67064
		53 19 12	232 47 48	Phoebe	43,892·7	4·64239
		71 16 56	250 43 41	Selby	39,189·4	4·59317
		87 30 18	266 37 40	Dave	58,616·9	4·76802
		108 06 15	287 46 48	Garrett	22,701·0	4·35604
		108 44 57	288 02 37	Villard	49,456·3	4·69422
		136 34 16	316 23 04	B.P. 105	18,038·8	4·25621
B.P. 103	59 07 53·17	23 27 46	203 11 57	Berner	44,720·3	4·65050
	134 33 49·50	49 17 47	228 50 36	Phoebe	40,184·8	4·60406
		68 47 59	248 18 57	Selby	34,747·8	4·54093
		87 16 12	266 27 48	Dave	53,914·2	4·73170
		112 45 52	292 30 39	Garrett	18,306·7	4·26261
		149 35 36	329 28 38	B.P. 105	15,236·7	4·18289
B.P. 104	59 11 33·33	91 21 53	271 12 31	Garrett	10,393·8	4·01678
	134 40 38·29	104 11 02	283 38 47	Villard	36,793·2	4·56577
		168 58 02	348 56 55	B.P. 105	6,439·5	3·80885
B.P. 106	59 16 52·51	18 20 44	198 12 00	Selby	30,953·1	4·49070
	134 57 29·12	58 01 51	237 33 44	Dave	36,846·4	4·56640
		66 56 26	246 34 33	Riley	26,347·9	4·42075
		87 09 12	266 51 26	Villard	19,684·8	4·29413
		283 24 58	103 38 20	B.P. 105	15,204·5	4·18197
		355 02 10	175 06 37	Berner	57,967·7	4·76319
B.P. 107	59 20 48·03	4 09 35	184 06 19	Phoebe	50,435·9	4·70274
	135 01 43·34	8 48 43	188 43 37	Selby	37,114·4	4·56954
		45 24 24	224 59 55	Dave	38,212·8	4·58221
		62 04 49	241 50 41	Villard	17,693·2	4·24781
		299 50 48	120 07 49	B.P. 105	21,697·0	4·33640
		330 11 34	150 20 19	Garrett	19,499·0	4·29001
		352 01 55	172 10 00	Berner	65,665·0	4·81733
B.P. 108	59 23 14·84	6 15 12	186 09 50	Phoebe	55,171·3	4·74171
	134 59 16·53	11 01 21	190 54 09	Selby	41,989·8	4·62314
		43 18 08	222 51 32	Dave	43,083·1	4·63431
		45 28 51	225 08 31	Riley	31,608·0	4·49980
		54 29 06	234 12 51	Villard	22,063·8	4·34368
		312 56 58	133 11 53	B.P. 105	22,531·7	4·35279
		341 04 16	161 10 55	Garrett	22,694·8	4·35593
		354 27 54	174 33 54	Berner	69,904·8	4·84451

SKAGWAY RIVER, WHITE AND CHILKOOT PASSES

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarith
FIRST-ORDER NET	° ′ ″	° ′ ″	° ′ ″			
Skag (U.S.C. and G.S.)	59 25 19·465					
	135 17 24·256					
Tai (U.S.C. and G.S.)	59 26 45·110	296 02 33·46	116 07 29·16	Skag	6,027·83	3·7801611
	135 23 07·678					
Bain (I.B.C.) (U.S.C. and G.S.)	59 28 34·775	28 52 10·47	208 49 08·55	Skag	6,900·08	3·8388540
	135 13 53·004	68 50 21·92	248 42 24·19	Tai	9,373·16	3·9718859
Hump (I.B.C.) (U.S.C. and G.S.)	59 31 12·525	0 47 33·20	180 47 24·95	Skag	10,926·80	4·0384928
	135 17 14·672	33 55 25·17	213 50 21·07	Tai	9,968·05	3·9986104
		326 57 05·40	146 59 59·16	Bain	5,822·42	3·7651032

SKAGWAY RIVER, WHITE AND CHILKOOT PASSES—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
FIRST-ORDER NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Elbow (U.S.C. and G.S.)	59 31 23·744	36 49 24·61	216 45 50·44	Bain	6,529·68	3·8148917
	135 09 44·443	87 14 45·87	267 08 17·85	Hump	7,087·82	3·8505129
Knee (U.S.C. and G.S.)	59 34 22·745	323 37 15·84	143 40 59·50	Elbow	6,877·57	3·8374352
	135 14 03·886	359 05 18·34	179 05 27·72	Bain	10,769·73	4·0322049
Rail (U.S.C. and G.S.)	59 34 22·581	30 22 46·22	210 19 48·39	Elbow	6,413·57	3·8070999
	135 06 18·153	33 39 19·29	213 32 47·28	Bain	12,922·48	4·1113457
		60 23 16·72	240 13 50·77	Hump	11,874·33	4·0746089
		90 05 43·99	269 59 02·40	Knee	7,311·97	3·8640346
West (I.B.C.) (U.S.C. and G.S.)	59 37 22·868	37 42 32·07	217 38 35·42	Knee	7,042·75	3·8477420
	135 09 29·509	331 41 37·12	151 44 22·16	Rail	6,335·65	3·8017911
Summit (U.S.C. and G.S.)	59 38 00·457	12 43 08·62	192 41 45·01	Rail	6,911·81	3·8395917
	135 04 41·224	52 42 36·39	232 34 31·07	Knee	11,103·51	4·0454604
		75 35 53·31	255 31 44·59	West	4,665·95	3·6689404
B.P. 119 ecc. (U.S.C. and G.S.)	59 39 55·422	6 05 22·11	186 04 21·76	Knee	10,353·49	4·0150867
	135 12 53·929	294 41 22·99	114 48 28·17	Summit	8,498·45	3·9293395
		325 49 25·69	145 52 22·09	West	5,704·81	3·7562413
		328 53 12·63	148 58 54·06	Rail	12,024·97	4·0800841
MAJOR NET						
Garb (U.S.C. and G.S.)	59 25 25·452	132 47 03·0	312 44 37·4	Tai	3,630·6	3·559973
	135 20 18·600	195 04 10·0	15 06 48·5	Hump	11,124·1	4·046266
Pheasant (U.S.C. and G.S.)	59 25 18·189	232 23 39·1	52 30 51·7	Bain	9,982·9	3·999255
	135 22 15·306	263 01 24·6	83 03 05·1	Garb	1,854·1	3·268138
		269 28 20·3	89 32 30·9	Skag	4,590·1	3·661822
Frame (U.S.C. and G.S.)	59 26 03·327	14 53 06·2	194 52 45·9	Pheasant	1,445·3	3·159963
	135 21 51·764	308 34 33·6	128 35 53·8	Garb	1,879·2	3·273978
Sharp (U.S.C. and G.S.)	59 27 09·350	3 58 31·6	183 58 19·4	Garb	3,223·0	3·508254
	135 20 04·430	30 58 03·7	210 56 11·0	Pheasant	4,011·2	3·603270
		39 38 09·0	219 36 36·6	Frame	2,652·5	3·423659
		75 27 33·5	255 24 55·7	Tai	2,983·4	3·474709
		245 38 18·3	65 43 38·2	Bain	6,419·7	3·807513
		323 23 14·2	143 25 32·1	Skag	4,235·3	3·626887
B.P. 119 (I.B.C.) (U.S.C. and G.S.)	59 39 47·163	213 45 37·3	33 45 46·7	119 ecc.	307·4	2·487761
	135 13 04·841	292 39 10·0	112 46 24·6	Summit	8,552·3	3·932084
		322 54 10·5	142 57 16·3	West	5,596·6	3·747924
		327 32 37·2	147 38 28·0	Rail	11,897·7	4·075463
MINOR NETS						
Lame (U.S.C. and G.S.)	59 27 48·39	257 34 58	77 40 56	Bain	6,702·3	3·82623
	135 20 48·74	329 58 32	149 59 11	Sharp	1,395·2	3·14462
Flat (U.S.C. and G.S.)	59 29 34·00	233 46 29	53 50 17	Hump	5,163·3	3·71293
	135 21 39·56	283 57 22	104 04 04	Bain	7,569·3	3·87906
Oskar	59 27 39·92	205 25 14	25 35 03	B.P. 119	24,935·1	4·39681
	135 24 28·43	216 57 51	37 00 17	Flat	4,419·6	3·64538
		226 00 17	46 06 31	Hump	9,481·0	3·97686
		260 17 45	80 26 52	Bain	10,149·3	4·00646
		265 38 37	85 41 46	Lame	3,470·4	3·54038
		282 46 57	102 50 44	Sharp	4,265·3	3·62995
		316 33 08	136 36 43	Garb	5,728·8	3·75807
B.P. 109	59 25 40·29	102 04 03	281 48 06	Oskar	17,901·2	4·25288
	135 05 57·10	125 48 51	305 42 01	Bain	9,240·2	3·96568
		134 01 15	313 51 31	Hump	14,816·6	4·17075
B.P. 110	59 27 07·55	93 11 04	272 53 53	Oskar	18,880·8	4·27602
	135 04 31·64	107 02 40	286 54 36	Bain	9,244·6	3·96589
		122 21 07	302 10 10	Hump	14,202·8	4·15237

SKAGWAY RIVER, WHITE AND CHILKOOT PASSES—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 111	59 28 30·23	86 03 16	265 43 31	Oskar	21,722·5	4·33691
	135 01 32·66	90 46 48	270 36 10	Bain	11,657·7	4·06661
		108 49 52	288 36 20	Hump	15,650·3	4·19452
Marshall	59 33 07·59	22 23 34	202 20 23	Bain	9,129·5	3·96044
	135 10 12·12	53 07 52	232 55 34	Oskar	16,860·6	4·22687
		61 51 06	241 45 02	Hump	7,535·8	3·87713
		167 39 49	347 37 20	B.P. 119	12,658·6	4·10239
Glacier	59 32 42·61	58 34 51	238 20 55	Oskar	17,909·5	4·25308
	135 08 18·16	71 46 18	251 38 36	Hump	8,882·0	3·94851
		113 22 14	293 20 36	Marshall	1,950·1	3·29006
		161 08 27	341 04 20	B.P. 119	13,886·6	4·14260
"F"	59 35 33·74	2 05 25	182 05 16	Marshall	4,525·8	3·65570
	135 10 01·61	188 28 29	8 28 57	West	3,414·4	3·53332
		342 56 14	162 57 43	Glacier	5,539·4	3·74346
"L"	59 35 29·65	20 28 40	200 27 10	Marshall	4,692·2	3·67138
	135 08 27·62	94 55 12	274 53 51	"F"	1,480·2	3·17031
		164 31 24	344 30 30	West	3,635·7	3·56059
		358 21 13	178 21 21	Glacier	5,171·4	3·71360
Bluff	59 33 18·90	7 39 27	187 39 24	Marshall	353·1	2·54788
	135 10 09·12	201 29 02	21 30 30	"L"	4,348·6	3·63835
		302 46 45	122 48 21	Glacier	2,073·6	3·31673
B.P. 114	59 33 50·34	12 25 02	192 22 32	B.P. 110	12,762·4	4·10593
	135 01 37·47	15 06 31	195 02 47	B.P. 109	15,705·7	4·19606
		62 10 05	241 50 23	Oskar	24,420·1	4·38775
		71 37 48	251 32 03	Glacier	6,634·0	3·82178
		71 45 58	251 32 30	Hump	15,516·0	4·19078
		135 46 31	315 36 38	B.P. 119	15,430·9	4·18839
		359 33 42	179 33 46	B.P. 111	9,906·5	3·99592
B.P. 113	59 32 39·98	179 33 43	359 33 42	B.P. 114	2,177·4	3·33794
	135 01 36·41					
B.P. 112	59 32 22·42	179 33 43	359 33 43	B.P. 113	543·6	2·73530
	135 01 36·15					
McCrory	59 37 38·83	26 15 47	206 08 12	Bain	18,764·4	4·27333
	135 05 05·66	43 50 24	223 39 54	Hump	16,550·2	4·21880
		83 13 13	263 09 25	West	4,165·5	3·61966
		117 56 15	297 49 21	B.P. 119	8,492·8	3·92905
		335 10 57	155 13 56	B.P. 114	7,788·9	3·89148
Turning Point	59 37 07·44	17 36 15	197 35 22	"L"	3,174·8	3·50172
	135 07 26·43	40 01 42	219 59 28	"F"	3,785·7	3·57815
		103 54 47	283 53 01	West	1,987·8	3·29837
		133 01 53	312 57 01	B.P. 119	7,248·9	3·86027
		246 13 23	66 15 24	McCrory	2,411·2	3·38224
"A"	59 37 24·36	6 25 09	186 24 47	"L"	3,572·5	3·55297
	135 08 02·17	28 42 03	208 40 20	"F"	3,902·4	3·59134
		88 04 18	268 03 02	West	1,370·0	3·13672
		313 04 09	133 04 40	Turning Point	767·0	2·88480
B.P. 116	59 37 24·22	41 01 00	221 00 35	Turning Point	688·4	2·83785
	135 06 57·61	89 00 30	268 58 19	West	2,381·6	3·37686
B.P. 115	59 37 11·77	79 48 10	259 47 29	Turning Point	756·6	2·87889
	135 06 38·93	97 20 20	277 17 53	West	2,696·2	3·43074
		142 46 16	322 46 00	B.P. 116	484·1	2·68491
B.P. 118	59 37 33·76	22 12 07	202 11 59	West	364·1	2·56117
	135 09 20·73	277 28 33	97 30 37	B.P. 116	2,262·8	3·35466
		294 25 51	114 27 29	Turning Point	1,968·4	3·29411

SKAGWAY RIVER, WHITE AND CHILKOOT PASSES—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 117	59 37 29·21	313 04 00	133 04 09	"A"	219·7	2·34178
	135 08 12·40					
Fin	59 33 30·30	0 54 27	180 54 18	Oskar	10,844·3	4·03520
	135 24 17·53	222 02 59	42 12 39	B.P. 119	15,726·0	4·19662
		302 37 58	122 44 03	Hump	7,895·5	3·89738
Hoff	59 40 11·16	9 47 33	189 43 53	Oskar	23,589·8	4·37272
	135 20 13·72	17 09 26	197 05 56	Fin	12,981·1	4·11331
		276 15 34	96 21 44	B.P. 119	6,755·7	3·82967
		350 24 45	170 27 19	Hump	16,904·0	4·22800
B.P. 120	59 41 47·28	32 29 04	212 20 07	Fin	18,217·6	4·26049
	135 13 54·60	63 25 01	243 19 33	Hoff	6,636·7	3·82195
Gracey	59 41 54·25	18 35 10	198 27 04	Oskar	27,882·2	4·44533
	135 15 04·26	29 08 34	209 00 37	Fin	17,844·5	4·25150
		56 39 39	236 35 12	Hoff	5,799·0	3·76335
		281 11 06	101 12 06	B.P. 120	1,110·7	3·04559
		334 34 10	154 35 53	B.P. 119	4,354·3	3·63892
B.P. 121	59 41 54·97	32 18 23	212 18 22	Gracey	26·24	1·41896
	135 15 03·35					
Ora	59 41 50·65	67 56 58	247 50 00	Hoff	8,181·1	3·91281
	135 12 09·36	92 20 54	272 18 23	Gracey	2,738·0	3·43743
"T1"	59 44 03·60	24 24 27	204 21 27	Hoff	7,897·8	3·89751
	135 16 45·25	313 36 56	133 40 54	Ora	5,960·9	3·77531
		336 29 34	156 32 44	B.P. 119	8,652·5	3·93714
		338 27 48	158 29 15	Gracey	4,303·3	3·63380
B.P. 122	59 44 16·58	5 12 48	185 10 14	Oskar	30,970·2	4·49094
	135 21 29·78	7 30 19	187 27 54	Fin	20,172·1	4·30475
		297 12 07	117 20 11	Ora	9,856·2	3·99371
		302 56 28	123 03 01	B.P. 120	8,484·1	3·92861
		306 06 56	126 12 29	Gracey	7,464·6	3·87301
		316 29 30	136 36 46	B.P. 119	11,484·1	4·06010
		350 36 42	170 40 22	Hump	24,591·0	4·39078
		351 05 24	171 06 30	Hoff	7,687·4	3·88578
B.P. 123	59 47 54·11	315 07 52	135 14 02	B.P. 122	9,490·6	3·97729
	135 28 38·34	331 06 51	151 14 07	Hoff	16,353·3	4·21361
		340 51 47	161 01 37	Hump	32,792·8	4·51578
		351 17 13	171 20 58	Fin	27,042·2	4·43204

CHILKAT RIVER

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
FIRST-ORDER NET	° ′ ″	° ′ ″	° ′ ″			
Knob (I.B.C.) (U.S.C. and G.S.)	59 24 14·506					
	136 03 08·992					
Emerge(I.B.C.)(U.S.C. and G.S.)	59 26 22·457	338 05 36·62	158 07 03·49	Knob	4,267·31	3·6301541
	136 04 49·895					
Hen (I.B.C.) (U.S.C. and G.S.)	59 29 15·574	29 40 53·41	209 36 03·71	Knob	10,719·55	4·0301764
	135 57 32·580	52 10 40·84	232 C4 24·18	Emerge	8,726·15	3·9408226

CHILKAT RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET	° ′ ″	° ′ ″	° ′ ″			
Whistle	59 27 20·75	51 49 52	231 43 12	Knob	9,314·5	3·96916
	135 55 24·88	78 36 53	258 28 47	Emerge	9,084·5	3·95830
		150 30 32	330 28 42	Hen	4,083·0	3·61098
Cliff	59 29 09·10	268 17 51	88 24 12	Hen	6,966·4	3·84301
	136 04 54·99	290 24 38	110 32 49	Whistle	9,583·6	3·98153
Slide	59 29 54·61	279 17 06	99 23 48	Hen	7,442·7	3·87173
	136 05 19·24	296 53 45	117 02 17	Whistle	10,499·8	4·02118
		344 49 57	164 50 18	Cliff	1,459·4	3·16416
Martin	59 34 30·18	0 30 01	180 29 57	Slide	8,528·1	3·93085
	136 05 14·51	323 13 39	143 20 17	Hen	12,145·3	4·08441
		358 13 42	178 13 59	Cliff	9,941·0	3·99743
Loweat	59 31 19·74	53 50 26	233 45 23	Cliff	6,845·1	3·83538
	135 59 03·87	65 59 56	245 54 32	Slide	6,465·3	3·81059
		135 23 15	315 17 55	Martin	8,285·0	3·91829
Ankutz	59 31 12·61	36 09 31	216 06 58	Cliff	4,733·1	3·67515
	136 01 57·56	153 10 44	333 07 54	Martin	6,852·2	3·83583
		265 21 48	85 24 18	Loweat	2,740·1	3·43776
Upeat	59 32 04·92	46 27 11	226 21 58	Cliff	7,891·3	3·89715
	135 58 51·60	56 33 42	236 28 08	Slide	7,309·0	3·86386
		126 49 07	306 43 37	Martin	7,509·0	3·87558
Cache	59 32 07·58	177 39 21	357 39 11	Martin	4,416·6	3·64509
	136 05 03·00	270 45 48	90 51 08	Upeat	5,838·1	3·76627
		284 39 01	104 44 11	Loweat	5,836·6	3·76616
Brown	59 34 31·11	307 34 15	127 39 37	Upeat	7,412·4	3·86996
	136 05 05·39	316 09 13	136 14 25	Loweat	8,205·8	3·91412
		334 19 03	154 21 45	Ankutz	6,814·9	3·83346
		359 30 58	179 31 00	Cache	4,442·1	3·64759
Williams	59 35 17·31	22 06 44	202 04 33	Cache	6,336·8	3·80187
	136 02 31·24	59 26 35	239 24 22	Brown	2,810·2	3·44874
		329 53 11	149 56 20	Upeat	6,880·8	3·83764
		336 04 40	156 07 39	Loweat	8,041·2	3·90532
Bob	59 35 49·12	24 07 20	204 06 56	Williams	1,078·6	3·03286
	136 02 03·15	49 51 24	229 48 47	Brown	3,742·5	3·57316
		336 32 19	156 35 04	Upeat	7,562·1	3·87864
Cascade	59 36 07·30	17 27 53	197 25 43	Upeat	7,862·5	3·89556
	135 56 21·48	70 09 35	250 02 03	Brown	8,743·8	3·94170
		84 02 50	263 57 55	Bob	5,389·5	3·73155
Turn	59 36 49·26	20 30 47	200 30 09	Bob	1,987·2	3·29824
	136 01 18·77	285 31 34	105 35 51	Cascade	4,840·1	3·68485
		345 16 15	165 18 22	Upeat	9,097·7	3·95893
Jay	59 36 47·62	27 11 25	207 07 18	Upeat	9,832·4	3·99266
	135 54 05·76	59 38 27	239 36 30	Cascade	2,467·2	3·39220
		76 27 56	256 21 04	Bob	7,703·5	3·88669
		90 28 53	270 22 39	Turn	6,790·2	3·83188
Pseudo	59 37 28·25	5 16 42	185 15 51	Upeat	10,048·5	4·00210
	135 57 52·79	69 32 09	249 29 11	Turn	3,447·5	3·53750
		289 25 53	109 29 09	Jay	3,775·1	3·57693
		330 14 13	150 15 32	Cascade	2,885·6	3·46023
Tahini north base	59 36 43·53	94 03 32	274 01 13	Turn	2,518·8	3·40119
	135 58 38·55	207 23 26	27 24 05	Pseudo	1,559·0	3·19284
		268 16 23	88 20 18	Jay	4,279·5	3·63139
		297 31 27	117 33 25	Cascade	2,424·5	3·38463

CHILKAT RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Tahini south base	59 36 22·06	107 51 56	287 49 31	Turn	2,747·3	3·43891
	135 58 32·02	171 14 23	351 14 17	Tahini north base	672·3	2·82758
		196 42 21	16 42 54	Pseudo	2,138·9	3·33020
		282 33 17	102 35 09	Cascade	2,097·8	3·32177
Stria	59 37 53·83	292 17 16	112 21 51	Jay	5,393·9	3·73190
	135 59 24·04	298 56 52	118 58 11	Pseudo	1,634·6	3·21340
		319 00 36	139 03 14	Cascade	4,365·9	3·64007
		341 50 39	161 51 19	Tahini north base	2,289·5	3·35974
Brulé	59 38 06·98	38 03 01	218 02 43	Stria	517·0	2·71347
	135 59 03·70	297 42 11	117 46 28	Jay	5,276·9	3·72238
		325 30 04	145 32 24	Cascade	4,492·9	3·65253
		351 18 49	171 19 11	Tahini north base	2,612·6	3·41708
McKee	59 40 12·98	310 20 17	130 27 09	Jay	9,806·9	3·99153
	136 02 02·46	322 28 28	142 32 04	Pseudo	6,425·2	3·80789
		330 01 46	150 04 03	Stria	4,970·2	3·69637
		348 45 56	168 48 41	Upeat	15,397·8	4·18746
B.P. 132	59 39 11·53	208 17 21	28 18 17	McKee	2,159·9	3·33443
	136 03 07·84	297 36 00	117 43 48	Jay	9,591·8	3·98190
		304 24 49	124 28 02	Stria	4,251·8	3·62857
		311 46 55	131 52 46	Cascade	8,548·3	3·93188
B.P. 128	59 39 44·96	79 46 59	259 41 44	B.P. 132	5,808·3	3·76405
	135 57 02·87	333 09 13	153 11 46	Jay	6,149·9	3·78887
		354 29 35	174 30 11	Cascade	6,766·9	3·83039
Low Bend	59 37 44·92	52 01 55	231 58 55	Tahini south base	4,165·8	3·61970
	135 55 02·63	79 04 38	259 02 11	Pseudo	2,716·7	3·43404
Fiedler	59 38 25·56	39 32 19	219 29 26	Tahini south base	4,954·5	3·69500
	135 55 10·92	55 03 38	235 01 18	Pseudo	3,095·4	3·49071
		354 05 55	174 06 02	Low Bend	1,264·6	3·10194
Awe	59 38 37·60	40 05 31	220 04 15	Low Bend	2,130·9	3·32856
	135 53 35·07	76 04 47	256 03 24	Fiedler	1,547·3	3·18957
Button	59 37 51·06	84 58 09	264 56 10	Low Bend	2,159·0	3·33426
	135 52 45·41	115 06 45	295 04 39	Fiedler	2,518·0	3·40105
		151 37 33	331 36 50	Awe	1,637·2	3·21411
Albus	59 39 01·87	35 27 52	215 26 26	Button	2,690·2	3·42978
	135 51 05·82	72 12 41	252 10 32	Awe	2,455·7	3·39017
Lupus	59 39 17·39	0 31 22	180 31 22	Albus	480·1	2·68137
	135 51 05·54					
Traverse	59 40 40·77	356 22 52	176 23 01	Lupus	2,585·7	3·41257
	135 51 15·96					
Gus	59 38 09·10	69 11 17	249 09 56	Button	1,570·4	3·19600
	135 51 11·75	111 27 54	291 25 50	Awe	2,412·7	3·38250
		183 15 19	3 15 24	Albus	1,635·8	3·21373
Glacier 2	59 38 40·81	64 19 44	244 17 52	Gus	2,264·4	3·35496
	135 49 01·51	108 31 01	288 29 14	Albus	2,053·5	3·31249
Southeast	59 40 28·54	20 25 58	200 24 30	Gus	4,604·8	3·66321
	135 49 29·17	29 26 42	209 25 19	Albus	3,079·8	3·48852
		352 35 44	172 36 08	Glacier 2	3,361·9	3·52658
Bush	59 40 46·40	288 54 53	108 56 22	Southeast	1,704·0	3·23148
	135 51 12·16	332 13 30	152 15 23	Glacier 2	4,392·1	3·64267
		359 55 33	179 55 33	Gus	4,868·1	3·68736
Boundary Point	59 41 17·18	305 27 03	125 28 59	Southeast	2,594·2	3·41401
	135 51 44·18	332 14 47	152 15 14	Bush	1,076·3	3·03194

CHILKAT RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 127	59 41 08·79	240 15 16	60 15 41	Boundary Point	523·6	2·71896
	135 52 13·24	295 51 29	115 53 50	Southeast	2,853·8	3·45542
		305 55 43	125 56 35	Bush	1,180·5	3·07206
B.P. 126	59 41 28·63	60 16 15	240 15 16	B.P. 127	1,238·0	3·09272
	135 51 04·53					
Point No. 2	59 41 23·63	60 16 00	240 15 16	B.P. 127	926·0	2·96660
	135 51 21·85	240 16 00	60 16 15	B.P. 126	312·0	2·49415
Klukwan	59 42 04·80	60 18 03	240 16 00	Point No. 2	2,570·4	3·41000
	135 48 59·14	60 18 03	240 15 16	B.P. 127	3,496·4	3·54362
Goat	59 43 16·57	300 44 36	120 48 02	Klukwan	4,341·1	3·63760
	135 52 57·69	336 46 38	156 48 01	Point No. 2	3,802·9	3·58012
Camp	59 44 52·89	27 55 00	207 23 35	Goat	3,357·5	3·52602
	135 51 18·78	337 13 17	157 15 18	Klukwan	5,641·1	3·75136
Camp south base	59 43 25·53	80 17 50	260 16 21	Goat	1,643·3	3·21573
	135 51 14·06	178 26 13	358 26 09	Camp	2,704·5	3·43208
Camp north base	59 43 47·29	47 48 57	227 48 16	Camp south base	1,002·4	3·00102
	135 50 26·54	68 06 02	248 03 52	Goat	2,546·4	3·40592
		158 06 20	338 05 35	Camp	2,188·2	3·34008
Stick Pass	59 45 09·41	59 27 33	239 22 32	Camp south base	6,318·3	3·80060
	135 45 25·89	61 37 01	241 32 41	Camp north base	5,340·1	3·72755
		63 43 58	243 37 28	Goat	7,875·4	3·89627
		84 44 35	264 39 30	Camp	5,534·9	3·74311
B.P. 125	59 42 45·27	60 20 04	240 18 03	Klukwan	2,528·9	3·40294
	135 46 38·64	99 19 46	279 14 19	Goat	6,004·4	3·77847
Grizzly Bear	59 43 43·45	60 22 59	240 18 03	Klukwan	6,169·5	3·79025
	135 43 16·21	60 22 59	240 20 04	B.P. 125	3,640·6	3·56117
		105 58 03	285 51 06	Camp	7,839·3	3·89428
		142 43 31	322 41 39	Stick Pass	3,343·6	3·52422
B.P. 124	59 43 43·37	240 22 59	60 22 59	Grizzly Bear	4·93	0·69263
	135 43 16·48					
Mideat	59 31 25·73	10 50 36	190 50 34	Loweat	188·7	2·27584
	135 59 01·61	81 40 31	261 37 59	Ankutz	2,796·2	3·44657
		134 17 56	314 12 35	Martin	817·9	2·91272
		187 23 30	7 23 39	Upeat	1,222·9	3·08740
Darby	59 34 55·10	103 03 09	282 56 31	Bob	7,432·8	3·87115
	135 54 21·63	118 24 45	298 18 45	Turn	7,437·0	3·87140
		129 48 27	309 44 46	Tahini north base	5,244·7	3·71972
		139 55 47	319 54 04	Cascade	2,920·5	3·46545
Camp 2	59 36 29·09	216 03 43	36 04 56	Pseudo	2,265·1	3·35509
	135 59 17·85	263 16 58	83 21 27	Jay	4,927·5	3·69263
		283 40 42	103 43 14	Cascade	2,847·5	3·45446
Goat 2	59 37 07·65	231 35 06	51 37 14	Brulé	2,956·0	3·47070
	136 01 31·50	275 01 01	95 07 26	Jay	7,016·7	3·84613
		290 58 36	111 03 04	Cascade	5,208·3	3·71670
		340 39 49	160 40 00	Turn	603·3	2·78050
Glave	59 36 08·80	289 14 32	109 22 31	Martin	9,230·4	3·96522
	136 14 29·63	325 07 26	145 15 42	Cliff	15 818·7	4·19917
Tarn	59 36 37·24	291 13 44	111 22 58	Martin	10,822·6	4·03433
	136 15 57·11	302 40 13	122 41 28	Glave	1,630·1	3·21221
		323 02 48	143 12 19	Cliff	17,336·8	4·23897
Polk	59 37 49·08	10 28 11	190 27 39	Glave	3,155·9	3·49912
	136 13 53·07	41 11 28	221 09 41	Tarn	2,953·7	3·47037

CHILKAT RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 140	59 36 00·52	243 42 02	63 48 17	Polk	7,596·6	3·88062
	136 21 07·59	256 49 41	76 54 09	Tarn	5,000·7	3·69903
		267 36 09	87 41 52	Glave	6,247·7	3·79572
		280 28 28	100 42 10	Martin	15,215·6	4·18229
		292 31 29	112 50 31	Loweat	22,532·0	4·35280
B.P. 134	59 38 25·23	34 02 25	213 59 48	Glave	5,093·8	3·70704
	136 11 27·87	51 39 35	231 35 43	Tarn	5,383·3	3·73105
		340 13 47	160 19 26	Cliff	18,283·1	4·26205
B.P. 141	59 33 35·02	164 25 09	344 23 43	Tarn	5,854·8	3·76751
	136 14 16·83	177 35 05	357 34 55	Glave	4,763·2	3·67790
		258 36 03	78 43 51	Martin	8,685·2	3·93878
Peak 50-51	59 34 03·98	172 24 16	352 23 41	Tarn	4,785·1	3·67989
	136 15 16·78	190 50 18	10 50 58	Glave	3,933·0	3·59472
		265 01 41	85 10 20	Martin	9,490·7	3·97730
		288 16 28	108 30 27	Loweat	16,110·2	4·20710
Bear	59 26 27·41	283 51 18	103 51 52	Emerge	640·0	2·80616
	136 05 29·32	331 42 03	151 44 04	Knob	4,670·4	3·66935
Summit	59 23 59·00	239 15 09	59 22 11	Bear	8,998·9	3·95419
	136 13 40·00	241 58 04	62 05 40	Emerge	9,466·1	3·97617
		267 09 53	87 18 56	Knob	9,968·5	3·99863
Rain	59 27 04·33	277 09 43	97 17 55	Bear	9,077·4	3·95796
	136 15 00·75	347 28 22	167 29 32	Summit	5,874·9	3·76900
Flower	59 23 49·84	202 07 33	22 09 47	Rain	6,498·0	3·81278
	136 17 36·08	235 37 13	85 40 37	Summit	3,736·4	3·57245
Bates 157	59 27 33·79	20 41 42	200 39 25	Summit	7,104·6	3·85154
	136 11 00·90	76 27 53	256 24 26	Rain	3,887·2	3·58964
B.P. 144	59 27 53·41	275 03 48	95 09 59	Bates 157	6,810·4	3·83317
	136 18 11·54	282 24 13	102 35 09	Bear	12,300·7	4·08993
		296 47 12	116 49 56	Rain	3,367·4	3·52729
		329 25 17	149 29 11	Summit	8,423·1	3·92547
E	59 28 11·84	278 35 12	98 42 15	Bates 157	7,833·0	3·89393
	136 19 12·57	300 40 18	120 41 10	B.P. 144	1,117·7	3·04832
		326 08 11	146 12 57	Summit	9,418·5	3·97398
C	59 25 55·83	189 39 51	9 40 30	E	4,269·6	3·63039
	136 19 58·09	250 14 01	70 21 43	Bates 157	8,992·1	3·95386
		301 10 55	121 16 20	Summit	6,974·0	3·84348
B.P. 147	59 26 57·41	228 42 03	48 44 26	E	3,491·3	3·54299
	136 21 59·13	304 59 21	125 06 30	Summit	9,614·1	3·98291
		314 57 11	134 58 55	C	2,696·5	3·43080
F	59 29 46·46	303 02 13	123 06 19	E	5,366·0	3·72965
	136 23 58·22	332 03 01	152 06 27	C	8,077·4	3·90727
		340 15 53	160 17 35	B.P. 147	5,557·4	3·74487
B.P. 142	59 31 28·71	29 31 16	209 27 47	B.P. 144	7,654·4	3·88391
	136 14 12·07	37 51 09	217 46 50	E	7,711·9	3·88716
		71 07 41	250 59 15	F	9,747·4	3·98889
		337 29 47	157 32 29	Bates 157	7,867·7	3·89585
Z	59 31 49·92	6 48 26	186 47 37	B.P. 144	7,370·9	3·86752
	136 17 16·07	15 12 35	195 10 55	E	6,993·4	3·84469
		58 54 47	238 49 01	F	7,389·4	3·86861
		282 45 58	102 48 37	B.P. 142	2,966·2	3·47220
D	59 27 52·07	23 53 58	203 52 31	C	3,934·1	3·59485
	136 18 16·99	64 13 45	244 10 34	B.P. 147	3,887·0	3·58962
		124 57 04	304 56 16	E	1,068·0	3·02857

CHILKAT RIVER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 150	59 27 58·14	232 00 43	52 04 39	F	5,450·2	3·73641
	136 28 31·19	267 10 25	87 18 26	E	8,807·9	3·94487
		286 52 35	106 58 13	B.P. 147	6,455·9	3·80996
		295 01 25	115 08 47	C	8,927·5	3·95073
		297 40 11	117 52 58	Summit	15,879·6	4·20084
Snow	59 21 36·50	207 37 17	27 43 07	E	13,813·7	4·14031
	136 25 59·25	231 56 00	52 08 53	Bates 157	17,974·6	4·25466
McA 158	59 19 13·30	135 17 26	315 13 27	Snow	6,238·9	3·79511
	136 21 21·44	186 56 35	6 58 26	E	16,788·8	4·22502
		212 14 14	32 23 08	Bates 157	18,325·3	4·26305
Cook	59 17 19·44	227 24 25	47 32 16	Snow	11,768·5	4·07072
	136 35 07·62	254 49 07	75 00 56	McA 158	13,540·7	4·13164
Plato	59 18 37·70	80 04 49	259 52 25	Cook	13,915·2	4·14349
	136 20 41·83	137 49 45	317 45 12	Snow	7,470·0	3·87332
		150 22 30	330 21 56	McA 158	1,267·4	3·10290
B.P. 154	59 17 03·91	193 00 50	13 02 36	Snow	8,658·2	3·93743
	136 28 02·66	237 43 01	57 48 46	McA 158	7,506·7	3·87545
		247 21 43	67 28 02	Plato	7,557·0	3·87835
B.P. 156	59 15 36·43	119 50 55	299 45 53	Cook	6,413·0	3·80706
	136 29 16·29	195 36 29	15 39 18	Snow	11,570·4	4·06335
		203 17 59	23 19 01	B.P. 154	2,947·8	3·46950
		228 11 14	48 18 02	McA 158	10,077·4	4·00335
		235 23 09	55 30 31	Plato	9,890·5	3·99522
B.P. 155	59 16 31·71	236 35 08	56 36 30	B.P. 154	1,810·3	3·25775
	136 29 38·09	237 28 44	57 35 51	McA 158	9,316·7	3·96926
		245 16 01	65 23 42	Plato	9,341·6	3·97042
		348 35 11	168 35 30	B.P. 156	1,745·1	3·24183
Hip	59 16 43·56	112 21 49	292 19 22	Cook	2,921·1	3·46554
	136 32 17·00	245 51 19	66 00 42	McA 158	11,363·4	4·05551
		252 07 13	72 17 11	Plato	11,557·1	4·06285
		278 16 10	98 18 26	B.P. 155	2,543·3	3·40539
		305 56 45	125 59 20	B.P. 156	3,536·8	3·54861
B.P. 157	59 09 58·37	179 18 48	359 18 39	Cook	13,649·9	4·13513
	136 34 57·29	191 26 40	11 28 58	Hip	12,793·8	4·10700
		202 33 00	22 37 34	B.P. 155	13,183·2	4·12002
		207 18 28	27 23 21	B.P. 156	11,777·7	4·07106
B.P. 151	59 22 35·63	14 38 41	194 33 09	B.P. 157	24,215·3	4·38409
	136 28 31·97	307 09 43	127 11 54	Snow	3,027·5	3·48109
		314 40 41	134 47 25	Plato	10,461·2	4·01958
Windy	59 16 24·08	9 30 57	189 29 09	B.P. 157	12,101·8	4·08285
	136 32 51·37	128 28 00	308 26 03	Cook	2,755·0	3·44012
		222 05 10	42 05 40	Hip	812·2	2·90967
		293 22 30	113 25 35	B.P. 156	3,712·7	3·56969
B.P. 152	59 19 20·47	271 53 31	91 59 27	McA 158	6,546·5	3·81601
	136 28 15·08	280 24 11	100 30 41	Plato	7,291·4	3·86281
		357 20 03	177 20 14	B.P. 154	4,230·5	3·62639
B.P. 153	59 19 06·10	177 17 28	357 17 27	B.P. 152	445·2	2·64858
	136 28 13·75	267 59 34	88 05 29	McA 158	6,525·9	3·81464
		276 57 09	97 03 38	Plato	7,203·4	3·85754
		357 20 24	177 20 34	B.P. 154	3,785·1	3·57808
Ed	59 13 11·74	26 44 42	206 42 00	B.P. 157	6,699·8	3·82606
	136 31 47·53	157 32 56	337 30 05	Cook	8,295·1	3·91882
		170 21 28	350 20 33	Windy	6,037·3	3·78084
		175 55 39	355 55 14	Hip	6,571·0	3·81763
		208 09 16	28 11 26	B.P. 156	5,078·8	3·70576

CHILKAT RIVER—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Art	59 13 20·37	27 37 20	207 34 24	B.P. 157	7,053·6	3·84841
	136 31 31·46	43 41 32	223 41 18	Ed	368·9	2·56692
		173 27 29	353 26 50	Hip	6,328·8	3·80132
		196 52 13	16 53 50	B.P. 155	6,187·6	3·79152
		206 57 36	26 59 34	B.P. 156	4,724·3	3·67434
		226 16 00	46 25 20	Plato	14,225·3	4·15306
Walt	59 14 06·86	209 11 18	29 14 19	Cook	6,827·8	3·83428
	136 38 37·94	232 15 02	52 20 00	Windy	6,942·4	3·84151
		335 29 08	155 32 18	B.P. 157	8,449·7	3·92684
Nugget	59 18 46·43	72 59 26	252 42 12	B.P. 156	19,935·6	4·29963
	136 09 13·18	78 00 43	257 43 10	B.P. 155	19,833·1	4·29739
		88 39 45	268 29 53	Plato	10,898·8	4·03738
		94 12 56	274 02 30	McA 158	11,550·5	4·06260
		108 25 44	288 11 19	Snow	16,753·7	4·22411
Hall	59 17 21·04	76 02 37	255 50 55	B.P. 156	13,330·3	4·12484
	136 15 39·85	83 32 23	263 20 22	B.P. 155	13,361·3	4·12585
		246 35 56	66 41 28	Nugget	6,665·8	3·82385
B.P. 158	59 09 37·19	223 50 12	44 02 38	Cook	19,865·1	4·29809
	136 49 36·66	231 13 06	51 27 59	Hip	21,121·3	4·32472
		231 19 48	51 29 13	Walt	13,378·6	4·12641
		267 12 36	87 25 11	B.P. 157	13,988·8	4·14578

GLACIER BAY

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET	° ′ ″	° ′ ″	° ′ ″			
Dam (U.S.C. and G.S.)	58 19 10·065					
	136 02 20·517					
Gus (U.S.C. and G.S.)	58 22 59·611	45 37 12·9	225 30 53·7	Dam	10,145·1	4·006255
	135 54 55·127					
Top	58 21 55·600	260 00 19·2	80 10 13·0	Gus	11,505·3	4·060899
	136 06 32·379	321 18 31·3	141 22 05·7	Dam	6,559·2	3·816848
Beard (I.B.C.) (U.S.C. and G.S.)	58 30 48·126	16 45 42·5	196 41 22·5	Top	17,204·7	4·235648
	136 01 27·206	336 15 56·8	156 21 31·0	Gus	15,830·0	4·199482
Low	58 29 53·809	258 23 40·2	78 30 53·4	Beard	8,397·2	3·924137
	136 09 55·251	311 09 44·9	131 22 32·0	Gus	19,429·6	4·288463
		347 25 54·2	167 28 47·1	Top	15,158·1	4·180644
Will (I.B.C.) (U.S.C. and G.S.)	58 35 14·676	14 34 23·2	194 32 07·3	Low	10,257·2	4·011030
	136 07 15·915	325 35 35·1	145 40 32·6	Beard	9,991·4	3·999626
Cliff	58 37 46·341	296 20 10·7	116 28 30·4	Will	10,552·1	4·023339
	136 17 01·242	310 29 21·0	130 42 38·0	Beard	19,884·3	4·298511
		334 43 36·3	154 49 39·8	Low	16,161·7	4·208488
Marble (I.B.C.) (U.S.C. and G.S.)	58 38 36·327	36 00 36·2	215 56 36·7	Will	7,710·1	3·887060
	136 02 35·349	83 47 06·6	263 34 47·2	Cliff	14,055·6	4·147849
		355 38 41·8	175 39 40·0	Beard	14,528·6	4·162225

GLACIER BAY—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MAJOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Point	58 46 21·210	7 23 28·4	187 21 38·9	Cliff	16,064·1	4·205857
	136 14 53·181	320 21 36·3	140 32 06·8	Marble	18,655·9	4·270816
Happy	58 42 30·832	235 17 24·5	55 26 32·9	Point	12,542·9	4·098397
	136 25 34·755	287 54 48·2	108 14 26·5	Marble	23,384·3	4·368924
		316 42 04·4	136 49 23·0	Cliff	12,083·1	4·082178
Gloomy	58 50 14·822	299 15 14·9	119 26 39·7	Point	14,748·2	4·168739
	136 28 13·825	349 53 05·6	169 55 21·6	Happy	14,582·9	4·163843
Slide	58 44 23·468	216 58 57·6	37 06 14·5	Gloomy	13,620·8	4·134202
	136 36 44·630	260 02 29·9	80 21 11·1	Point	21,398·8	4·330389
		287 50 08·3	107 59 40·8	Happy	11,330·0	4·054228
Wright	58 47 59·413	2 02 38·4	182 02 05·5	Marble	17,434·2	4·241403
	136 01 56·800	37 36 50·5	217 23 57·6	Cliff	23,913·0	4·378635
		66 08 07·0	245 47 54·8	Happy	24,964·3	4·397319
		76 24 00·4	256 12 56·5	Point	12,837·3	4·108472
Canadian No. 189	58 50 37·300	16 30 23·2	196 26 26·3	Happy	15,697·0	4·195816
	136 20 57·755	52 51 25·5	232 37 55·6	Slide	19,108·0	4·281216
		323 30 19·3	143 35 31·1	Point	9,851·5	3·993501
Canadian No. 190	58 42 52·336	105 04 32·2	284 55 13·2	Slide	10,896·4	4·037283
	136 25 50·569	170 28 21·8	350 26 19·4	Gloomy	13,883·9	4·142510
		238 29 13·6	58 38 35·6	Point	12,392·6	4·093161
Slip	58 50 34·650	271 56 33·1	92 11 39·4	Gloomy	16,998·8	4·230418
	136 45 52·918	322 27 15·7	142 35 04·6	Slide	14,473·2	4·160565
Dix	58 55 06·694	29 33 20·3	209 29 05·6	Slip	9,673·7	3·985593
	136 40 55·402	306 24 57·8	126 35 49·7	Gloomy	15,181·0	4·181300
		348 32 29·0	168 36 03·5	Slide	20,305·9	4·307622
Pauline	58 49 32·219	8 53 00·7	188 51 41·3	Slide	9,669·3	3·985397
	136 35 11·808	100 42 48·0	280 33 39·5	Slip	10,464·9	4·019735
		152 01 37·5	331 56 43·5	Dix	11,723·1	4·069044
		258 49 46·9	78 55 44·6	Gloomy	6,834·4	3·834698
End	58 52 02·254	239 56 08·1	60 04 56·8	Dix	11,417·4	4·057567
	136 51 12·845	297 49 02·0	117 53 35·8	Slip	5,801·6	3·763548
Wells	58 58 47·092	1 18 14·1	181 17 58·8	End	12,530·2	4·097959
	136 50 55·055	305 21 07·8	125 29 41·5	Dix	11,766·2	4·070635
		342 21 18·9	162 25 37·6	Slip	15,986·8	4·203761
Camp	58 43 54·338	173 58 45·4	353 57 39·2	Gloomy	11,838·7	4·073303
	136 26 56·416	248 34 13·2	68 44 31·4	Point	12,486·4	4·096438
Paul	58 47 50·000	210 32 39·6	30 35 00·6	Gloomy	5,204·3	3·716359
	136 30 58·703	279 55 45·4	100 09 31·0	Point	15,753·0	4·197362
		331 51 50·6	151 55 17·7	Camp	8,266·9	3·917344
Bench	58 44 37·614	196 48 31·1	16 50 06·9	Paul	6,219·0	3·793723
	136 32 50·685	283 10 48·9	103 15 51·7	Camp	5,854·4	3·767482
Island	58 46 29·917	56 17 47·0	236 13 10·3	Bench	6,256·0	3·796300
	136 27 27·110	126 06 59·0	306 03 58·1	Paul	4,206·5	3·623926
		354 08 33·2	174 08 59·4	Camp	4,839·3	3·684779
Hugh Miller east base	58 44 15·467	98 52 05·3	278 48 11·0	Bench	4,461·5	3·649481
	136 28 16·621	190 49 36·7	10 50 19·0	Island	4,235·7	3·626927
Hugh Miller west base	58 43 51·364	121 02 35·2	301 00 28·8	Bench	2,776·6	3·443508
	136 30 22·784	209 54 43·9	29 57 14·1	Island	5,661·2	3·752908
		249 48 36·6	69 50 24·5	Hugh Miller east base	2,162·49	3·334955

GLACIER BAY—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET	° ′ ″	° ′ ″	° ′ ″			
Reid	58 57 47·22	251 09 06	71 13 58	Wells	5,746·9	3·759438
	136 56 35·50	288 10 10	108 23 36	Dix	15,834·6	4·199606
		334 08 37	154 13 14	End	11,857·8	4·074005
Calamity	59 03 01·95	318 26 33	138 32 48	Wells	10,530·6	4·022453
	136 58 12·34	350 58 13	170 59 36	Reid	9,861·0	3·993920
Steep	58 59 32·16	211 21 55	31 25 28	Calamity	7,605·0	3·881101
	137 02 20·62	277 10 36	97 20 24	Wells	11,038·7	4·042918
		300 27 21	120 32 17	Reid	6,399·0	3·806114
Glacier	59 03 31·98	276 47 46	96 54 42	Calamity	7,785·1	3·891262
	137 06 17·22	333 00 37	153 04 00	Steep	8,325·6	3·920415
Granite	59 05 18·22	3 08 22	183 07 50	Steep	10,724·5	4·030377
	137 01 43·85	52 59 05	232 55 10	Glacier	5,457·0	3·736954
		321 20 32	141 23 33	Calamity	5,398·1	3·732242
Gull	59 08 25·03	4 10 58	184 10 22	Glacier	9,092·6	3·958686
	137 05 35·62	327 26 02	147 29 21	Granite	6,857·0	3·836133
Twin	59 08 08·10	266 25 58	86 33 40	Gull	8,575·1	3·933238
	137 14 33·85	293 07 36	113 18 37	Granite	13,333·8	4·124955
		317 09 38	137 16 44	Glacier	11,641·5	4·066009
Triangle	59 13 40·30	9 32 47	189 31 14	Twin	10,423·7	4·018020
	137 12 45·15	324 59 15	145 05 24	Gull	11,903·9	4·075691
		341 48 44	161 54 17	Glacier	19,808·9	4·296860
B.P. 157	59 09 58·37	2 04 57	182 03 25	Slide	47,525·9	4·67693
	136 34 57·29	16 17 06	196 07 44	Slip	37,499·9	4·57403
		321 59 00	142 27 18	Wright	51,638·1	4·71297
		353 45 58	173 50 48	Found	50,149·9	4·70027
B.P. 158	59 09 37·19	3 33 45	183 32 38	Wells	20,155·3	4·30439
	136 49 36·66	338 15 34	158 32 58	Found	52,916·1	4·72359
		339 34 19	159 46 41	Pauline	39,761·2	4·59946
B.P. 159	59 08 11·50	307 22 29	128 05 48	Wright	61,281·6	4·78733
	136 52 29·48	318 04 22	138 36 35	Point	54,267·5	4·73454
		324 55 03	145 15 51	Gloomy	40,626·6	4·60881
		331 15 12	151 38 01	Canadian No. 190	53,518·0	4·72850
B.P. 160	59 06 05·80	58 50 48	238 43 45	Glacier	9,185·0	3·96308
	136 58 04·05	301 34 46	122 22 51	Wright	63,470·2	4·80257
		333 12 11	153 18 19	Wells	15,202·0	4·18190
		337 50 33	158 01 00	Slip	31,091·4	4·49264
B.P. 161	59 01 57·09	287 19 39	107 36 23	Wells	19,588·0	4·29199
	137 10 25·54	293 58 13	114 23 30	Dix	31,002·7	4·49140
		297 54 58	118 31 07	Gloomy	45,960·0	4·66238
		304 01 31	124 31 42	Pauline	40,925·1	4·61199
B.P. 162	59 00 01·36	275 05 51	95 28 05	Wells	24,962·6	4·39729
	137 16 51·46	292 38 08	113 31 11	Point	64,741·1	4·81118
		295 38 55	116 14 36	Pauline	44,493·8	4·64830
		305 12 23	126 03 34	Cliff	70,905·5	4·85068
B.P. 163	58 54 31·40	256 52 01	77 22 54	Wells	35,504·2	4·55028
	137 26 59·40	268 15 27	88 54 54	Dix	44,253·7	4·64595
		277 34 49	98 25 07	Gloomy	57,050·6	4·75626
		281 48 57	102 50 39	Point	71,029·7	4·85144
B.P. 164	58 54 24·27	257 54 04	78 28 47	Wells	39,735·6	4·59918
	137 31 27·20	277 14 07	98 30 43	Wright	86,926·1	4·93915
		280 55 12	102 00 43	Point	75,188·3	4·87615
		292 44 41	113 48 19	Cliff	78,141·2	4·89288
		305 39 18	126 51 49	Top	101,941·3	5·00835

GLACIER BAY—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NET—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 165	58 59 08·75	278 42 39	99 24 36	Dix	47,564·2	4·67728
	137 29 53·21	283 08 35	104 23 53	Wright	87,004·2	4·93954
		297 48 35	118 34 04	Slide	57,989·6	4·76335
		298 57 37	119 59 57	Cliff	80,630·6	4·90650
B.P. 166	59 06 24·44	289 19 18	109 54 54	Wells	42,148·3	4·62478
	137 32 24·93	290 51 28	112 08 59	Wright	93,273·9	4·96976
		296 01 49	117 08 15	Point	83,193·6	4·92009
		305 42 45	126 47 18	Cliff	89,902·1	4·95377
		314 16 41	135 30 05	Top	117,003·8	5·06820
B.P. 167	59 14 38·96	298 02 14	119 23 09	Wright	103,021·8	5·01293
	137 36 19·78	303 22 41	124 32 30	Point	94,039·4	4·97331
		304 01 00	124 43 32	Dix	64,184·5	4·80743
		304 19 26	125 17 50	Gloomy	79,360·8	4·89961
		308 06 56	128 59 21	Pauline	74,808·5	4·87396
		310 37 25	131 37 49	Canadian No. 190	89,694·8	4·95276
Found	58 43 07·15	108 16 45	288 10 24	Slide	7,549·9	3·877939
	136 29 18·97	184 30 55	4 31 51	Gloomy	13,274·6	4·123020
		237 30 37	57 32 39	Camp	2,719·4	3·434467
		250 53 51	71 17 15	Wright	27,907·4	4·445720
Late	58 52 31·64	26 36 58	206 24 52	Cliff	30,613·5	4·485913
	136 02 51·32	45 23 17	225 12 59	Point	16,296·3	4·212090
		354 03 57	174 04 43	Wright	8,468·9	3·927829
Mount La Perouse	58 33 48·76	224 08 43	44 33 57	Pauline	40,827·5	4·610953
	137 04 43·87	233 15 49	53 53 12	Canadian No. 189	52,555·5	4·720618
		245 38 53	66 12 05	Canadian No. 190	41,228·9	4·615202
		246 06 38	67 00 16	Wright	66,159·3	4·820591
Mount Crillon	58 39 45·78	224 29 38	44 54 39	Dix	40,090·5	4·603041
	137 10 11·05	244 01 20	64 37 12	Gloomy	44,916·7	4·652408
		256 27 37	77 25 57	Wright	67,622·3	4·830090
		262 00 51	82 38 44	Canadian No. 190	43,246·7	4·635953

ALSEK RIVER, YAKUTAT BAY, AND MALASPINA GLACIER

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS	° ′ ″	° ′ ″	° ′ ″			
B.P. 164	58 54 24·27					
	137 31 27·20					
B.P. 165	58 59 08·75					
	137 29 53·21					
B.P. 166	59 06 24·44					
	137 32 24·93					
Alsek west base	59 07 30·15	271 27 22	92 22 06	B.P. 166	60,933·2	4·78485
	138 36 12·16	283 16 17	104 13 10	B.P. 165	65,294·9	4·81488
		290 57 14	111 52 44	B.P. 164	66,596·3	4·82345
Alsek east base	59 06 52·66	111 43 18	291 40 41	Alsek west base	3,137·41	3·49657
	138 33 08·94					
Flat	59 11 00·92	10 55 40	190 54 32	Alsek west base	6,642·4	3·82233
	138 34 53·00	289 04 12	109 59 58	B.P. 165	65,903·8	4·81891
		347 50 07	167 51 36	Alsek east base	7,858·3	3·89533

ALSEK RIVER, YAKUTAT BAY, AND MALASPINA GLACIER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Bay	59 09 45·68 138 41 08·65	311 37 22	131 41 37	Alsek west base	6,309·5	3·79999
Dry	59 07 51·53 138 37 30·34	135 31 49 298 00 10	315 28 41 118 01 17	Bay Alsek west base	4,952·0 1,408·6	3·69478 3·14880
Azimuth station	59 08 20·53 138 37 14·19	15 58 37 125 17 20 204 18 29 327 39 52	195 58 20 305 13 56 24 20 30 147 40 45	Dry Bay Flat Alsek west base	933·3 4,564·3 5,446·8 1,844·8	2·97004 3·65938 3·73614 3·26596
Canadian No. 1	59 09 53·63 138 35 14·18	11 44 13 340 24 33	191 43 23 160 26 20	Alsek west base Alsek east base	4,534·5 5,943·4	3·65653 3·77404
Island	59 09 14·85 138 27 16·50	51 54 43 69 14 22 80 02 23 114 24 15	231 49 40 249 06 42 259 53 50 294 17 43	Alsek east base Alsek west base Azimuth station Flat	7,125·8 9,113·1 9,649·7 7,961·1	3·85283 3·95967 3·98452 3·90097
Island East	59 09 08·47 138 26 44·53	55 32 31 71 26 26 99 50 58	235 27 01 251 18 19 279 43 40	Alsek east base Alsek west base Canadian No. 1	7,418·8 9,525·2 8,219·2	3·87033 3·97888 3·91483
Tern	59 11 41·53 138 29 18·10	59 29 07 279 50 38 291 53 06 332 43 46	239 24 01 100 39 28 112 44 05 152 45 58	Canadian No. 1 B.P. 166 B.P. 165 Island East	6,567·5 55,135·7 61,360·4 5,327·7	3·81740 4·74143 4·78789 3·72654
Root	59 11 46·63 138 21 34·43	45 13 24 75 03 51 88 49 38 281 39 11 295 01 58 303 34 25	225 08 58 254 52 07 268 43 00 102 21 23 115 46 19 124 17 24	Island East Canadian No. 1 Tern B.P. 166 B.P. 165 B.P. 164	6,943·9 13,480·9 7,362·7 47,932·5 54,668·4 57,781·4	3·84160 4·12972 3·86704 4·68063 4·73774 4·76179
Nest	59 12 29·02 138 25 27·48	16 05 16 68 09 21 289 29 48	196 03 40 248 06 03 109 33 08	Island Tern Root	6,253·1 3,944·6 3,924·7	3·79609 3·59600 3·59380
Banff	59 07 59·41 138 17 04·31	103 06 41 148 37 51	282 58 23 328 33 59	Island East Root	9,469·6 8,237·6	3·97633 3·91580
Moraine	59 09 48·32 138 11 45·81	56 23 28 85 10 23 111 27 20	236 18 54 264 57 31 291 18 54	Banff Island East Root	6,082·4 14,336·4 10,040·1	3·78408 4·15644 4·00174
Double	59 09 11·56 138 07 36·20	76 11 04 106 01 48	256 02 56 285 58 14	Banff Moraine	9,304·7 4,126·8	3·96870 3·61561
End	59 11 55·85 138 13 14·86	26 30 52 87 59 56 299 30 08 308 50 46 313 20 29 340 16 18	206 27 35 267 52 47 120 07 20 129 26 37 133 25 20 160 17 34	Banff Root B.P. 165 B.P. 164 Double Moraine	8,174·5 7,935·5 47,745·0 51,544·9 7,401·6 4,192·2	3·91246 3·89957 4·67893 4·71219 3·86933 3·62244
Good	59 17 32·86 138 10 09·25	15 46 40 351 05 13	195 44 01 171 07 24	End Double	10,836·0 15,701·6	4·03487 4·19594
Windy	59 17 17·71 138 13 35·62	261 48 32 316 15 10 339 12 00 358 06 18	81 51 30 136 51 19 159 17 09 178 06 36	Good B.P. 164 Double End	3,300·6 58,537·3 16,088·1 9,965·5	3·51860 4·76743 4·20651 3·99850
Point	59 21 19·84 138 15 37·04	323 31 47 345 36 32	143 36 29 165 38 17	Good Windy	8,730·0 7,735·0	3·94101 3·88846

ALSEK RIVER, YAKUTAT BAY, AND MALASPINA GLACIER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
New	59 21 14·20	267 03 25	87 06 32	Point	3,428·2	3·53506
	138 19 13·72	308 26 01	128 33 49	Good	11,003·2	4·04152
		323 48 10	143 53 01	Windy	9,063·9	3·95732
Bend	59 20 59·74	93 45 47	273 39 31	New	6,914·2	3·83974
	138 11 57·10	100 10 18	280 07 09	Point	3,530·9	3·54788
Flower	59 23 04·04	11 19 48	191 19 13	Point	3,288·3	3·51697
	138 14 56·16	50 09 10	230 05 28	New	5,301·0	3·72435
		323 38 57	143 41 31	Bend	4,774·2	3·67890
Club	59 23 33·59	23 10 52	203 09 01	Bend	5,178·3	3·71419
	138 09 48·12	79 23 06	259 18 41	Flower	4,947·9	3·69442
Alder	59 21 38·40	69 13 28	249 10 36	Bend	3,368·6	3·52745
	138 08 37·81	113 57 44	293 52 18	Flower	6,536·7	3·81536
		162 42 27	342 41 26	Club	3,733·5	3·57212
Rain	59 21 53·41	79 18 36	259 16 22	Alder	2,499·4	3·39783
	138 06 02·35	131 02 18	310 59 04	Club	4,724·4	3·67435
Knob	59 24 42·94	7 58 48	187 58 04	Alder	5,766·4	3·76090
	138 07 47·14	41 40 12	221 38 28	Club	2,872·2	3·45822
		342 29 15	162 30 45	Rain	5,500·8	3·74042
Crook	59 23 33·71	45 59 43	225 56 48	Rain	4,466·0	3·64992
	138 02 39·00	113 48 51	293 44 26	Knob	5,313·2	3·72536
Nose	59 25 18·82	22 20 38	202 19 25	Crook	3,516·3	3·54609
	138 01 14·30	35 36 29	215 32 21	Rain	7,815·0	3·89293
		79 53 14	259 47 36	Knob	6,294·7	3·79897
Boundary	59 28 56·71	27 12 00	207 08 20	Knob	8,827·2	3·94582
	138 03 31·36	342 13 34	162 15 32	Nose	7,080·2	3·85005
Flat Top	59 29 12·87	15 34 51	195 33 01	Nose	7,518·8	3·87615
	137 59 06·24	44 33 32	224 26 04	Knob	11,711·1	4·06860
		83 11 48	263 08 00	Boundary	4,203·0	3·62356
Down	59 25 55·63	149 45 31	329 42 32	Boundary	6,488·0	3·81211
	138 00 03·78	188 26 22	8 27 11	Flat Top	6,170·8	3·79034
Upper Alsek east base	59 26 10·81	78 53 58	258 51 47	Down	2,436·8	3·38682
	137 57 32·11	132 15 22	312 10 12	Boundary	7,640·8	3·88314
		165 15 57	345 14 36	Flat Top	5,825·8	3·76536
Side	59 25 23·12	114 37 43	294 35 43	Down	2,415·9	3·38307
	137 57 44·48	187 31 43	7 31 54	Upper Alsek east base	1,488·9	3·17287
Bar	59 26 22·55	64 37 04	244 35 28	Down	1,942·3	3·28832
	137 58 12·47	299 42 20	119 42 55	Upper Alsek east base	732·6	2·86485
		346 30 14	166 30 38	Side	1,891·3	3·27677
Upper Alsek west base	59 26 03·52	211 32 02	31 32 21	Bar	690·7	2·83927
	137 58 35·39	257 15 02	77 15 56	Upper Alsek east base	1,022·77	3·00978
		327 17 54	147 18 38	Side	1,485·9	3·17200
Logs	59 27 46·55	8 08 20	188 07 45	Side	4,484·0	3·65166
	137 57 04·23	22 28 46	202 27 47	Bar	2,813·3	3·44922
Canadian Moraine	59 26 14·58	61 18 15	241 15 36	Side	3,314·6	3·52043
	137 54 40·11	94 14 11	274 11 08	Bar	3,356·5	3·52588
		141 25 53	321 23 49	Logs	3,641·1	3·56123
B.P. 168	59 25 38·04	39 37 09	219 36 48	Side	599·4	2·77768
	137 57 20·25					

ALSEK RIVER, YAKUTAT BAY, AND MALASPINA GLACIER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 169	59 25 49·05 137 57 41·49	192 24 14	12 24 22	Upper Alsek east base	689·5	2·83851
B.P. 170	59 27 39·70 138 01 15·15	48 31 44 138 01 34	228 26 07 317 59 37	Knob Boundary	8,252·6 3,206·1	3·91659 3·50598
B.P. 171	59 28 01·96 138 01 58·19	41 48 30 352 11 41	221 43 29 172 12 19	Knob Nose	8,257·3 5,095·6	3·91684 3·70720
Sand	59 09 17·57 138 39 07·12	231 35 07 320 03 01	51 38 45 140 05 31	Flat Alsek west base	5,150·6 4,334·6	3·71186 3·63695
Goat	59 18 03·20 138 39 55·87	4 17 46 339 47 18 349 42 09 357 16 22	184 16 43 159 51 38 169 45 21 177 17 04	Bay Flat Alsek west base Sand	15,438·9 13,921·5 19,908·5 16,283·8	4·18862 4·14369 4·29904 4·21176
Bank	59 10 20·90 138 42 58·76	191 26 17 286 03 24 292 52 38 298 00 16 301 54 29 309 12 55	11 28 54 107 06 06 113 53 58 118 03 35 121 56 04 129 18 44	Goat B.P. 165 B.P. 164 Sand Bay Alsek west base	14,596·7 72,888·2 74,566·1 4,170·0 2,061·3 8,348·6	4·16425 4·86266 4·87254 3·62014 3·31414 3·92162
Chamberlain	59 22 15·64 138 49 21·32	198 58 10 304 16 24 311 04 48 344 37 58	120 06 25 125 23 16 131 12 54 164 43 27	B.P. 165 B.P. 164 Goat Bank	87,045·8 90,547·2 11,872·0 22,932·5	4·93975 4·95688 4·07452 4·36045
Italio	59 17 30·72 139 04 24·58	238 12 17 267 20 57 290 02 06 302 57 44	58 25 14 87 42 00 111 23 14 123 16 09	Chamberlain Goat B.P. 165 Bank	16,784·8 23,269·3 96,412·7 24,345·3	4·22492 4·36678 4·98413 4·38642
Tip	59 20 23·72 138 53 12·86	63 20 29 226 32 37 288 56 11 332 22 33	243 10 51 46 35 56 109 07 36 152 31 21	Italio Chamberlain Goat Bank	11,898·6 5,037·9 13,335·3 21,040·0	4·07550 3·70225 4·12500 4·32305
Ah Quay	59 15 25·79 138 55 24·07	114 22 04 192 40 42 204 18 11 251 33 20 308 29 43	294 14 19 12 42 35 24 23 23 71 46 38 128 40 23	Italio Tip Chamberlain Goat Bank	9,393·4 9,450·5 13,920·8 15,485·6 15,127·8	3·97282 3·97545 4·14366 4·18993 4·17978
Slate	59 33 41·40 139 07 21·00	307 57 05 321 09 57 354 41 16	129 19 29 141 25 27 174 43 48	B.P. 164 Chamberlain Italio	116,806·9 27,193·9 30,166·9	5·06747 4·43447 4·47953
Black Sand	59 24 15·05 139 29 22·61	229 43 50 275 16 50 297 40 34	50 02 49 95 51 17 118 02 03	Slate Chamberlain Italio	27,203·0 38,086·8 26,778·5	4·43462 4·58077 4·42779
Mount Tebenkof	59 43 23·78 139 25 26·02	5 59 42 316 32 36	185 56 18 136 48 12	Black Sand Slate	35,742·8 24,775·2	4·55319 4·39402
Ankau	59 32 11·69 139 51 14·73	229 13 22 265 50 48 305 21 52	49 35 38 86 28 38 125 40 42	Mount Tebenkof Slate Black Sand	31,965·5 41,471·5 25,387·4	4·50468 4·61775 4·40462
Black Tip	59 37 58·36 139 03 44·98	23 06 32 116 28 17	203 03 26 296 09 34	Slate Mount Tebenkof	8,644·3 22,716·8	3·93673 4·35635
Station A	59 37 08·68 139 10 40·78	130 03 29 256 40 33 333 55 53	309 50 45 76 46 32 153 58 45	Mount Tebenkof Black Tip Slate	18,077·4 6,696·7 7,139·7	4·25714 3·82586 3·85368

ALSEK RIVER, YAKUTAT BAY, AND MALASPINA GLACIER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Mount Hoorts	59 45 08·41	37 34 09	217 17 16	Ankau	30,268·6	4·48099
	139 31 40·49	298 55 05	119 00 29	Mount Tebenkof	6,686·7	3·82521
Ocean Cape	59 32 34·27	218 37 38	38 54 50	Mount Hoorts	29,933·8	4·47616
	139 51 37·07					
Ocean Cape (2)	59 32 34·26	218 37 44	38 54 57	Mount Hoorts	29,935·0	4·47618
	139 51 37·17	230 35 09	50 57 44	Mount Tebenkof	31,785·5	4·50223
		266 49 53	87 28 03	Slate	41,778·9	4·62096
		333 12 11	153 12 30	Ankau	782·2	2·89332
Malaspina southwest base	59 43 29·66	265 03 51	85 38 30	Mount Hoorts	37,719·6	4·57657
	140 11 46·97	316 47 00	137 04 24	Ocean Cape	27,764·8	4·44350
		316 47 09	137 04 33	Ocean Cape (2)	27,764·1	4·44348
Malaspina northeast base	59 45 23·69	58 56 50	238 51 26	Malaspina southwest base	6,832·1	3·83456
	140 05 32·48	270 36 35	91 05 51	Mount Hoorts	31,733·6	4·50152
		331 06 28	151 18 29	Ocean Cape	27,170·0	4·43409
Malaspina middle base	59 44 45·90	34 25 44	214 24 14	Malaspina southwest base	2,860·13	3·45639
	140 10 03·50	254 31 26	74 35 20	Malaspina northeast base	4,391·17	3·64258
Yakutat astronomical station	59 33 52·92	127 53 09	307 31 57	Malaspina southwest base	29,180·2	4·46509
	139 47 13·42	141 17 42	321 01 54	Malaspina northeast base	27,443·8	4·43845
		214 50 15	35 03 40	Mount Hoorts	25,503·6	4·40660
Yakutat magnetic station	59 33 54·72	348 02 14	168 02 15	Yakutat astronomical station	56·96	1·75557
	139 47 14·07					
Mount Hendricksen	59 49 10·97	23 04 04	203 01 07	Mount Hoorts	8,157·4	3·91155
	139 28 15·82	35 34 49	215 14 39	Ocean Cape (2)	37,846·4	4·57802
		346 07 28	166 09 55	Mount Tebenkof	11,066·5	4·04401
Mad	59 48 53·58	41 18 34	221 10 19	Mount Tebenkof	13,573·4	4·13269
	139 15 52·76	92 44 58	272 34 16	Mount Hendricksen	11,593·9	4·06423
Long	59 52 58·13	4 10 23	184 09 11	Mount Tebenkof	17,821·8	4·25095
	139 24 03·05	29 16 17	209 12 39	Mount Hendricksen	8,056·9	3·90617
		314 41 30	134 48 34	Mad	10,750·1	4·03141
Easy	59 53 12·76	5 30 53	185 30 10	Mad	8,058·3	3·90624
	139 15 03·07	86 58 45	266 50 58	Long	8,411·3	3·92486
Cloud	59 54 43·32	6 59 19	186 58 09	Mount Hendricksen	10,362·4	4·01546
	139 26 54·92	284 07 29	104 17 45	Easy	11,416·9	4·05755
		316 19 24	136 28 57	Mad	14,945·7	4·17452
		320 35 50	140 38 19	Long	4,211·8	3·62447
B.P. 172	59 46 08·08	83 53 35	263 12 09	Mount Tebenkof	45,244·0	4·65556
	138 37 27·67	97 09 19	276 25 25	Mount Hendricksen	47,876·6	4·68012
		106 34 43	285 54 26	Long	45,368·4	4·65675
		109 23 31	288 40 46	Cloud	48,888·4	4·68921
		110 46 36	290 14 06	Easy	37,518·7	4·57425
Mount Draper	59 48 24·34	64 34 59	244 17 03	Mount Tebenkof	21,552·9	4·33351
	139 04 40·54	115 13 15	294 56 30	Long	19,988·9	4·30079
		119 36 43	299 17 29	Cloud	23,854·1	4·37756
		132 42 45	312 33 47	Easy	13,177·8	4·11984
Sharp Peak	59 46 15·78	83 41 55	262 59 51	Mount Tebenkof	45,951·3	4·66230
	138 36 43·75	96 47 08	276 02 36	Mount Hendricksen	48,528·0	4·68599
		106 03 37	285 22 42	Long	45,959·1	4·66237
		108 52 42	288 09 18	Cloud	49,457·9	4,69424

ALSEK RIVER, YAKUTAT BAY, AND MALASPINA GLACIER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINORS NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
Snow Peak	59 46 34·00	82 57 47	262 15 55	Mount Tebenkof	45,791·4	4·66078
	138 36 58·30	96 08 56	275 24 36	Mount Hendricksen	48,239·0	4·68340
		105 27 17	284 46 35	Long	45,587·5	4·65885
		108 20 15	287 37 04	Cloud	49,063·0	4·69075
Gay	59 39 48·0	120 54	300 29	Mount Draper	31,307	4·4956
	138 35 57·5	173 10	353 09	B.P. 172	11,848	4·0736
		175 41	355 40	Snow Peak	12,602	4·1004
Kiddo	59 44 19·9	25 38	205 34	Gay	9,333	3·9700
	138 31 39·6	103 59	283 31	Mount Draper	31,828	4·5028
		121 40	301 35	B.P. 172	6,384	3·8051
		127 05	307 01	Sharp Peak	5,952	3·7746
		129 52	309 47	Snow Peak	6,480	3·8116
John	59 44 16·3	22 07	202 04	Gay	8,962	3·9524
	138 32 22·0	104 28	284 00	Mount Draper	31,214	4·4943
		132 10	312 06	Sharp Peak	5,512	3·7413
		134 41	314 37	Snow Peak	6,064	3·7828
		260 25	80 26	Kiddo	672	2·8273
Worm	59 39 32·1	118 06	297 37	Mount Draper	35,246	4·5471
	138 31 26·3	155 17	335 12	B.P. 172	13,494	4·1301
		158 22	338 18	Sharp Peak	13,442	4·1285
		174 21	354 20	John	8,837	3·9463
		178 40	358 40	Kiddo	8,908	3·9498
Coffee	59 41 24·3	68 08	248 00	Worm	9,297	3·9684
	138 22 15·3	77 03	256 51	Gay	13,210	4·1209
		119 22	299 13	John	10,876	4·0365
B.P. 173	59 48 35·96	10 16 04	190 08 01	Chamberlain	49,690·1	4·69627
	138 40 00·48	43 02 06	222 38 30	Slate	37,753·3	4·57696
		48 37 27	228 16 57	Black Tip	29,751·0	4·47350
		77 32 00	256 52 45	Mount Tebenkof	43,627·8	4·63976
		91 43 22	271 01 39	Mount Hendricksen	45,142·9	4·65459
		101 28 15	280 50 10	Long	41,943·2	4·62266
		104 54 54	284 24 36	Easy	33,842·3	4·52946
B.P. 174	59 50 44·53	72 17 48	251 39 06	Mount Tebenkof	44,078·3	4·64422
	138 40 39·39	86 37 12	265 56 03	Mount Hendricksen	44,593·6	4·64927
		96 08 18	275 30 46	Long	40,733·8	4·60996
		100 02 43	279 22 42	Cloud	43,807·3	4·64155
B.P. 175	59 54 23·97	6 21 53	186 15 49	Chamberlain	60,039·5	4·77844
	138 42 19·91	31 33 38	211 12 02	Slate	45,042·2	4·65362
		33 28 58	213 10 28	Black Tip	36,505·6	4·56236
		63 25 57	242 48 42	Mount Tebenkof	45,191·8	4·65506
		72 10 06	251 41 05	Mad	32,957·1	4·51795
		77 36 22	256 56 39	Mount Hendricksen	43,974·2	4·64320
B.P. 176	59 55 29·94	1 22 03	181 20 43	Chamberlain	61,734·2	4·79053
	138 47 48·01	24 29 08	204 12 15	Slate	44,447·7	4·64785
		24 45 48	204 32 01	Black Tip	35,806·3	4·55396
		57 42 20	237 09 48	Mount Tebenkof	41,750·5	4·62066
		65 07 42	244 43 25	Mad	28,945·5	4·46158
		80 42 47	260 19 12	Easy	25,769·6	4·41111
B.P. 177	59 59 42·63	30 45 33	210 34 30	Mad	23,352·7	4·36834
	139 03 06·53	34 42 04	214 22 45	Mount Tebenkof	36,775·5	4·56556
		42 23 03	221 41 08	Ocean Cape	67,846·9	4·83153
		50 22 41	230 00 55	Mount Hendricksen	30,537·3	4·48483
		57 28 07	237 10 00	Long	23,183·1	4·36517
		65 20 49	244 21 26	Malaspina southwest base	70,854·3	4·85037
		65 55 58	245 01 58	Malaspina northeast base	64,056·9	4·80657

ALSEK RIVER, YAKUTAT BAY, AND MALASPINA GLACIER—*Continued*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 178	60 05 19·07	7 05 51	187 02 20	Mad	30,732·9	4·48760
	139 11 49·14	17 25 25	197 13 37	Mount Tebenkof	42,639·9	4·62982
		26 29 02	206 18 27	Long	25,600·1	4·40824
		27 11 37	206 57 23	Mount Hendricksen	33,648·4	4·52696
		31 45 31	211 11 06	Ocean Cape	71,291·4	4·85304
		53 56 05	233 09 35	Malaspina northeast base	62,261·4	4·79422
		54 30 23	233 38 29	Malaspina southwest base	69,061·7	4·83924
Mount Seattle (1892)	60 04 02·60	19 01 46	198 49 34	Mount Tebenkof	40,530·3	4·60778
	139 11 20·53	29 51 40	209 37 01	Mount Hendricksen	31,780·2	4·50216
		29 59 57	209 48 57	Long	23,722·9	4·37517
		33 06 07	212 31 18	Ocean Cape	69,531·6	4·84218
		55 58 29	235 11 34	Malaspina northeast base	61,264·9	4·78721
		56 21 04	235 28 47	Malaspina southwest base	68,083·7	4·83304
		351 36 34	171 43 08	Black Tip	48,926·1	4·68954
Hope	59 56 26·3	275 57	96 12	B.P. 176	16,507	4·2177
	139 05 24·8	279 49	100 09	B.P. 175	21,847	4·3394
		294 26	114 47	B.P. 174	25,406	4·4049
Draper	59 48 40·4	178 55	358 55	Hope	14,424	4·1591
	139 05 07·2	185 13	5 15	B.P. 177	20,581	4·3135
		231 47	52 02	B.P. 176	20,548	4·3128
		243 17	63 37	B.P. 175	23,792	4·3764
		260 17	80 38	B.P. 174	23,190	4·3653
Mother Hubbard	60 02 01·1	214 58	35 02	B.P. 178	7,480	3·8739
	139 16 26·5	231 32	51 35	Mount Seattle (1892)	6,046	3·7815
		288 59	109 10	B.P. 177	13,114	4·1177
		315 12	135 22	Hope	14,582	4·1638
		336 51	157 01	Draper	26,935	4·4303
Cultus	59 59 02·0	1 12	181 11	Mount Draper	19,738	4·2953
	139 04 14·1	2 28	182 27	Draper	19,256	4·2846
		12 50	192 49	Hope	4,940	3·6937
		50 58	230 37	Mount Hendricksen	28,929	4·4613
		144 41	324 35	Mount Seattle (1892)	11,410	4·0573
Mineral Hill	60 01 09·7	315 25	135 27	B.P. 177	3,782	3·5777
	139 05 57·8	337 52	157 53	Cultus	4,266	3·6300
		358 03	178 04	Draper	23,203	4·3655
Irish	60 03 17·2	75 05	254 57	Mother Hubbard	9,105	3·9593
	139 06 58·3	130 01	309 57	B.P. 178	5,870	3·7687
		331 35	151 38	B.P. 177	7,549	3·8779
		346 38	166 39	Mineral Hill	4,057	3·6082
B.P. 179	60 19 11·13	16 40 44	196 22 21	Mount Tebenkof	69,320·5	4·84086
	139 04 13·12	20 50 08	200 32 57	Long	52,039·4	4·71633
		22 00 07	201 39 17	Mount Hendricksen	60,015·6	4·77826
		27 22 46	206 41 46	Ocean Cape	97,176·4	4·98756
B.P. 180	60 21 10·20	15 43 56	195 25 42	Mount Tebenkof	72,818·0	4·86224
	139 04 22·81	19 20 07	199 03 04	Long	55,449·9	4·74390
		20 37 39	200 16 57	Mount Hendricksen	63,395·3	4·80206
		26 20 06	205 39 13	Ocean Cape	100,397·1	5·00172
B.P. 181	60 20 08·02	6 11 13	186 02 25	Ocean Cape	88,823·3	4·94853
	139 41 27·92	19 17 31	198 56 39	Malaspina northeast base	68,272·5	4·83425
		22 42 41	202 16 25	Malaspina southwest base	73,637·2	4·86710
		351 57 47	172 06 16	Mount Hoorts	65,613·2	4·81699

ALSEK RIVER, YAKUTAT BAY, AND MALASPINA GLACIER—*Concluded*

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (metres)	Logarithm
MINOR NETS—*contd.*	° ′ ″	° ′ ″	° ′ ″			
B.P. 182	60 10 56·32 139 58 45·07	7 38 21	187 32 28	Malaspina northeast base	47,852·1	4·67990
		13 29 24	193 18 07	Malaspina southwest base	52,386·6	4·71922
		332 03 08	152 26 34	Mount Hoorts	54,132·1	4·73346
		354 36 23	174 42 33	Ocean Cape	71,554·3	4·85464
B.P. 183	60 18 30·40	308 27 50	129 22 44	Long	75,480·0	4·87783
	140 27 22·54	314 21 12	135 12 26	Mount Hendricksen	77,301·5	4·88819
		318 06 06	138 59 45	Mount Tebenkof	86,981·7	4·93943
		338 23 57	158 54 54	Ocean Cape (2)	91,576·9	4·96179
B.P. 185	60 15 37·98	308 47 09	129 51 32	Mount Hoorts	89,349·5	4·95109
	140 46 00·60	325 52 49	146 27 51	Malaspina northeast base	67,590·7	4·82989
		331 40 19	152 09 57	Malaspina southwest base	67,639·9	4·83020
B.P. 186	60 17 37·76	297 38 24	118 57 52	Long	96,576·8	4·98487
	140 55 43·54	302 24 40	123 40 28	Mount Hendricksen	96,869·2	4·98619
		306 28 44	127 46 56	Mount Tebenkof	105,300·0	5·02243
		323 59 49	144 55 17	Ocean Cape (2)	102,820·3	5·01208
She	60 11 34·2	117 10	296 49	B.P. 186	24,793	4·3943
	140 31 47·7	119 59	299 47	B.P. 185	15,143	4·1802
		197 33	17 36	B.P. 183	13,512	4·1307
		271 57	92 26	B.P. 182	30,581	4·4854
Shell	60 09 54·4	106 58	286 48	She	10,638	4·0269
	140 20 47·4	114 13	293 43	B.P. 186	35,309	4·5479
		159 12	339 06	B.P. 183	17,090	4·2327
		264 28	84 47	B.P. 182	20,480	4·3113
B.P. 184	60 13 12·6	11 47	191 46	She	3,112	3·4931
	140 31 06·5	199 17	19 20	B.P. 183	10,420	4·0179
		277 48	98 16	B.P. 182	30,207	4·4801
		302 41	122 50	Shell	11,344	4·0547
Sinker	60 12 09·4	145 13	325 12	B.P. 184	2,385	3·3774
	140 29 38·2	190 01	110 03	B.P. 183	11,976	4·0783
Steve	60 13 38·1	42 55	222 53	Sinker	3,749	3·5739
	140 26 52·5	78 39	258 35	B.P. 184	3,990	3·6010
		177 05	357 04	B.P. 183	9,059	3·9571
		280 42	101 06	B.P. 182	26,471	4·4228
		320 52	140 57	Shell	8,921	3·9504
Bean	60 08 09·7	127 57	307 36	B.P. 186	28,705	4·4580
	140 31 10·1	135 26	315 13	B.P. 185	19,513	4·2903
		174 46	354 45	She	6,356	3·8032
		190 19	10 22	B.P. 183	19,528	4·2906
		201 19	21 23	Steve	10,912	4·0379
		251 17	71 26	Shell	10,139	4·0060
		260 01	80 29	B.P. 182	30,444	4·4835

STATIONS NOT GIVEN IN REGULAR TABLES BUT SHOWN ON OFFICIAL BOUNDARY MAPS AND USED FOR TOPOGRAPHIC CONTROL, 1927 NORTH AMERICAN DATUM

Station	Latitude and longitude	Station	Latitude and longitude
	° ′ ″		° ′ ″
Kapho Cairn (1907) (Bradfield Canal, Alaska)	56 13 52·64 131 35 42·53	Boat, U.S.C. and G.S. 1894, 4. 1936 (Chilkat Inlet, Alaska)	59 11 12·065 135 28 59·178
Man 2, U.S.C. and G.S. 1893, r. 1937 (Taku Inlet, Alaska)	58 11 17·64 134 05 08·97	Back, U.S.C. and G.S. 1894, r. 1936 (Chilkat Inlet, Alaska)	59 12 17·871 135 30 38·972
Sap 2, U.S.C. and G.S. 1893, r. 1937 (Taku Inlet, Alaska)	58 12 47·36 134 04 58·22	Gripe, U.S.C. and G.S. 1894, r. 1936 (Chilkoot Inlet, Alaska)	59 14 16·351 135 20 26·835
Lag, U.S.C. and G.S. 1893, r. 1937 (Taku Inlet, Alaska)	58 17 13·48 134 08 37·07	Style, U.S.C. and G.S. 1894, r. 1936 (Taiya Inlet, Alaska)	59 15 51·388 135·22 12·408
Keep, U.S.C. and G.S. 1893, r. 1937 (Taku Inlet, Alaska)	58 16 58·83 134 04 17·16	Lounge, U.S.C. and G.S. 1894, r. 1922 (Taiya Inlet, Alaska)	59 21 39·85 135 23 02·32
Bin, U.S.C. and G.S. 1893, r. 1937 (Taku Inlet, Alaska)	58 20 32·97 134 00 09·95	Feast, U.S.C. and G.S. 1890-94, r. 1922 (Taiya Inlet, Alaska)	59 21 02·86 135 21 39·56
Let, U.S.C. and G.S. 1893, r. 1937 (Taku Inlet, Alaska)	58 21 56·48 134 02 59·52	Mountain, U.S.C. and G.S. 1894 (Taiya River, Alaska)	59 20 23·60 135 21 37·70
Bet, U.S.C. and G.S. 1893 (Taku River, Alaska)	58 25 28·58 133 56 06·47	Emergency, U.S.C. and G.S. 1894 (Taiya River, Alaska)	59 30 46·64 135 20 44·24
Duck, U.S.C. and G.S. 1893 (Taku River, Alaska)	58 31 30·36 133 51 55·18	Bee, U.S.C. and G.S. 1894 (Chilkat River, Alaska)	59 15 57·61 135 36 12·72
Mountain, U.S.C. and G.S. 1893 (Taku River, Alaska)	58 30 54·89 133 49 58·61	Cut, U.S.C. and G.S. 1894 (Chilkat River, Alaska)	59 20 02·71 135 47 39·44
High, U.S.C. and G.S. 1893 (Taku River, Alaska)	58 32 16·83 331 43 19·81	Isthmus, U.S.C. and G.S. 1894 (Chilkat River, Alaska)	59 22 37·16 135 51 05·65
Fresh, U.S.C. and G.S. 1893, r. 1905 (Taku River, Alaska)	58 34 44·91 33 40 00·73	Upper, U.S.C. and G.S. 1894, r. 1900 (Chilkat River, Alaska)	59 23 45·68 135 54 34·74
Rock, U.S.C. and G.S. 1893, r, 1902 (Taku River, Alaska)	58 33 17·02 133 40 30·20	Divide, 2 (1940) (Chilkat River, Alaska)	59 25 04·45 135 56 30·59
Back, U.S.C. and G.S. 1893 (Taku River, B.C.)	58 35 32·54 133 36 23·67	Birch, U.S.C. and G.S. 1894, r. 1898 (Chilkat River, Alaska)	59 25 28·39 135 58 09·20
Talta, U.S.C. and G.S. 1893 (Taku River, B.C.)	58 35 23·91 133 35 50·44	Adolphus, U.S.C. and G.S. 1901 (Icy Strait, Alaska)	58 16 29·42 135 48 37·65
Robertson, U.S.C. and G.S. 1894 (Chilkat Inlet, Alaska)	59 13 38·827 135 28 02·931	Gospel Hill, U.S.C. and G.S. 1892 (Yakatut, Alaska)	59 33 20·35 139 44 42·05

DESCRIPTIONS OF TRIANGULATION STATIONS

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER, FIRST-ORDER NET

Muzon (Alaska, Dixon Entrance; Geodetic Survey of Canada, 1914). On the south end of Dall Island; about 1 mile from the summit of Muzon Mountain. The mountain has an elevation of 1,520 feet and the station about 1,000 feet. An old slide well overgrown with alder begins near the station and extends down to the shore of McLeods Bay, about midway between Kaigani village and the head of the bay.

Station mark: a copper bolt 4 inches long set 3 inches in the rock. Over this a concrete pier 18 inches square and 42 inches high was built with a nail set in the top to mark the point over the bolt.

North Island (British Columbia, Dixon Entrance; Geodetic Survey of Canada, 1914). On the north end of Langara Island (near the northwest corner of Graham Island); on the summit of a hill 523 feet high, directly between two lakes.

Station mark: a spike driven into a hardwood stump about 18 inches high with a heavy tripod built over it.

Chacon (Alaska, Dixon Entrance; Geodetic Survey of Canada, 1914). On the summit of Nichols Mountain, near the southern end of Prince of Wales Island; elevation 1,830 feet.

Station mark: a copper bolt 4 inches long set 3 inches in the rock. Over this a concrete pier 18 inches square and 42 inches high was built with a nail set in the top to mark the point over the bolt.

Tow Hill (British Columbia, Dixon Entrance; Geodetic Survey of Canada, 1914). On the northern end of Graham Island, and about 7 miles from the northeasterly end of the island known as Rose Point; on a rocky bluff 500 feet high, which stands out alone about 600 feet west of the mouth of Hiellen River. The top of the hill is cleared of timber.

Station mark: a copper bolt 4 inches long set 3 inches in the rock. Over this a concrete pier 18 inches square and 40 inches high was built with a nail set in the top to mark the point over the bolt.

Dundas (British Columbia, Dixon Entrance; Geodetic Survey of Canada, 1914). On the summit of Mount Henry at the southern end of North Dundas Island; elevation 1,520 feet.

Station mark: a copper bolt 4 inches long set 3 inches in the rock. Over this a concrete pier 18 inches square and 42 inches high was built with a nail set in the top to mark the point over the bolt.

Stephens (British Columbia, Dixon Entrance; Geodetic Survey of Canada, 1914). On the summit of the highest mountain on the southern end of Stephens Island.

Station mark: a copper bolt 4 inches long set 3 inches in the rock. Over this a concrete pier 18 inches square and 42 inches high was built with a nail set in the top to mark the point over the bolt.

Simpson (British Columbia, Dixon Entrance; Geodetic Survey of Canada, 1914). On the summit of Mount Griffin (of the Admiralty charts), about 1¾ miles south of the village of Port Simpson. A sidewalk makes travelling easy for about a mile from the village, but for the rest of the way the travelling is difficult. The top of the hill is heavily timbered. Elevation 1,430 feet.

Station mark: a copper bolt set in the rock. Over this a cement pier 17 inches square and 30 inches high was built with a copper bolt set in the top to mark the point over the ground bolt.

Whitly (British Columbia, Dixon Entrance; U.S. Coast and Geodetic Survey, 1895, 1933; W. H. McTavish, 1913). On the east side of Holliday Island off the northeast point of Dundas Island, on the summit of a rock 15 feet above high water.

Station mark: from 1895 to 1933, a drill-hole in the rock. In 1933 a brass disk stamped "Whitly 1895" was cemented in the drill-hole and two reference marks were set as follows: No. 1, a plain brass disk cemented in a drill-hole in azimuth 336° 39′, distant 3·941 metres; No. 2, a copper bolt cemented in a crevice in the rock in azimuth 79° 24′, distant 4·231 metres.

Garnet (Alaska, Dixon Entrance; U.S. Coast and Geodetic Survey, 1895; W. H. McTavish, 1913). On the southern end of Garnet Point on Kanaghunut Island; on the west side of the entrance to Lincoln Channel. The station is about 6 feet above mean high water and about 90 metres outside of the timber-line.

Station mark: one-half inch drill-hole in the rock.

Boston (Alaska, Dixon Entrance; U.S. Coast and Geodetic Survey, 1895, 1933; W. H. McTavish, 1913). About 5 miles south of the entrance to Tongass Passage; on the most southerly wooded island of the Boston Islands. The station is about 15 feet above mean high water, on the summit of the bare rock on the outer extremity of the island.

Station mark: from 1895 to 1933, a drill-hole in the rock. In 1933 a brass disk, stamped "Boston 1895" was cemented in the drill-hole and two reference marks were set as follows: No. 1, a plain brass disk cemented in a drill-hole in azimuth 211° 10′, distant 3·609 metres; No. 2, a copper bolt cemented in a crevice in the rock in azimuth 301° 13′, distant 5·057 metres.

Pointers (1913) (British Columbia, Dixon Entrance; W. H. McTavish, 1913). About 6 miles northwest of Port Simpson; on the middle and highest of the Pointers Rocks.

Station mark: the centre of the lighthouse established in 1907. This lighthouse was altered in 1917. U.S.C. and G.S. Pointers (1895), marked by a brass disk, is a few feet away from this station.

Thirty (Alaska, Portland Canal; W. H. McTavish, 1913). On the timbered summit of the most southeasterly knob on the peninsula between Willard and Nakat Inlets; about 1 mile north of the end of Tongass Passage. Lines of sight were opened from the station. Elevation above mean high water 1,410 feet.

Station mark: a nail driven in the centre of a wooden hub.

Des Brisay (British Columbia, Portland Canal; W. H. McTavish, 1913). On the highest part of Wales Island, a little north of the centre of the island. The station is about 2,100 feet above mean high water.

Station mark: a drill-hole in outcropping rock.

Thirty-one (British Columbia, Portland Canal; W. H. McTavish, 1913). On the west side of Wales Harbour, on a timbered hill at the south end of the western arm of the harbour. There is a rocky bluff about 150 feet west of the station. Elevation about 600 feet.

Station mark: a drill-hole in the rock.

Twenty-nine (British Columbia, Portland Canal; D. J. Fraser, 1912). On the summit of the most northerly mountain on Wales Island.

Station mark: a small cairn.

Twenty-four (Alaska, Portland Canal; T. C. Dennis, 1912). About 6 miles south of the north end of Pearse Canal, on the summit of the peninsula between the canal and Hidden Inlet. Elevation about 3,400 feet.

Station mark: a small cairn.

Twenty-two (Alaska, Portland Canal; T. C. Dennis, 1912). On the east shoulder of a mountain northwest of the junction of Portland Inlet and Portland Canal, about 2 miles northwest of Reef Island; elevation about 2,690 feet.

Station mark: a small cairn.

Twenty-three (British Columbia, Portland Canal; D. J. Fraser, 1912). At the south end of the peninsula between Portland Canal and Observatory Inlet, on the summit of the mountain about 4 miles east of Spit Point; elevation about 3,747 feet.

Station mark: a drill-hole and small cairn.

Twenty-one (British Columbia, Portland Canal; T. C. Dennis, 1912). About 2 miles east of Portland Canal, on the northwestern shoulder of a high mountain between Logan Point and White Bluff; elevation about 3,820 feet.

Station mark: a small cairn.

Seventeen (British Columbia, Portland Canal; T. C. Dennis, 1912). About 5 miles above Hattie Island and 2 miles above Car Point, on a bare rock shoulder about 1 mile east of the canal; elevation about 3,180 feet.

Station mark: a small cairn.

Fourteen (Alaska, Portland Canal; T. C. Dennis, 1912). About 12 miles above Hattie Island on a sparsely wooded shoulder 1½ miles west of the canal, ½ mile above Turn Point. Elevation about 3,058 feet.

Station mark: a small cairn.

Fifteen (British Columbia, Portland Canal; T. C. Dennis, 1912). About 12 miles above Hattie Island, on a bench of bare rock on the west slope of Mount Tourney, 1½ miles east of the canal, opposite Turn Point; elevation about 3,900 feet.

Station mark: a small cairn.

Twel (Alaska, Portland Canal; F. H. Mackie, 1911). About 2 miles southwest of Steep Point, on the eastern end of a ridge; elevation about 3,580 feet.

Station mark: a small cairn.

Thur (British Columbia, Portland Canal; F. H. Mackie, 1911). About 2 miles southeast of White Point, near the summit of the mountain; elevation about 4,035 feet.

Station mark: a small cairn.

Dix (Alaska, Portland Canal; F. H. Mackie, 1911). About 24 miles south of Hyder, Alaska, and 2½ miles northwest of River Point, on the eastern shoulder of the mountain; elevation about 3,975 feet.

Station mark: a small cairn.

Leven (British Columbia, Portland Canal; F. H. Mackie, 1911). About 24 miles south of Hyder, Alaska, and 2 miles northeast of White Point, on the western shoulder of the mountain; elevation about 3,655 feet.

Station mark: a small cairn.

Ate (Alaska, Portland Canal; F. H. Mackie, 1911). About 22 miles south of Hyder, Alaska, and 2 miles west of the canal, 4 miles about River Point; elevation about 3,660 feet.
Station mark: a small cairn.

Neuf (British Columbia, Portland Canal; F. H. Mackie, 1911). About 19 miles south of Hyder, Alaska, and 2½ miles northeast of Fords Cove; elevation about 4,825 feet.
Station mark: a small cairn.

Sex (Alaska, Portland Canal; F. H. Mackie, 1911). About 16 miles south of Hyder, Alaska, on the northern side of a small knob about 2 miles west of the canal, opposite Blue Point.
Station mark: a small cairn.

Seben (British Columbia, Portland Canal; F. H. Mackie, 1911). About 17 miles south of Hyder, Alaska, on the western side of a large mountain about 4 miles east of Blue Point; elevation about 4,690 feet.
Station mark: a small cairn.

Fore (Alaska, Portland Canal; F. H. Mackie, 1911). About 10 miles southwest of Hyder, Alaska, about halfway up the slope of the mountain and 1½ miles west of the entrance to the creek opposite Engineers Point; elevation 3,325 feet.
Station mark: a small cairn.

Sank (British Columbia, Portland Canal; F. H. Mackie, 1911). About 8 miles south of Hyder, Alaska, almost 2 miles south of British Point, on the western slope of a mountain in the Colling Range; elevation about 4,490 feet.
Station mark: a small cairn.

Tray (British Columbia, Portland Canal; F. H. Mackie, 1911). About 5 miles south of Hyder, Alaska, 1 mile east of the canal and 3 miles south of Lion Point, on the northern end of the Colling Range; elevation about 3,425 feet.
Station mark: a small cairn.

Tew (Alaska, Portland Canal; F. H. Mackie, 1911). About 4 miles southwest of Hyder, Alaska, ¾ mile west of the canal and 2½ miles north of the Seal Rocks near Reference Monument S-26; on a southerly projection of the mountain at an elevation of about 3,110 feet.
Station mark: a small cairn.

Won (Alaska, Portland Canal; F. H. Mackie, 1911). Nearly 3 miles southwest of Hyder, Alaska, on the eastern slope and near the southern end of the mountain on the west side of the mouth of Salmon River; elevation about 3,545 feet.
Station mark: a small cairn.

"A" (British Columbia, Portland Canal; G. White-Fraser, 1905; 1911). About 2½ miles southeast of Hyder, Alaska, and the same distance northeast of Lion Point, near the top of the western slope of a mountain.
Station mark: the remains of a wooden signal with metal fittings and probably a steel drill sunk in the rock.

Lion Point astronomical station (British Columbia, Portland Canal; U.S. Coast and Geodetic Survey, 1895; restored by Fremont Morse, 1910). About 2 miles south of Hyder, Alaska; on a small rocky knoll on Lion Point, on the north side of the mouth of Marmot River; about 65 feet from, and 23 feet above, mean high water.
Station mark: a brick pier, with a granite capstone, built on a solid rock foundation; a copper nail set with plaster of Paris in a hole drilled in the centre of the stone marks the station.
NOTE: this pier served originally as the mounting for the astronomical transit used when the longitude of the station was determined chronometrically from Seattle and Port Simpson in 1895.

Salmon River Southwest Base (Alaska, Portland Canal; U.S. Coast and Geodetic Survey, 1895; Fremont Morse, 1910). On the south side of the mouth of Salmon River, opposite Hyder, Alaska, on a large granite boulder at mean high water line.
Station mark: a concrete monument similar to Law (*See* p. 317), built over the original U.S.C. and G.S. mark.

East Reference Monument (British Columbia, Portland Canal; Fremont Morse, 1910). Due east from Boundary Point 1 at Hyder, Alaska; on the steep mountain side, 57 feet from and 71 feet (top of monument) above mean high water.
Station mark: a concrete monument in the form of a frustum of a pyramid, 15 inches square at the base, 36 inches high, and 6 inches square at the top; secured by four steel rods sunk in drill-holes in the solid rock.

Salmon River Northeast Base (British Columbia, Portland Canal; U.S. Coast and Geodetic Survey, 1895; 1911). Located 481 feet from Boundary Point 1, in azimuth 250° 04′; in marshy ground, 50 or 60 feet from the cliff.
Station mark: a hole drilled in a small rock, filled in with lead, with a copper tack to mark the centre.

Law (British Columbia, Portland Canal; U.S. Coast and Geodetic Survey, 1895; Fremont Morse, 1910). About $1\frac{1}{4}$ miles southeast of Hyder, Alaska, and the same distance northeast of Lion Point, slightly above mean high water just outside of the tree line.

Station mark: a concrete monument in the form of a frustum of a pyramid, 15 inches square at the base, 30 inches high, and 6 inches square at the top; secured by four steel rods sunk in drill-holes in the solid rock.

Boundary Point 1 (*See* p. 153).

"B" (Alaska, Portland Canal; G. White-Fraser, 1905; 1910). About 2 miles west of Hyder, Alaska, at the northern end of the mountain west of the mouth of Salmon River; elevation about 4,592 feet.

Station mark: the remains of a wooden signal with metal fittings and probably a steel drill sunk in the rock.

DIXON ENTRANCE, PORTLAND CANAL, AND SALMON RIVER, MINOR NETS

Cape Muzon Monument 1 (Alaska, Dixon Entrance; W. M. Dennis, 1913). At the extreme south end of Dall Island, on the rocky point south of Cape Muzon; about 150 feet from the shore and about 700 feet northwest of three small rocky islands.

Station mark: a concrete pier in the form of a frustum of a pyramid, 28 inches square at the base, 36 inches high, and 8 inches square at the top.

Cape Muzon Monument 2 (Alaska, Dixon Entrance; W. M. Dennis, 1913). On the most southerly of the three small rocky islands off the shore about 500 feet southeast of the extreme southerly point of Dall Island; near the shore about midway between the most westerly and southerly points of the island.

Station mark: a concrete pier similar to Cape Muzon Monument 1.

Sunday (Alaska, Portland Canal; W. H. McTavish, 1913). On Sitklan Island, on an open part of the island, a short distance from the shore of the third bay from the southeasterly corner of the island. Elevation about 430 feet.

Station mark: a drill-hole in the rock.

Reference Monument S-1 and 2 (Alaska, Portland Canal; W. H. McTavish, 1913). On the southeast point of Sitklan Island; 10 feet above mean high water.

Station mark: a concrete pier in the form of a frustum of a pyramid, 14 inches square at the base, 18 inches high, and 4 inches square at the top; placed on a concrete base embedded in the rock with three iron driftbolts.

Reference Monument C-1 (British Columbia, Portland Canal; W. H. McTavish, 1913). On the northwest corner of Haystack Island, 12 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* above).

Reference Monument C-2 (British Columbia, Portland Canal; W. H. McTavish, 1913). On a small island in Tongass Passage opposite the third bay from the southeasterly corner of Sitklan Island, 18 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* above).

Reference Monument S-3 (Alaska, Portland Canal; W. H. McTavish, 1913). On the northeast point of Sitklan Island, 12 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* above).

Reference Monument C-3 (British Columbia, Portland Canal; W. H. McTavish, 1913). On Bartlett Point, Wales Island, at the north end of Tongass Passage, 4 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* above).

Reference Monument S-4 (Alaska, Portland Canal; W. H. McTavish, 1913). At the entrance to Pearse Canal, on a small island one-quarter mile off the south end of Fillmore Island, 12 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* above).

Reference Monument C-4 (British Columbia, Portland Canal; W. H. McTavish, 1913). At the entrance to Pearse Canal, on Phipp Point on Wales Island, 15 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* above).

Reference Monument S-5 (Alaska, Portland Canal; W. H. McTavish, 1913). About $2\frac{1}{2}$ miles northeast of Phipp Point at the entrance to Pearse Canal, on the east side of a small peninsula on Fillmore Island, 10 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* above).

Reference Monument C-5 (British Columbia, Portland Canal; W. H. McTavish, 1913). About $2\frac{1}{2}$ miles northeast of Phipp Point at the entrance to Pearse Canal, on a small island about one-third mile from Wales Island, 10 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* above).

Reference Monument S-6 (Alaska, Portland Canal; D. J. Fraser, 1912). About three-quarters mile northeast of the entrance to Edward Passage off Pearse Canal, on a small point on the west side of the canal, 8 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-6 (British Columbia, Portland Canal; T. C. Dennis, 1912). About half-way between Wales Passage and Winter Harbour, on the east side of Pearse Canal, 6 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-7 (Alaska, Portland Canal; T. C. Dennis, 1912). On the west side of Pearse Canal, about 1 mile north of the entrance to Winter Harbour, 3 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-7 (British Columbia, Portland Canal; D. J. Fraser, 1912). On the east side of Pearse Canal, just north of the entrance to Winter Harbour, 5 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-8 (Alaska, Portland Canal; D. J. Fraser, 1912). On the west side of Pearse Canal, on the northerly point of a small bay about 4 miles above Edward Passage, 6 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-8 (British Columbia, Portland Canal; D. J. Fraser, 1912). On the east side of Pearse Canal, about 3 miles above the entrance to Winter Harbour and one-half mile below the mouth of a creek, 6 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-9 (Alaska, Portland Canal; D. J. Fraser, 1912). On the west side of Pearse Canal, on a point about 2 miles below Hidden Inlet, 5 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-9 (British Columbia, Portland Canal; D. J. Fraser, 1912). On the east side of Pearse Canal, about 2 miles south of the entrance to Hidden Inlet, 4 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-10 (Alaska, Portland Canal; T. C. Dennis, 1912). On the west side of Pearse Canal, about 3 miles above the entrance to Hidden Inlet, 5 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-10 (British Columbia, Portland Canal; T. C. Dennis, 1912). On the east side of Pearse Canal, about 3 miles above the entrance to Hidden Inlet, 8 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-11 (Alaska, Portland Canal; D. J. Fraser, 1912). On the west side of Portland Canal at the junction with Portland Inlet, about 1¼ miles below Reef Island.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-11 (British Columbia, Portland Canal; T. C. Dennis, 1912). About 1 mile above Dogfish Bay at the junction with Portland Inlet, 8 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-12 (Alaska, Portland Canal; T. C. Dennis, 1912). About one-half mile above Reef Island, 5 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-12 (British Columbia, Portland Canal; D. J. Fraser, 1912). About 2 miles northeast of Reef Island, 6 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-13 (Alaska, Portland Canal; T. C. Dennis, 1912). On Harrison Point, about 3 miles above Reef Island, at about mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-13 (British Columbia, Portland Canal; T. C. Dennis, 1912). South of a creek about 4 miles above Reef Island, 8 feet above high water mark.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-14 (Alaska, Portland Canal; T. C. Dennis, 1912). About 1 mile below Fools Point, 8 feet above mean high water.
Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-14 (British Columbia, Portland Canal; T. C. Dennis, 1912). About 2 miles below Fools Point and three-quarters mile above Reference Monument C-13, 8 feet above high water mark.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-15 (Alaska, Portland Canal; Fremont Morse, 1912). About 2 miles below Astronomical Point, 1 foot above mean high water mark.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-15 (British Columbia, Portland Canal; T. C. Dennis, 1912). About 2½ miles below Astronomical Point, 6 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-16 and 17 (Alaska, Portland Canal; T. C. Dennis, 1912). On Camp Point, about 1 mile west of the north end of Hattie Island.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-16 (British Columbia, Portland Canal; T. C. Dennis, 1912). About three-quarters mile below Hattie Island.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-17 (British Columbia, Portland Canal; T. C. Dennis, 1912). About 1 mile above Hattie Island.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-18 (Alaska, Portland Canal; T. C. Dennis, 1912). About 4 miles above Hattie Island, opposite Car Point.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-18 (British Columbia, Portland Canal; T. C. Dennis, 1912). About 4 miles above Hattie Island, on Car Point.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-19 (Alaska, Portland Canal; T. C. Dennis, 1912). About 11 miles above Hattie Island, on Turn Point.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-19 (British Columbia, Portland Canal; T. C. Dennis, 1912). About 12 miles above Hattie Island and 2 miles above Turn Point.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-20 (Alaska, Portland Canal; T. C. Dennis, 1912). South of the mouth of a creek about 4½ miles above Turn Point.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument C-20 (British Columbia, Portland Canal; T. C. Dennis, 1912). About 4¾ miles above Turn Point, on Pirie Point.

Station mark: a concrete pier similar to Reference Monument S-1 and 2 (*See* p. 317).

Reference Monument S-21 (Alaska, Portland Canal; F. H. Mackie, 1911). About 23 miles south of Hyder, Alaska, and 1¾ miles above River Point.

Station mark: a concrete pier in the form of a frustum of a pyramid, 12 inches square at the bottom, 36 inches high, and 6 inches square at the top; secured by an iron rod sunk in a drill-hole in the solid rock.

Reference Monument C-21 (British Columbia, Portland Canal; F. H. Mackie, 1911). About 23 miles south of Hyder, Alaska, and 2 miles above River Point.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* above).

Reference Monument C-22 (British Columbia, Portland Canal; F. H. Mackie, 1911). About 3 miles above Fords Cove.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* above).

Pack (British Columbia, Portland Canal; U.S. Coast and Geodetic Survey, 1888; 1911). About 16 miles south of Hyder, Alaska, slightly above Blue Point and about one-half mile below Reference Monument C-23.

Station mark: a cross chipped in the rock. Three piles of rocks were placed for witness marks, bearing north, east by south, and south-southwest respectively, each distant 4 feet from the centre of the station.

Reference Monument S-22 (Alaska, Portland Canal; F. H. Mackie, 1911). About 17 miles south of Hyder, Alaska, and opposite the creek emptying into the canal below Blue Point.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* above).

Whip 2 (British Columbia, Portland Canal; Fremont Morse, 1911). About 16 miles south of Hyder, Alaska, on the southerly end of Blue Point, 3 feet above mean high water.

Station mark: a not quite round drill-hole in the rock.

Mid (Alaska, Portland Canal; U.S. Coast and Geodetic Survey, 1888; 1911). About 16 miles south of Hyder, Alaska, and almost directly west of Blue Point; on top of a rounded granite ledge, 4 feet above mean high water.

Station mark: a drill-hole in a crack in the ledge that lies in the general direction of the canal.

Reference Monument C-23 (British Columbia, Portland Canal; F. H. Mackie, 1911). About 15 miles south of Hyder, Alaska, and 1 mile above Blue Point.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* p. 319).

Yam 2 (Alaska, Portland Canal; Fremont Morse, 1911). About 16 miles south of Hyder, Alaska, on the south point of the bight opposite Miners Point, about 90 metres southeast of a large detached rock; the station is on a narrow ledge, furrowed by a glacier in the solid granite wall, 3 feet above mean high water near a shallow saucer-shaped depression.

Station mark: a not quite round drill-hole in a crack in the ledge that lies parallel with the shore.

Reference Monument S-23 (Alaska, Portland Canal; F. H. Mackie, 1911). About 15 miles south of Hyder, Alaska, on the north side of the bight opposite Miners Point, 5 feet above mean high water.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* p. 319).

Hall 2 (Alaska, Portland Canal; Fremont Morse, 1911). About 8 miles southwest of Hyder, Alaska, on the southeast corner of Glacier Point; below high tide.

Station mark: the tip of the head of an arrow chiselled in the rock.

Reference Monument S-24 (Alaska, Portland Canal; F. H. Mackie, 1911). About 12 miles southwest of Hyder, Alaska, opposite Round Point.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* p. 319).

Reference Monument S-25 (Alaska, Portland Canal; F. H. Mackie, 1911). About 8 miles southwest of Hyder, Alaska, on the north side of the creek opposite Engineers Point.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* p. 319).

Reference Monument C-24 (British Columbia, Portland Canal; F. H. Mackie, 1911). About 12 miles southwest of Hyder, Alaska, at the north end of Round Point.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* p. 319).

Reference Monument C-25 (British Columbia, Portland Canal; F. H. Mackie, 1911). About 9 miles southeast of Hyder, Alaska, on the north shore of Engineers Point.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* p. 319).

Reference Monument S-26 (Alaska, Portland Canal; F. H. Mackie, 1911). About 6½ miles southwest of Hyder, Alaska, on the shore opposite the Seal Rocks.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* p. 319).

Reference Monument C-26 (British Columbia, Portland Canal; F. H. Mackie, 1911). About 7 miles southwest of Hyder, Alaska, opposite Reference Monument S-26 and south of British Point.

Station mark: a concrete pier similar to Reference Monument S-21 (*See* p. 319).

Debt (British Columbia, Portland Canal; U.S. Coast and Geodetic Survey, 1888; 1895, 1911). At the extreme end of Lion Point, at the centre of a large flat rock, 12 feet long, 8 feet wide, and 6 feet high; 24·03 metres from Lion Point astronomical station 4° 46′ west of north.

Station mark: a hole drilled in the centre of a cross chiselled in the rock.

Keen (Alaska, Portland Canal; Fremont Morse, 1910). Opposite Lion Point, close to the rocky bank, about 14 feet from and 12 feet above mean high water.

Station mark: a concrete monument similar to Law (*See* p. 317).

Boundary Tablet No. 1 (*See* p. 153).

Boundary Tablet No. 2 (*See* p. 153).

Boundary Point 2 (*See* p. 153).

Boundary Point 3 (*See* p. 153).

Boundary Point 4 (*See* p. 153).

Boundary Point 8 (*See* p. 154).

Boundary Point 7 (*See* p. 153).

Boundary Point 6 (*See* p. 153).

Boundary Point 5 (*See* p. 153).

Texas (Alaska, Salmon River; F. H. Mackie, 1910). About 2 miles southwesterly from the forks of Texas Creek, on the nose of the ridge between the creek and a small glacier emptying into the west fork; elevation 4,140 feet.

Station mark: a cairn and pole.

Boundary Point 15 (*See* p. 154).

Boundary Point 9 (*See* p. 154).

Boundary Point 10 (*See* p. 154).

Boundary Point 11 (*See* p. 154).

Boundary Point 12 (*See* p. 154).

Boundary Point 13 (*See* p. 154).

Boundary Point 14 (*See* p. 154).

Boundary Point 16 (*See* p. 155).

White-Fraser (Alaska, Salmon River; G. White-Fraser, 1905; 1920). The western end of the rocky ridge between the snow-covered peaks north of the divide between the Texas Glacier and a glacier tributary to Chickamin River; elevation 7,073 feet.

Station mark: a steel drill set in the rock.

Boundary Point 15A (*See* p. 154).

Boundary Point 17 (*See* p. 155).

Boundary Point 18 Reference Monument (*See* p. 155).

Boundary Point 18 (*See* p. 155).

London (Alaska, Salmon River; F. H. Mackie, 1910). About 2 miles southerly from the west fork of Texas Creek 7 miles from its confluence with Texas Creek, and just west of the third and last glacier flowing into the fork from the south; on a northerly nose of the ridge, just north of the head of a small glacier; elevation 6,035 feet.

Station mark: a cairn and pole.

BURROUGHS BAY AND UNUK RIVER, MAJOR NET

Mab 2 (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1929, 1931). On the northwest side of the mouth of Burroughs Bay, opposite Point Fitzgibbon, on a boulder strewn point. The station is on a large boulder at about high-water mark about 6 metres from a perpendicular bluff. Station Mab 1891 was not recovered but the witness mark, a cross in a circle cut in rock, was found.

Station mark: a standard U.S.C. and G.S. bronze disk, stamped "Mab 2, 1929", set in concrete in a depression on the boulder. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk stamped "Mab 2, 1929, No. 1", set in the vertical face of the bluff about 4 feet above the ground 6·192 metres from the station in azimuth 144° 22′ 20″. Reference mark No. 2 is a like disk, stamped "Mab 2, 1929, No. 2", with the arrow pointing to the station, set in concrete in a depression on the top of a flat white boulder at about extreme high water, 9·200 metres from the station in azimuth 232° 18′ 15″. The witness mark of 1891 is 8·10 metres from the station in azimuth 172° 26′.

Deed 2 (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1929, 1931). On the southeast shore of Burroughs Bay, about one-half mile north of Point Fitzgibbon, on a high light-coloured granite bluff. The station is about 2 metres back from the bluff, on the highest point, and about 7 metres above high water. The turf was removed in the form of a semi-circle about 6 feet across. Station Deed was probably about 5 metres southwest of Station Deed 2, but it was not recovered.

Station mark: a standard U.S.C. and G.S. bronze disk stamped "Deed 2, 1929", set in concrete in a depression in outcropping rock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk with the arrow pointing to the station, set in concrete in a depression in the rock 11·630 metres from the station in azimuth 240° 01′ 58″. A witness mark is a blaze on a large spruce tree with three nails forming a triangle and one nail at the centre, 3·180 metres from the station in azimuth 18° 04′ 26″.

Feat (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1891, 1929, 1931). On the southeast shore of Burroughs Bay, about 1⅝ miles north of Point Fitzgibbon, on a high bluff of light-coloured granite. The station is about 7 metres above and 4 metres from the high-water mark, and 2 metres from the brush line. The turf was removed to reach rock. A stump, an old witness mark for station Feat, bears W by S Mag., distant about 1 metre.

Station mark: a standard U.S.C. and G.S. bronze disk stamped "Feat" set in concrete in a depression in bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk stamped "Feat 1929, No. 1", with the arrow pointing to the station, set in concrete on a rounded inclined rock ledge, about 5 metres above the high-water mark 3·830 metres from the station in azimuth 69° 28′ 18″. Reference mark No. 2 is a like disk, stamped "Feat, 1929, No. 2", set in concrete on top of a rock ledge about 6 metres above high water 6·930 metres from the station in azimuth 237° 52′ 41″.

Jane 2 (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1929, 1931). On the northwest shore of Burroughs Bay, about 2½ miles northeasterly from Point Fitzgibbon and 1 mile southwest of a cove, on a rough, irregular, rocky ledge. A low water rock is about 125 metres south of the station. A blazed tree, the old witness mark for station "Jane" (which was not recovered) bears W by N Mag., distant about 10 metres, and there is a mass of high granite rock about 3 metres northwest of the station. The station is about at high-water mark on the east edge of a small water pocket.

Station mark: a standard U.S.C. and G.S. bronze disk, stamped "Jane 2", set in concrete in a depression in outcropping bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk, stamped "Jane 2, 1929, No. 1", with the arrow pointing to the station, set in rock 1 metre above the high-water mark and 5 metres from the tree line, 4·140 metres from the station in azimuth 96° 28′ 36″. Reference mark No. 2 is a like disk, stamped "Jane 2, 1929, No. 2", set on top of a pinnacle-shaped rock about 1 metre above the high-water mark, 3·963 metres from the station in azimuth 108° 13′ 21″.

Bight 2 (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1929, 1931). On the northwest shore of Burroughs Bay, about 3½ miles northeast of Point Fitzgibbon and five-eighths mile northeast of a small cove that has a good sized river emptying into it; on the highest part of the first point north of the cove, about the centre of a high ledge of deeply furrowed rock, about 20 metres long, which is detached from the white rock behind it. A blazed tree, the old witness mark for station Bight (which was not recovered) bears W by N Mag., distant about 4 metres.

Station mark: a standard U.S.C. and G.S. bronze disk, stamped "Bight 2, 1929", set in concrete in a depression in the rock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk, stamped "Bight 2, 1929, No. 1", with the arrow pointing to the station, set in concrete in a depression near the south end of a detached rock ledge about 2 metres above and 3 metres from the high-water mark, 8·575 metres from the station in azimuth 56° 24′ 28″. Reference mark No. 2 is a like disk, stamped "Bight 2, 1929, No. 2", on top of a pinnacle rock that is part of a white bluff, at the tree line about 3 metres above high-water mark, 3·020 metres from the station in azimuth 226° 07′ 23″.

Oak (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1891; 1905; 1929, 1931). On the northwest shore of Burroughs Bay, about 4½ miles northeast of Point Fitzgibbon, on a low, grass-covered and boulder-strewn flat, about 60 metres long and 10 metres wide, which has a solid rock ledge on both sides; about 2 metres above and 6 metres from the high-water mark.

Station mark: a standard U.S.C. and G.S. bronze disk stamped "Oak", set in concrete in a depression in a boulder, 1½ feet in diameter and 2½ feet long, buried flush with the surface of the ground. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk, stamped "Oak 1929, No. 1", set in a depression in a rock ledge about 2 metres above and 3 metres from the high-water mark, 3·851 metres from the station in azimuth 331° 52′ 40″. Reference mark No. 2 is a like disk, stamped "Oak 1929, No. 2", set in the same manner 2 metres above and 6 metres from the high-water mark, 4·360 metres from the station in azimuth 227° 00′ 00″.

This boulder was reported to be loose in 1931.

Tab (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1891; 1905; 1929, 1931). On the eastern shore of Burroughs Bay, about 1¾ miles southwest of the mouth of Klahini River, on a smooth rocky point that projects into the bay to the southwest; there is a small bight on the east side of this point. On top of a rock ledge about 2 metres above and 2 metres from the high-water mark; about 4 metres northeast from the southwest end of the rock.

Station mark: a standard U.S.C. and G.S. bronze disk, stamped "Tab", set in concrete in a depression in outcropping bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk stamped "Tab 1929, No. 1", with the arrow pointing to the station, set in concrete in a depression in outcropping bedrock near extreme high water 12·760 metres from the station in azimuth 188° 43′ 02″. Reference mark No. 2 is a like disk stamped "Tab 1929, No. 2" set in the same manner 3·440 metres from the station in azimuth 283° 05′ 32″.

Dick (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1891; International Boundary Commission, 1905; U.S. Coast and Geodetic Survey, 1929, 1931). On the northwest side of the mouth of Unuk River, and about opposite the prominent point of land between the mouth of Unuk River and the mouth of Klahini River; about 2 metres above and 3 metres from high-water mark. There is a large flat boulder 1 metre north of the station, and looking south from the station only about 300 metres of the northwest shore of the bay can be seen.

Station mark: a standard U.S.C. and G.S. bronze disk, stamped "Dick" set in concrete in a depression in outcropping bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk stamped "Dick No. 1", with the arrow pointing to the station, set in a depression in outcropping bedrock 10·477 metres from the station in azimuth 208° 30′ 19″. Reference mark No. 2 is a like disk stamped "Dick No. 2", set in the same manner 4·380 metres from the station in azimuth 325° 24′ 04″.

Unuk (Alaska, Burroughs Bay; U.S. Coast and Geodetic Survey, 1929). At the head of Burroughs Bay on the most extreme southwestern point of the point of land that projects into the bay between Unuk and Klahini Rivers; about a metre east of a 2-foot crevice that extends into the brush, on a small flat rock bench about 1½ metres above and 2 metres from high-water mark. The bench is on a rough inclined ledge of rock, the most westerly of three ledges that extend into the water—the eastern and western ledges are about 50 metres apart.

Station mark: a standard U.S.C. and G.S. bronze disk, stamped "Unuk 1929", set in a depression in outcropping bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk, stamped "Unuk 1929, No. 1", with the arrow pointing to the station, set in concrete in a depression in outcropping bedrock, 4·210 metres from the station in azimuth 208° 51′ 27″. Reference mark No. 2 is a like disk stamped "Unuk 1929, No. 2", set in the same manner 3·190 metres from the station in azimuth 318° 52′ 50″.

BURROUGHS BAY AND UNUK RIVER, MINOR NET

Hollow (Alaska, Burroughs Bay; Fremont Morse, 1905; U.S. Coast and Geodetic Survey, 1929, 1931). On the eastern shore of Burroughs Bay, about 1¾ miles southwest of the mouth of Klahini River and on the same rocky point on which station "Tab" is situated. This part of the point projects into the bay to the north, and there is a small bight about 150 feet east of the station. The station is about 10 feet above and 15 feet from the high-water line. A blazed tree, the old witness mark, bears E by S Mag., distant 5¼ metres.

Station mark: a standard U.S.C. and G.S. bronze disk, stamped "Hollow", set in a depression at the top of an inclined ledge in the bottom of a small water hollow. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk stamped "Hollow 1929 No. 1", with the arrow pointing to the station, set in concrete in a depression on an inclined ridge about 3 feet above and 3 feet from the high-water line, 4·220 metres from the station N 20° E Mag. Reference mark No. 2 is a like disk, stamped "Hollow 1929 No. 2", set in the same manner on top of a pinnacle-shaped ledge about 6 feet above and 12 feet from the high-water line, 4·884 metres from the station N 82° E Mag.

Rock (Alaska, Burroughs Bay; Fremont Morse, 1905). On the east side of the bay, near the mouth of Unuk River; on a rock projecting above high water, about three-quarters mile easterly along the shore from the extremity of the point of land that projects into the bay between Unuk and Klahini Rivers, on which triangulation station "Unuk" is situated.

Station mark: a hub, marked by a copper tack, driven between small rocks with a small cairn around it.

Ooli (Alaska, Unuk River; Fremont Morse, 1905). Near the mouth of Unuk River on the north side; on the shoulder of the ridge north of the first small tributary creek on the west side of Oolican Creek; elevation 3,285 feet.

Station mark: a hole drilled 2 inches deep in the rock.

Cubs (Alaska, Unuk River; Fremont Morse, 1905). On the north shoulder of the mountain south of the mouth of Lake Creek; elevation 3,325 feet.

Station mark: a hole drilled in the rock, about 3·7 metres westerly from a cross cut in the rock, and 6·1 metres southerly from a cross cut in a rock facing south.

Can (Alaska, Unuk River; Fremont Morse, 1905). Near the mouth of Unuk River on the north side; on the second shoulder east of the summit of Spur Mountain, on the east side of Oolican Creek; elevation 3,995 feet.

Station mark: a drill-hole in the rock about 10 feet east of a cross marked on the rock.

Lake (Alaska, Unuk River; Fremont Morse, 1905, 1908, 1909). About 3 miles northeasterly from the mouth of the small creek entering Lake Creek 3 miles above its confluence with Unuk River; about 5 feet east of the highest point of the knob on the ridge between the head of the small creek and Lake Creek; elevation 4,135 feet.

Station mark: a drill-hole in the rock. An arrow pointing toward the station is cut in the rock on the highest point of the knob.

Jes (Alaska, Unuk River; O. M. Leland, 1908, 1909). About 3 miles south of Lake Creek and 8 miles above its confluence with Unuk River; on the highest rock point on the northeast slope of a snowy mountain; elevation 5,690 feet.

Station mark: a copper bolt set in a drill-hole in the rock.

Hop (Alaska, Unuk River; O. M. Leland, 1909). On the south side of Lake Creek, about 10 miles above its confluence with Unuk River; on the highest point of a small ridge of crumbling rock about 3 miles southwesterly from the forks; about 200 feet northwest of a strip of heather.

Station mark: a 3-foot cairn with pole in centre.

Net (Alaska, Unuk River; Fremont Morse, 1905, 1908, 1909, 1920). About 3 miles east of Unuk River, 3 miles above the first canyon; on the highest part of the ridge; elevation 6,020 feet.

Station mark: a drill-hole in the rock, about 6 feet westerly from three small holes in a line in the rock. There are two arrows cut in the rock, each about 18 inches from the station.

Boundary Point 23 (*See* p. 155).

Ralf (Alaska, Leduc River; O. M. Leland, 1909). On the north side of Leduc River, on the east side of the ridge west of the Clarasmith Glacier, and two-thirds mile northwest of Boundary Point 21; just south of a gully dropping abruptly to the glacier; elevation 3,652 feet.

Station mark: a shallow cross chiselled on a boulder, 4 feet in diameter, surrounded by heather.

Leduc (British Columbia, Leduc River; O. M. Leland, 1909). On the north side of the glacier at the head of Leduc River; about $2\frac{1}{2}$ miles northeasterly from Boundary Point 22, well above the snow line; elevation 5,107 feet.

Station mark: a cairn bearing a long vertical stone.

Al (British Columbia, Leduc River; O. M. Leland, 1909). On the south side of the glacier at the head of Leduc River; about 1 mile southeasterly from Boundary Point 20; just above the snow line on the ridge facing north and east; elevation 4,465 feet.

Station mark: a small cairn and flag-pole.

Boundary Point 19 (*See* p. 155).

Leduc South Bolt (British Columbia-Alaska, Leduc River; O. M. Leland, 1909). About 100 feet south of Leduc River and 80 feet above the river level; it is 0·69 foot from Boundary Point 20 in azimuth 347°.

Station mark: a $\frac{3}{4}$-inch copper bolt set in cement.

Boundary Point 20 (*See* p. 155).

Boundary Point 21 (*See* p. 155).

Leduc North Bolt (British Columbia-Alaska, Leduc River; O. M. Leland, 1909). About 1 mile north of Leduc River and 344·5 feet in azimuth 347° 02′ 27″ from Boundary Point 22; it is about 20 feet south of a stream that crosses the boundary. This station is on the boundary line.

Station mark: a $\frac{3}{4}$-inch copper bolt set in cement.

Boundary Point 22 (*See* p. 155).

Boundary Point 24 (*See* p. 156).

Boundary Point 28 (*See* p. 156).

Smith (Alaska, Unuk River; O. M. Leland, 1909). On the ridge between Gracey Creek Glacier and Smith Lake, on a prominent point overlooking the glacier; about 200 feet southeast of a narrow cut through the main ridge.

Station mark: a pole set in a crack with a small cairn around it.

Gracey Creek Monument (old site) (Alaska, Unuk River; O. M. Leland, 1909; removed by Jesse Hill, 1920). Distant 177·0 metres from Boundary Monument 25 in azimuth 315° 00′ 41″; on a large rock near the bed of a mountain stream about 200 feet above Gracey Creek Glacier. Holes were drilled into the rock to take the legs of a conical aluminium-bronze monument; the monument was moved by sawing through the legs, and it was placed in the cairn that references Monument 25.

Station mark: the centre point of the sawed-off legs of the monument.

Boundary Point 25 (*See* p. 156).

Boundary Point 26 (*See* p. 156).

Boundary Point 27 (*See* p. 156).

Boundary Point 40 (*See* p. 158).

Tom (Alaska, Unuk River; O. M. Leland, 1909). About 600 feet southeast of the top of the snow ridge and one-third mile south of the highest part of Mount Middleton; on a rock outcrop above the snow, 306·4 metres from Boundary Point 27 in azimuth 105° 34′ (*See* description of Boundary Point 28).

Station mark: a $\frac{3}{4}$-inch copper bolt with a small cairn beside it.

Boundary Point 29 (*See* p. 157).

Lake Creek West Bolt (British Columbia-Alaska, Unuk River; O. M. Leland, 1909). Two inches southwest of Boundary Point 31 (*See* p. 157).

Station mark: a $\frac{3}{4}$-inch copper bolt.

Boundary Point 30 (*See* p. 157).

Boundary Point 31 (*See* p. 157).

Boundary Point 32 (*See* p. 157).

Boundary Point 39 (*See* p. 157).

Boundary Point 33 (*See* p. 157).

Boundary Point 34 (*See* p. 157).

Boundary Point 35 (*See* p. 157).

Boundary Point 36 (*See* p. 157).

Boundary Point 37 (*See* p. 157).

Boundary Point 38 (*See* p. 157).

Ray (Alaska, Unuk River; O. M. Leland, 1908, 1909). About 2 miles east of Blue River, 5 miles above its confluence with Unuk River; it is on a high rock knob northeast of the north end of the second timber island in the lava of the river, and is seen against the sky from the island. The station is on the highest part of the knob, which is separated from the mountain by a deep gulch with snow in it and is connected by a snow bridge to a snow dome, nearly as high as the station, to the northeast.

Station mark: a flag-pole in the centre of a 4½-foot cairn.

Carol (Alaska, Unuk River; O. M. Leland, 1909). About 2½ miles west of Blue River 10 miles above its confluence with Unuk River and opposite the southern extremity of Blue Lake; the station is on a bare rock hump above timber-line, on the second ridge above the first large fork of Blue River flowing from the southwest, which joins the river almost opposite the Lava Fork; elevation 3,986 feet.

Station mark: a flag-pole and small cairn.

Albert (British Columbia, Unuk River; O. M. Leland, 1908, 1909). On the first distinct peak on the high ridge between the Lava Fork of Blue River and the next branch of the river northerly; about 3 miles from Blue River. The station is on the rocky ridge extending southwesterly from the top and is on the west high knob, which is only a few feet lower than the east knob; to the N 15° E is another peak, almost completely covered with snow, a little higher than the station, and a bowl is formed by the two peaks and a lower ridge connecting them. Boundary Point 44 is about 571·5 feet from the station in azimuth 22°.

Station mark: a copper bolt set in the rock; 4 feet northeast is a cairn 6 feet high with a flag-pole in its centre.

BRADFIELD RIVER, MINOR NET

Tyee (Alaska, Bradfield River; J. D. Craig, 1907). About 2 miles southeasterly from the mouth of the East Fork of Bradfield River, on the steep bare summit; elevation 4,690 feet.

Station mark: a cairn.

First (Alaska, Bradfield River; J. D. Craig, 1907). About 2½ miles northwesterly from the confluence of the North and East Forks of Bradfield River, on a knob just above timber-line at the east end of Kapho Mountains; elevation 2,755 feet.

Station mark: a tripod signal.

Daws (Alaska, Bradfield River; J. D. Craig, 1907). About 7 miles northerly from the mouth of the North Fork of Bradfield River, on a knob between two small glaciers flowing northeasterly; elevation 4,460 feet.

Station mark: stove-pipe signal and small cairn.

Forks (Alaska, Bradfield River; J. D. Craig, 1907). On a rounded snow summit with bare patches on the southerly end of the mountain between the forks of the North Fork of Bradfield River; about 3 miles north of the forks and 13 miles above the mouth of the river; elevation 5,530 feet.

Station mark: stove-pipe signal and small cairn.

Boundary Point 53 (*See* p. 159).

Boundary Point 48 (*See* p. 159).

Boundary Point 50 (*See* p. 159).

Boundary Point 49 (*See* p. 159).

Boundary Point 51 (*See* p. 159).

Boundary Point 52 (*See* p. 159).

STIKINE RIVER, MAJOR NET

Boundary Point 62 (*See* p. 160).

Boundary Point 66 (*See* p. 160).

STIKINE RIVER, MINOR NETS

Iskut (British Columbia, Stikine River; W. F. Ratz, 1907; U.S. Coast and Geodetic Survey, 1929). About 3 miles easterly from the small easterly channel of Stikine River 3 miles above its junction with Katete River, on the flat rock summit; elevation 4,710 feet.
Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Boundary Point 53 (*See* p. 159).

Boundary Point 54 (*See* p. 159).

Boundary Point 55 (*See* p. 159).

Boundary Point 56 (*See* p. 159).

Boundary Point 57 (*See* p. 159).

Boundary Point 58 (*See* p. 160).

Boundary Point 59 (*See* p. 160).

Boundary Point 60 (*See* p. 160).

Boundary Point 61 (*See* p. 160).

Boulder (British Columbia, Stikine River; Fremont Morse, 1904; 1938). On the nose of the ridge about 5 miles east of the International Boundary at Boundary Point 63, and 1½ miles northeast of Katete River; elevation about 3,800 feet.
This station was not occupied and is described from views through the telescope from stations on both banks of Stikine River.
Station mark: the centre of a large loose boulder about 7 feet high and 7 feet square that appears to be lying on the surface of the ridge. No other boulders appear to be near it.

Boundary Point 63 (1938) (*See* p. 160).

Boundary Point 62A (*See* p. 160).

Boundary Point 64 (*See* p. 160).

Boundary Point 65 (*See* p. 160).

Boundary Point 67 (*See* p. 161).

Boundary Point 69 (*See* p. 161).

Boundary Point 68 (*See* p. 161).

Knob (British Columbia, Stikine River; W. F. Ratz, 1907). About 2 miles east of Stikine River 7 miles above its confluence with Iskut River, on a flat rock knob on the shoulder of the mountain opposite the north end of the face of the Great Glacier; elevation 4,270 feet.
Station mark: a galvanized iron stove-pipe signal in a 4-foot cairn.

Eagle Crag (British Columbia, Stikine River; Fremont Morse, 1904). An unoccupied sharp mountain peak nearly 6,000 feet in elevation; about 3 miles east of Stikine River and 11 miles north of Iskut River. It is 1 mile east by south of station "River". It is very conspicuous for many miles along Stikine River.
Station mark: the tip of the peak.

River (British Columbia, Stikine River; W. F. Ratz, 1907). About 2 miles east of Stikine River 12 miles above the mouth of Iskut River, on the westerly ridge of Eagle Crag, a very sharp peak; elevation 3,385 feet.
Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Lynx (British Columbia, Stikine River; H. S. Mussell, 1907). About 3 miles west of an easterly curve of Stikine River midway between Mud and Flood Glaciers and 26 miles above the mouth of Iskut River, on a flat rock summit opposite the mouth of Anook River; elevation 4,870 feet.
Station mark: a galvanized iron stove-pipe signal set in a 5-foot cairn. Five old cairns, supposedly built by Indians, were levelled.

Alpha (British Columbia, Stikine River; W. F. Ratz, 1907). About 2 miles southerly from the south side of the face of Flood Glacier about 30 miles above the mouth of Iskut River; on a rock summit on the west side of Stikine River; elevation 5,620 feet.
Station mark: a galvanized iron stove-pipe signal set in a 5-foot cairn.

Grizzly (British Columbia, Stikine River; W. F. Ratz, 1907). About 3 miles east of Stikine River about 35 miles above the mouth of Iskut River, and 3 miles above the creek issuing from Flood Glacier on the west side, on a rock summit on the northern shoulder of Pereleshin Mountain; elevation 6,200 feet.

Station mark: a galvanized iron stove-pipe signal set in a 5-foot cairn. Some old cairns, supposedly built by Indians, were levelled.

Thimble (British Columbia, Stikine River; W. F. Ratz, 1907). About 5 miles west of Stikine River opposite the mouth of Scud River 38 miles above the mouth of Iskut River, on a rock shaft on the ridge south of Patmore Creek; elevation 6,555 feet.

Station mark: a galvanized iron stove-pipe signal set in a 5-foot cairn.

Summit (British Columbia, Stikine River; W. F. Ratz, 1907). About 14 miles west of Stikine River 30 miles above the mouth of Iskut River, at the north end of the mountain on the ridge extending northwesterly from Kates Needle; 8 miles from Kates Needle, and at the head of Flood Glacier; approximate elevation 7,300 feet.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Bill (British Columbia, Stikine River; W. F. Ratz, 1907). About 14 miles west of Stikine River 30 miles above the mouth of Iskut River, on a sharp peak at the western end of the ridge north of the head of Flood Glacier.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Dominion (British Columbia, Stikine River; W. F. Ratz, 1907). On the south side of Flood Glacier about 9 miles west of Stikine River 30 miles above the mouth of Iskut River on the north shoulder of the rocky ridge at the southwesterly angle of the glacier.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Boundary Point 71 (*See* p. 162).

Boundary Point 72 (*See* p. 162).

ENDICOTT ARM, MINOR NET

Bird (Alaska, Endicott Arm; W. F. Ratz, 1908). About 2½ miles northeasterly from the face of Brown Glacier, at the east end of Fords Terror, on the sharp rock peak; elevation 6,590 feet.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Stung (Alaska, Endicott Arm; W. F. Ratz, 1908). About 7 miles northeasterly from the point between North and South Dawes Glaciers, on a flat summit on the east side of North Dawes Glacier.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Station 85 (Alaska, Endicott Arm; N. J. Ogilvie, 1909). About 2 miles south of Endicott Arm opposite the entrance to Fords Terror, near the summit of the rather sharp bare rock mountain.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Boundary Point 73 (*See* p. 162).

Boundary Point 74 (*See* p. 162).

Boundary Point 75 (*See* p. 162).

Boundary Point 76 (*See* p. 162).

Boundary Point 77 (*See* p. 163).

Trail (Alaska, Tracy Arm; W. F. Ratz, 1908, 1909). About 2 miles south of Tracy Arm on the first mountain west of South Sawyer Glacier, on the rock summit; elevation 5,665 feet.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Boundary Point 78 (*See* p. 163).

Tracy (Alaska, Tracy Arm; W. F. Ratz, 1908, 1909). About 2 miles north of Tracy Arm on the first mountain west of Sawyer Glacier, on the rock summit; elevation 6,240 feet.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Baird (Alaska, Tracy Arm; W. F. Ratz, 1908, 1909). About 4 miles northeasterly from the mouth of the only large creek on the north side of Tracy Arm, on the flat summit; elevation 5,645 feet.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

STEPHENS PASSAGE AND WHITING RIVER, MAJOR NET

Celt (Alaska, Stephens Passage; U.S. Coast and Geodetic Survey, 1890, 1893, 1929, 1937). On the east side of Taku Inlet about 3 miles north of its entrance to Stephens Passage, or about 1½ miles from Greeley Point northeasterly towards Jaw Point; about 40 metres north of a grey rock point that forms the northern extremity of a prominent bight. The station is about 1 metre south of the head of a rough cut in the rock running down to the water, and at low water it is difficult to reach from the front; the best way is to go up a steep ravine just inside the bight and pass through the timber to the station.

Station mark: a standard U.S.C. and G.S. bronze disk cemented in a drill-hole in bedrock in the bottom of an oval depression about 3 inches deep and just large enough to accommodate the station mark. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk cemented in a drill-hole 1·44 metres from the station in azimuth 233° 21′. Reference mark No. 2 is a similar disk, 7·085 metres from the station in azimuth 11° 09′, also set in bedrock.

Mood (Alaska, Stephens Passage; U.S. Coast and Geodetic Survey, 1890, 1893, 1929, 1937). On Greeley Point, on the east shore of Taku Inlet northeasterly from Bishop Point, which is at the west side of the entrance to the inlet from Stephens Passage. The station is near the southerly part of the point, in a small grassy area, and about 4 metres inside the edge of a 40-foot cliff.

Station mark: a standard U.S.C. and G.S. bronze disk cemented in a drill-hole in a small boulder set flush with the ground—it is likely that sod will grow over the station. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk cemented in a drill-hole in bedrock 2·374 metres from the station in azimuth 58° 37′. Reference mark No. 2 is a similar disk, 3·42 metres from the station in azimuth 179° 54′, also set in bedrock.

Zinc (Alaska, Stephens Passage; U.S. Coast and Geodetic Survey, 1888, 1929). On the west side of Stephens Passage about west by south of the entrance to Limestone Inlet, on the point about 1¾ miles north of station "Point". The bluff rises almost vertically about a metre behind the station, and to the north a rock spit juts out from the point; at the top of the bluff the first-order station "Stone, 1920", is located.

Station mark: a standard U.S.C. and G.S. bronze disk cemented in a drill-hole in bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk cemented in a drill-hole in bedrock 1·351 metres from the station in azimuth 87° 50′. Reference mark No. 2 is a similar disk, 2·9 metres from the station in azimuth 165°47′, also set in bedrock.

STEPHENS PASSAGE AND WHITING RIVER, MINOR NETS

Hat (Alaska, Stephens Passage; U.S. Coast and Geodetic Survey, 1888, 1893, 1927, 1929). On Bishop Point at the west side of the entrance to Taku Inlet, 17·45 metres northerly from the edge of the grass at the top of the bluff and 10·65 metres from an Indian grave on the extreme end of a rocky point. The station is 0·75 metre inside the grass line.

Station mark: a drill-hole at the centre of a cross in a stone 14 by 8 by 8 inches. First-order station "Hard", which is marked by a standard U.S.C. and G.S. bronze disk, is 7·89 metres from the station in azimuth 225° 52′ 24″; also a cross on an irregularly shaped rock near a small pool is 5·41 metres from the station.

Joy (Alaska, Stephens Passage; U.S. Coast and Geodetic Survey, 1888). On the east shore of Stephens Passage opposite Point Arden, and about 1 mile north of the north side of the entrance to Slocum Inlet. The site of the station may be distinguished by two sharp high-water rocks off the end of the point.

Station mark: a cross drilled in a flat slab in the centre of a pile of rocks. The centre mark is in line with the pinnacle of the eastern rock (mentioned above) and a circle drilled on the face of the ledge behind it, distant 6 feet. (This station could not be found in 1929.)

Tie (Alaska, Stephens Passage; U.S. Coast and Geodetic Survey, 1888). On the west shore of Stephens Passage on Cove Point; on the edge of a rocky bluff 40 feet above and 20 feet inside the high-water mark.

Station mark: a cross chipped in the granite. The reference mark is a cross chipped in a granite boulder bearing south by east, distant 5 feet.

Bed (Alaska, Stephens Passage; U.S. Coast and Geodetic Survey, 1888). On the east shore of Stephens Passage on Circle Point, which is the first point south of Slocum Inlet. The station is on a high bald ledge, the top of which is covered with grass.

Station mark: a hub driven in the ground. Witnessed by a blazed tree bearing east by south, distant 12 feet.

Bar (Alaska, Stephens Passage; U.S. Coast and Geodetic Survey, 1888). On the eastern shore of Stephens Passage opposite Grand Island, and about midway between Grave Point and Circle Point. The station is on top of the bluff.

Station mark: a cross cut by a drill in the surface of the ledge rock.

Gage (Alaska, Stephens Passage; G. Clyde Baldwin, 1906). On the mountain on the south side of Port Snettisham near its entrance to Stephens Passage, at the head of the valley at the base of which is an old fish cannery and other abandoned buildings that can be plainly seen from the station; elevation 2,825 feet.

Station mark: a cross cut in an exposed ledge of natural rock on the highest part of the peak; over this a large cairn of rocks was erected for a signal.

Grouse (Alaska, Stephens Passage; G. Clyde Baldwin, 1906). On the top of the most westerly of two peaks on the north side of Port Snettisham near its entrance to Stephens Passage (these two peaks are the highest in the vicinity and are quite close together); elevation 3,790 feet.
Station mark: a cross cut in a ledge of rock; over this a large cairn of rocks was erected for a signal.

Tom (Alaska, Whiting River; J. D. Craig, 1906). About 1 mile southeast of Whiting River 2 miles northeasterly from its entrance into Port Snettisham, on the westerly summit; elevation 3,380 feet.
Station mark; a galvanized iron stove-pipe signal set in a 4-foot cairn.

Wilson (Alaska, Whiting River; J. D. Craig, 1906). About 2 miles north of Whiting River 3 miles above its entrance into Port Snettisham, on the southwesterly end of a rock summit; elevation 4,300 feet.
Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Snowy (Alaska, Whiting River; J. D. Craig, 1906). About 5 miles southeasterly from Whiting River 15 miles above its entrance into Port Snettisham, on a rocky mountain at the head of the eastern branch of a large creek; elevation 5,940 feet.
Station mark: a galvanized iron stove-pipe signal set in a cairn.

Genesis (Alaska, Whiting River; J. D. Craig, 1906). About 1 mile southeast of Whiting River 13 miles above its entrance into Port Snettisham, on the ridge that extends northeasterly from a snow-covered peak on the west side of a large creek; elevation 3,640 feet.
Station mark: a galvanized iron stove-pipe signal set in a cairn.

Friday (Alaska, Whiting River; J. D. Craig, 1906). About 2 miles northeast of Whiting River 14 miles above its entrance into Port Snettisham, on the middle summit of a long rocky ridge extending southwesterly from the high peak west of the mouth of the creek from Crescent Lake; elevation 5,220 feet.
Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Cook (Alaska, Whiting River; J. D. Craig, 1906). About 2 miles southeasterly from Whiting River opposite the mouth of the creek from Crescent Lake, at the northeastern end of a long ridge about 4 miles westerly from Boundary Point 81.
Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Boundary Point 79 (*See* p. 163).

Snow Tower (British Columbia, Whiting River; J. D. Craig, 1906). About 2 miles northerly from Boundary Point 82 on the north bank of Whiting River 4 miles above the mouth of the creek from Crescent Lake, on a rocky summit; elevation 6,330 feet.
Station mark: a galvanized iron stove-pipe signal set in a cairn.

Boundary Point 83 (*See* p. 163).

Boundary Point 82 (*See* p. 163).

Boundary Point 81 (*See* p. 163).

Boundary Point 80 (*See* p. 163).

Boundary Point 84 (*See* p. 164).

Boundary Point 85 (*See* p. 164).

TAKU RIVER, MAJOR NET

Azimuth (Alaska, Taku River; D. H. Nelles, 1905, 1906; U.S. Coast and Geodetic Survey, 1929). About 7 miles southeasterly from the mouth of Taku River, on the summit of the mountain west of the face of Wright Glacier; elevation 5,540 feet.
Station mark: formerly a wooden hub, cairn, and flag-pole. Recovered by U.S.C. and G.S. in 1929, when old station mark was replaced by an iron rod ½ by ½ inch by 12 inches, cemented into the small loose rock. Reference bolts set as follows: No. 1, azimuth 121° 05′ 25″, distance 16·60 metres; No. 2, azimuth 260° 43′ 25″, distance 8·50 metres.

Twin (Alaska, Taku River; W. F. Ratz, 1906, 1907; U.S. Coast and Geodetic Survey, 1929). About 4 miles northerly from Twin Lake on the north side of the mouth of Taku River, on the middle peak of the mountain between the Twin Glaciers; elevation 4,705 feet.
Station mark: the wooden hub, cairn, and flag-pole were replaced in 1929 by a standard bronze disk cemented in bedrock. Reference disks were set as follows: No. 1, in azimuth 12° 40′ 23″, distance 6·30 metres; No. 2, in azimuth 138° 04′ 20″, distance 2·92 metres.

Cushoo (Alaska, Taku River; W. F. Ratz, 1906). On Kluchman Mountain about 2 miles northwesterly from Taku River opposite the mouth of Sittakanay River, 8 miles above the mouth of Taku River and 3 miles southwest of Boundary Point 90, on the summit of Kluchman Mountain; elevation 4,905 feet.
Station mark: a wooden hub, cairn, and flag-pole.

Carter (British Columbia, Taku River; W. F. Ratz, 1906). About 1 mile north of Sittakanay River 4 miles above its confluence with Taku River, on the first low peak at the west end of the Sittakany Range; elevation 4,120 feet.
Station mark: a wooden hub, cairn, and flag-pole.

TAKU RIVER, MINOR NET

Boundary Point 92 (*See* p. 165).

Wayhut (Alaska, Taku River; D. H. Nelles, 1905, 1906; U.S. Coast and Geodetic Survey, 1929). About 3 miles northeasterly from Twin Lake on the summit on the north side of the mouth of Taku River; elevation 4,525 feet. Station is on the flat mountain top, about 100 metres east of, and 4 feet lower than, the highest point.
Station mark: the original wooden hub, cairn, and pole were replaced in 1929 by an iron rod ½ by ½ inch by 12 inches cemented into the soft rock, and surmounted by a pole signal. Two standard bronze disk reference marks were cemented in drill-holes in bedrock.

Peshack (Alaska, Taku River; W. F. Ratz, 1905, 1906). About 4 miles southeasterly from the confluence of Taku and Sittakanay Rivers, on the ridge west of the sharp, rugged Wright Peaks; elevation 4,470 feet.
Station mark: a wooden hub, cairn, and flag-pole.

Wright (Alaska, Taku River; W. F. Ratz, 1906). About 7 miles southeasterly from Taku River on the mountain between two small glaciers on the west side of Wright Glacier; elevation 5,905 feet.
Station mark: a wooden hub, cairn, and flag-pole.

Nita (British Columbia, Taku River; W. F. Ratz, 1906). About 7 miles southeasterly from Taku River on a shoulder of the mountain on the east side of Wright Glacier, and 1½ miles northwesterly from a small lake below the divide east of the glacier; elevation 6,060 feet.
Station mark: a wooden hub, cairn, and flag-pole.

Boundary Point 87 (*See* p. 164).

Rock (British Columbia, Taku River; W. F. Ratz, 1906). About 2 miles north of the forks of Sittakanay River 4¼ miles above its confluence with Taku River, on the third low peak at the west end of the Sittakanay Range; elevation 5,285 feet.
Station mark: a wooden hub, cairn, and flag-pole.

George (British Columbia, Taku River; W. F. Ratz, 1906). About 1 mile north of Sittakanay River 5 miles above its confluence with Taku River, on the second low peak at the west end of the Sittakanay Range; about one-half mile east of station Carter.
Station mark: a wooden hub, cairn, and flag-pole.

Boundary Point 86 (*See* p. 164).

Tseepie (British Columbia, Taku River; W. F. Ratz, 1906). About 25 miles southeasterly from Taku River, on the mountain above the snow field at the head of Wright Glacier and easterly from its junction with Speel Glacier; elevation 6,815 feet. The top of the mountain is generally covered by snow throughout the summer.
Station mark: a wooden hub, cairn, and flag-pole.

Boundary Point 88 (*See* p. 164).

Boundary Point 89 (*See* p. 165).

Boundary Point 90 (*See* p. 165).

Boundary Point 91 (*See* p. 165).

Boundary Point 93 (*See* p. 165).

Boundary Point 94 (*See* p. 165).

Alah (British Columbia, Taku River; W. F. Ratz, 1906). About 5 miles northerly from the confluence of Tallsaykway and Taku Rivers on a knob on the southwesterly shoulder of the mountain between the two rivers; elevation 4,235 feet.
Station mark: a wooden hub, cairn, and flag-pole.

Canoe (British Columbia, Tallsaykway River; H. S. Mussell, 1910). About 2 miles east of Tallsaykway River 7 miles from its confluence with Taku River, on a westerly knob south of a snow field on the mountain between the two rivers; elevation 5,625 feet.
Station mark: a galvanized iron stove-pipe signal set in a cairn.

Stump (British Columbia, Tallsaykway River; H. S. Mussell, 1910). About 2 miles west of Tallsaykway River 8 miles above its confluence with Taku River, on a knob on the easterly shoulder of the mountain; elevation 3,035 feet.

Station mark: a galvanized iron stove-pipe signal set in a cairn.

Pillar (British Columbia, Tallsaykway River; H. S. Mussell, 1910). About 2 miles east of the East Fork of Tallsaykway River 3 miles above the forks, on a knob on the west side of the summit.

Station mark: the finger-shaped teat on the knob.

Snake (British Columbia, Tallsaykway River; H. S. Mussell, 1910). About 2 miles west of the West Fork of Tallsaykway River 6 miles above the forks, on a bare knob on a northeasterly shoulder of the mountain; elevation 4,895 feet.

Station mark: a galvanized iron stove-pipe signal set in a cairn.

Cache (British Columbia, Tallsaykway River; H. S. Mussell, 1910). About 1½ miles east of Tallsaykway Glacier on the sharp rock summit in the angle between the glacier and its north branch; elevation 6,585 feet.

Station mark: a galvanized iron stove-pipe signal set in a large cairn.

Nanny (British Columbia, Tallsaykway River; H. S. Mussell, 1910). About 1 mile northeasterly from Tallsaykway Glacier opposite the small glacier flowing from the north and east from Devils Paw, on the southwestern slope above a gully; elevation 5,500 feet.

Station mark: a 4-foot cairn.

Scrub (British Columbia, Tallsaykway River; H. S. Mussell, 1910). On the toe of the northerly ridge of Mount Nelles, in the angle between the small westerly extension of Tallsaykway Glacier and the southwesterly branch of the glacier; elevation 4,775 feet.

Station mark: a cairn.

Pussy (British Columbia, Tallsaykway River; H. S. Mussell, 1910). About 3 miles northwesterly from the northwesterly angle of Tallsaykway Glacier directly north of the large southwesterly branch west of Mount Nelles, on the summit of a fairly sharp peak; elevation 7,120 feet.

Station mark: a galvanized iron stove-pipe signal set in a 4-foot cairn.

Fly (British Columbia, Tallsaykway River; H. S. Mussell, 1910). About 1 mile west of the southern extension of the southwesterly branch of Tallsaykway Glacier, on a rock knob on the north side of the long snow slope from the west, and opposite Mount Nelles; elevation 6,105 feet.

Station mark: a galvanized iron stove-pipe signal set in a large cairn.

LYNN CANAL, FIRST-ORDER NET

Riley (Alaska, Lynn Canal; J. F. Pratt, 1894; O. M. Leland, 1907; U.S. Coast and Geodetic Survey, 1925, 1936). On the northern and highest peak of a mountain on the peninsula between Chilkat and Chilkoot Inlets; northeast from Litnikof Cove and south from Haines, and about 4 miles from the Chilkoot Barracks; elevation 1,711 feet.

The station is best reached by starting to climb about 1½ miles northwest of the cannery at Litnikof Cove. The summit is covered by a scrub growth of hemlock, but the station can be used with a 4-foot stand.

Station mark: a standard U.S.C. and G.S. bronze disk cemented in a drill-hole in outcropping bedrock. The reference mark is a standard U.S.C. and G.S. bronze disk, with the arrow pointing to the station, set in outcropping bedrock 9·516 metres from the station in azimuth 35° 36′ 07″; it is about 10 feet lower than the station.

Kabe (Alaska, Lynn Canal; O. M. Leland, 1907; U.S. Coast and Geodetic Survey, 1922, 1925). On Sullivan Island, on a grassy bluff that juts out from the extreme northeast end of the island; about 30 feet above high tide. About 100 yards west of and below the station there is a small spring.

Station mark: a standard U.S.C. and G.S. bronze disk wedged in a boulder about 1 foot in diameter. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk, with the arrow pointing to the station, wedged in a drill-hole in outcropping bedrock, 12·11 metres from the station in azimuth 36° 30′. Reference mark No. 2 is a similar disk, set in concrete in a depression in the outcropping bedrock, 9·15 metres from the station in azimuth 85°56′.

LYNN CANAL, MAJOR NET

Dave (Alaska, Lynn Canal; O. M. Leland, 1907). On the west side of Chilkat Inlet, northwesterly from Seduction Point; on the sharp easterly peak of the ragged ridge north of and parallel with Davidson Glacier; elevation 6,190 feet.

Station mark: a copper bolt that projects about 2 inches above the quartz rock, about 1 foot east of and 1 foot lower than the highest part of the peak.

Gump (Alaska, Lynn Canal; O. M. Leland, 1907). On the point of land that juts out east by south from Davidson Glacier, and south of the mouth of the large river from the glacier. The station is about 25 feet northwest of the southerly edge of thick grass, and about 20 feet from the high-water mark.

Station mark: a cross cut in a rock about 1 foot in diameter and buried 1 foot underground. A signal 30 feet high was erected over the station.

Seduction (Alaska, Lynn Canal; J. F. Pratt, 1894; U.S. Coast and Geodetic Survey, 1921). At the southerly end of Seduction Point, between Chilkoot and Chilkat Inlets; on top of a reddish vertical faced rock separated from the promontory by a small gully about 20 feet wide; about 8 feet above extreme high water.

Station mark: a $\frac{3}{4}$-inch drill-hole in the rock.

Middle (Alaska, Lynn Canal; O. M. Leland, 1907). On the second island from the south of the group of islands named the Chilkat Islands in Lynn Canal. The station is on a grassy promontory about 40 feet high near the north end of the island; it is about 2 metres from the north edge of the promontory and a little nearer the east than the west side.

Station mark: a copper bolt 4 inches long cemented in the rock to a depth of 3 inches, with the top marked "O.M.L. 07". Reference marks are two arrows pointing toward the station cut in a bare patch of rock 4·5 metres westward from the station.

Pat (Lynn Canal, Alaska; O. M. Leland, 1907; U.S. Coast and Geodetic Survey, 1921). On a prominent granite bluff, 60 feet above high-water mark, which is the most prominent point on the east side of Chilkat Inlet opposite Seduction Point. To the eastward the rock rises about 7 feet higher than the station.

This station was recovered by the U.S. Coast and Geodetic Survey in 1921, and was used as a reference mark for a new station "Pat 2, 1921".

Station mark: a standard bronze U.S.C. and G.S. reference disk, with the arrow pointing to Pat 2, set in a depression in the rock outcrop. Pat 2, at the edge of the bluff, is marked by a standard bronze U.S.C. and G.S. hydrographic disk, with a chisel-cut triangle inscribed in the circle, 3·23 metres from the station in azimuth 59° 25′. Two crosses are cut in the inclined surface of the rock, one filled with concrete is 2·12 metres from the station and the other is 2·52 metres from it.

Flow (Alaska, Lynn Canal; U.S. Coast and Geodetic Survey, 1890; O. M. Leland, 1907, 1921). On the east side of Lynn Canal on a prominent point on line from the north end of Sullivan Island and the north end of the most southerly of the Chilkat Islands. The station is most easily located by its proximity to a conical boulder about 15 feet high.

Station mark: a cross cut in a rock ledge about 10 feet above the high-water mark. At a distance of 4·1 metres southeasterly from the station is a white vein in the rock, about 1 foot thick, extending down nearly to the water; the vein is about 10 feet west of the west side of the conical boulder.

Villard (Alaska, Taiya Inlet; O.M. Leland, 1906, 1907). On the central part of the peak of Mount Villard, which is east by south from the entrance of Taiya Inlet from Chilkoot Inlet, and about 2½ miles from the shore.

Station mark: a small hole made by an 8-penny nail, with the nail left in it. A stove-pipe signal was erected over the station.

Boundary Point 105 (*See* p. 167).

Garrett (Alaska, Lynn Canal; O. M. Leland, 1907). About 15 miles easterly from the south of Katzehin River on the east side of Chilkoot Inlet, and 7 miles west of Boundary Point 104; on the highest point of the peak at the northwesterly end of the group of mountains around which Meade Glacier flows from a southerly to a westerly direction. The southern face of the peak is vertical for about 2,000 feet, and the northwestern slope is covered with snow and ice, limited by a rocky backbone on the west side. The ascent was made over this snow field from the northwest, and the upper part was steep and especially difficult at the bergschrund. The summit is separated from the rest of the ridge by a deep notch; seen from the west and east it has the appearance of a Scotch cap. Elevation 6,495 feet.

Station mark: a copper bolt about 4 inches by $\frac{3}{4}$ inch cemented in a hole 3 inches deep near the centre of a flat rock about 4 feet square.

Selby (Alaska, Lynn Canal; O. M. Leland, 1907). On the highest peak of a ridge that runs up from the east side of Lynn Canal from a point about 2 miles northeast of Eldred Rock Lighthouse. There is a glacier on each side of the ridge. The ridge is very rough and rugged, and has many sharp pinnacles of rock. The peak is about 30 metres long and 3 metres wide; elevation 6,430 feet.

Station mark: a copper bolt cemented in a drill-hole in the rock.

Damp (Alaska, Lynn Canal; U.S.C. and G.S. 1890; O. M. Leland, 1907). On the southeastern end of Sullivan Island. The site of the station is on a bench of a rotten slate ledge, about 20 feet square, behind which the ledge rises perpendicularly about 8 feet.

Station mark: the station is not marked, its site being on the rotten slate, but it can be recovered from U.S. Coast and Geodetic station "Van", marked by a standard bronze disk set in concrete, and a copper bolt set in the perpendicular back of the ledge, marked "O.M.L. 07", cemented in a mass of distintegrated slate rock. "Van" is 6·84 metres from the station in azimuth 315° 14′. The copper bolt marked "O.M.L. 07" is 3·97 metres from the station in azimuth 9° 35′.

Phoebe (Alaska, Lynn Canal; O. M. Leland, 1907). On the high peak about 3 miles northeasterly from Comet, the settlement about a mile north of Point Sherman; it is the most southerly of three high peaks rising from the nearby semicircular ridge that surrounds a glacial bowl; elevation about 5,400 feet. The peak can be climbed from the south and east sides. About 6 metres south of the station the top of the peak is cut transversely by a narrow cleft about 20 feet in depth, which is impassable; at about the same distance south of this is a second transverse cleft.

Station mark: a copper plug cemented into a drill-hole in the rock.

William Henry (Alaska, Lynn Canal; O. M. Leland, 1907). On the large round-topped mountain about 2 miles northwest of William Henry Bay, the inlet opposite Point St. Mary; higher mountains obstruct the view to the west. The ascent can be made by following the stream from a small bay just north of William Henry Bay up to its fork, about one-half mile, crossing the south fork and proceeding up the ridge on the south side of the main stream; elevation 3,455 feet.

Station mark: a copper bolt set in cement in a hole drilled in a small outcropping of rock near the highest point of the peak. About 15 metres easterly from the station a cairn 4 feet high was erected by the commission surveyors of 1893-95.

Hose (Alaska, Lynn Canal; U.S. Coast and Geodetic Survey, 1890; O. M. Leland, 1907). On Point Sherman, on a high-water ledge of rotten slate, vertical strata; high water separates the ledge from the timber-line on the slate bluff, inboard 7 metres.

Station mark: a nail driven in the rotten slate. Witness mark No. 1 is a cross, 5 inches wide drilled about one-half inch deep at the centre, on the highest point of a large irregular granite boulder, 9·75 metres inland from the station. Witness mark No. 2 is a cross on a round granite boulder bearing east and distant 10·31 metres from the station. Witness mark No. 3 is a V cut on the vertical solid face of slate near high water SW. by W. 3·71 metres.

Crag (Alaska, Lynn Canal; U.S. Coast and Geodetic Survey, 1890; O. M. Leland, 1907). On the west side of Lynn Canal on the first salient point southward from the entrance to William Henry Bay on a rock at high-water mark in front of the cliff.

Station mark: a cross was cut in the rock in 1890 but was not recovered in 1907. The site of the station mark is 5 feet northwesterly from a triangle, cut on the slanting face of the rock, on the line produced through the triangle from Gull Island. The triangle is about 5½ by 5½ by 7¼ inches.

Berner (Alaska, Lynn Canal; O. M. Leland, 1907). East of Berners Bay, a little over 2 miles from the shore. Northwest of a big bowl and small lake due east from the point about 1½ miles north of Point St. Mary. The station is on the east end of a sharp ridge dividing this bowl from another bowl to the north; it is about one-half mile northwest of a canyon, with glaciers on the southeast and south sides, having a lake in the bottom. The peak has a double top. Elevation 5,505 feet.

Station mark: a cross and copper bolt on a flat ledge between the two peaks. A cairn was built 5 metres northeasterly.

Dean (Alaska, Lynn Canal; O. M. Leland, 1907). About 5 miles northeasterly from the southern end of Echo Cove, the most southerly extension of Berners Bay. The peak is very narrow and is precipitous on all sides, especially so on the north and northwest sides. Just before reaching the highest part of the peak, in approaching it from the southwest, the ridge is very narrow and precipitous on the southeast side. The summit is nearly level over an area of about 50 by 8 feet—except for a large rock, about 4 feet square and 7 or 8 feet high above the surrounding rocks, and two other rocks a little lower about 15 feet northerly; elevation 5,835 feet.

Station mark: a copper bolt.

LYNN CANAL, MINOR NET

Boundary Point 95 (*See* p. 165).

Boundary Point 96 (*See* p. 165).

Boundary Point 97 (*See* p. 166).

Boundary Point 98 (*See* p. 166).

Boundary Point 99 (*See* p. 166).

Boundary Point 100 (*See* p. 166).

Boundary Point 101 (*See* p. 166).

Boundary Point 102 (*See* p. 166).

Boundary Point 103 (*See* p. 167).

Boundary Point 104 (*See* p. 167).

Boundary Point 106 (*See* p. 167).

Boundary Point 107 (*See* p. 167).

Boundary Point 108 (*See* p. 167).

SKAGWAY RIVER, WHITE AND CHILKOOT PASSES, FIRST-ORDER NET

Skag (Alaska, Skagway River; U.S. Coast and Geodetic Survey, 1925, 1936). About 2 miles south of Skagway, on the northwest end of a long flat ridge about 4,000 feet above sea-level; the ridge is separated from the 5,100-foot cone-shaped mountain behind it by a deep valley easily seen from the south, but from Skagway the valley cannot be seen and the ridge appears as a shoulder of the mountain.

Station mark: a standard U.S.C. and G.S. bronze disk set in concrete in the bedrock. The reference mark is a bronze disk set in bedrock 9·188 metres from the station in azimuth 337° 39′.

Tai (Alaska, Taiya Inlet; U.S. Coast and Geodetic Survey, 1925, 1936). Across Taiya Inlet from Skagway, on the ridge (which is a series of hummocks) leading up to Face Mountain; it is on the first and most southerly hummock, just above timber-line and south of a deep ravine; elevation about 2,800 feet.

Station mark: a standard U.S.C. and G.S. bronze disk, stamped "Tai 1925" set in a drill-hole in the bedrock. The reference mark is a similar disk set in the bedrock and stamped "Tai 1925", 32·31 feet from the station in azimuth 259° 58′.

Bain (Alaska, Skagway River; O. M. Leland, 1905; U.S. Coast and Geodetic Survey, 1936). About 3 miles northeast of Skagway and 1½ miles southwest of the East Fork 2 miles above its confluence with Skagway River; on the most northwesterly peak. The summit is very sharp, allowing little room for work, and the elevation is 5,645 feet, about 200 feet less than the round-topped peak lying about one-half mile to the south.

Station mark: a ¾-inch copper bolt was placed on the highest part of the peak in 1905, but in 1936 the upper part of the rock around it had broken off, leaving only a semicircular section of the drill-hole; the top of the mountain had disintegrated to such an extent that a stone retaining wall had to be built, and the station occupied eccentrically. A standard U.S.C. and G.S. bronze reference bolt, stamped "Bain, 1936", was set in a drill-hole in solid rock slightly down the west side 4·322 metres in azimuth 268°41′16″. The eccentric station was not marked, but the rock-loaded tripod may remain for some time.

Hump (Alaska, Taiya Inlet; O. M. Leland, 1905; U.S. Coast and Geodetic Survey, 1936). On the long ridge, between Taiya Inlet and Skagway River, leading to Mount Clifford; about 5 miles north of Skagway. The main ridge is broken up into a series of smaller ones, and the station is not on the first several of these, but on the top of the ridge overlooking both valleys, and almost directly on line with the direction of the East Fork of Skagway River; elevation 4,720 feet.

Station mark: a copper bolt 4 inches long set in a drill-hole in bedrock; the top of the bolt is marked with a cross. Two standard U.S.C. and G.S. bronze disk reference marks were set in drill-holes in bedrock, marked "R.M. No. 1, 1936" and "R.M. No. 2, 1936" respectively. R.M. No. 1 is 6·362 metres from the station in azimuth 349° 00′ 33″ and R.M. No. 2 is 129·624 metres from the station in azimuth 238° 56′ 07″.

Elbow (Alaska, Skagway River; U.S. Coast and Geodetic Survey, 1936). On the east side of the White Pass and Yukon Railway, about 2¾ miles southwest of the section house at Glacier; it is on the outer and most northwesterly high point of a ridge that at its inner end to the southeast joins a range of higher rugged peaks; elevation 5,416 feet.

Station mark: a standard U.S.C. and G.S. bronze disk set in a drill-hole in the bedrock. Reference mark No. 1 is a standard bronze disk with an arrow pointing towards the station set in a boulder distant 4·269 metres in azimuth 229° 44′. Reference mark No. 2 is a similar disk set in the bedrock 5·982 metres from the station in azimuth 320° 41′.

Knee (Alaska, Skagway River; U.S. Coast and Geodetic Survey, 1936). About 2 miles west of the point where the stream from Dead Horse Gulch enters Skagway River near Heney, a sign post on the White Pass and Yukon Railway near the 12-mile post; on the highest part of a peak of greyish colour; elevation 6,229 feet. About 100 yards below Heney a trail runs steeply down hill towards a cabin where it turns left to Skagway River, which is crossed by a footbridge; a better trail might be found if the river could be crossed at the 10-mile post, in which case much brush would be avoided.

Station mark: a standard U.S.C. and G.S. bronze disk set in a drill-hole in outcropping bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk with an arrow pointing to the station wedged in a drill-hole in a boulder, 9·468 metres from the station in azimuth 222° 39′. Reference mark No. 2 is a similar disk set in the bedrock 5·900 metres from the station in azimuth 99° 46′.

Rail (Alaska, Skagway River; U.S. Coast and Geodetic Survey, 1936). On the summit of a sharp peak about 1½ miles north of the section house at Glacier, on the White Pass and Yukon Railway; elevation 6,132 feet. The peak should be approached by following up the west side of the stream entering Skagway River at the loop of the railway crossing the river, keeping away from the stream and on the slope of the mountain side through the most open country; as the steep southern face of the peak is approached the trail turns to the west up a rock slide to the crest of the ridge where it joins the main peak. From this point there is only one way to go, the trail leading to the right over sharp rock and then following a very sharp ridge of loose boulders.

Station mark: a standard U.S.C. and G.S. bronze disk wedged in a drill-hole in outcropping bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk with an arrow pointing to the station wedged in a drill-hole in outcropping bedrock 2·238 metres from the station in azimuth 139° 57′. Reference mark No. 2 is a similar disk set in the bedrock 17·140 metres from the station in azimuth 206° 24′.

West (Alaska, Skagway River; O. M. Leland, 1904, 1905; U.S. Coast and Geodetic Survey, 1936). On the crest of and near the north end of the ridge parallel with, and west of, Dead Horse Gulch; about three-quarters mile west of Boundary Point 117 at the summit of White Pass, and 363·9 metres from Boundary Point 118 in azimuth 22° 12′ 02″.

Station mark: a standard U.S.C. and G.S. bronze disk stamped "West, 1936".

Summit (British Columbia, Skagway River; U.S. Coast and Geodetic Survey, 1936). About 2 miles north-easterly from the summit of White Pass; on the highest part of the peak that appears to be near the north end of a rocky ridge that has an easy slope to its south end; elevation 5,725 feet. This peak is lower than the others in the vicinity, and there are well-defined valleys to the north and south and between it and the higher mountains eastward.

Station mark: a standard U.S.C. and G.S. disk wedged in a drill-hole in bedrock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk with an arrow pointing to the station set in bedrock 8·162 metres from the station in azimuth 54° 46′. Reference mark No. 2 is a similar disk set in bedrock 6·131 metres from the station in azimuth 145° 02′.

SKAGWAY RIVER, WHITE AND CHILKOOT PASSES, MAJOR NET

Garb (Alaska, Taiya Inlet; U.S. Coast and Geodetic Survey, 1890, 1936). On the east side of Taiya Inlet, about 2 miles south of Skagway; it is near the western edge of a bluff about 30 feet above high water, just north of a small bight with a small stream emptying into it from the north.

Station mark: a standard U.S.C. and G.S. bronze disk set in a drill-hole in the rock. The witness mark is a cross cut in the sloping rock behind the station, distant 617 feet in azimuth 270° 50′.

Pheasant (Alaska, Taiya Inlet; J. F. Pratt, 1894; U.S. Coast and Geodetic Survey, 1936). On the west side of Taiya Inlet about 2 miles below Skagway and 1 mile south of Burro Creek; on a rounding point having a small rounding bight to the north; about 20 feet above the high-water mark.

Station mark: a standard U.S.C. and G.S. bronze disk cemented in a drill-hole in the rock. A reference tree was blazed 9·26 metres from the station in azimuth 81° 01′.

Frame (Alaska, Taiya Inlet; U.S. Coast and Geodetic Survey, 1890, 1936). On the west side of Taiya Inlet about 300 feet south of Burro Creek; it is on a boulder, 4 feet by 3 feet, which is covered at three-quarter tide.

Station mark: a standard U.S.C. and G.S. bronze disk set in a drill-hole in the rock. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk, set in a large boulder, 27·30 feet from the station in azimuth 117° 07′. Reference mark No. 2 is a cross on the vertical face of the boulder on which reference mark No. 1 is situated, 26·61 feet from the station in azimuth 109° 11′.

Sharp (Alaska, Taiya Inlet; J. F. Pratt, 1894; U.S. Coast and Geodetic Survey, 1936). On the east shore of Taiya Inlet on the rocky point north of Skagway River; on a sloping granite ledge about 6 feet above the high-water mark.

Station mark: a cross on the top of a ¾-inch copper bolt driven into a drill-hole in the rock. The reference mark is a cross on the sloping face of the rock 5·08 feet from the station in azimuth 50° 23′. There is also a cairn, presumably over a cross on the rock, in a northerly direction.

Boundary Point 119 (*See* p. 169).

SKAGWAY RIVER, WHITE AND CHILKOOT PASSES, MINOR NETS

Lame (Alaska, Taiya Inlet; U.S. Coast and Geodetic Survey, 1890, 1894, 1903, 1906). On the eastern shore of Taiya Inlet, about 1½ miles south of the flats; on the south end of the high point covered with scrub pines and spruce between the inlet and Nahku Bay about a mile above the mouth of Skagway River; about 30 metres above the high-water mark.

Station mark: a ¾-inch drill-hole at the centre of a white granite rock.

Flat (Alaska, Taiya Inlet; U.S. and Coast and Geodetic Survey, 1894, 1905, 1906). About 3 miles north of Skagway, on the west side of Taiya Inlet abreast of the beginning of a grass-covered flat; on a rounded rock with a vertical face; about 30 feet above high water.

Station mark: a ½-inch drill-hole 1½ inches deep on top of the rock. A blazed tree, with six nails driven in a triangular shape in the blaze, is in azimuth 131°, distant 3·94 metres; a second blazed tree (topped), with three nails driven in the blaze, is in azimuth 42°, distant 3·42 metres.

Oskar (Alaska, Taiya Inlet; O. M. Leland, 1905, 1907, 1914). About 1½ miles west of the west shore of Taiya Inlet opposite Skagway, on the granite ledge forming the top of the peak of the shoulder about 1½ miles southeasterly from Parsons Peak; elevation 4,830 feet.

Station mark: a copper bolt three-quarters inch in diameter and 4 inches long driven 2 inches in a hole in the solid granite. Though there are no witness marks the cairns placed at the foot of the signal and at the ends of the guy-wires should be in place.

Boundary Point 109 (*See* p. 168).

Boundary Point 110 (*See* p. 168).

Boundary Point 111 (*See* p. 168).

Marshall (Alaska, Skagway River; O. M. Leland, 1904, 1905). About 10 miles above Skagway and 1 mile southerly from the curve of the railway at the forks of Skagway River; on about the highest point of rock at the north end of the ridge; elevation 3,135 feet. It is 353·1 metres from triangulation station "Bluff" in azimuth 7° 39′ 25″.

Station mark: a ¾-inch drill-hole 1½ inches deep in the bedrock, with crosses radiating from it, marked by a cairn and flag-pole.

Glacier (Alaska, Skagway River; O. M. Leland, 1904, 1905). About 2 miles southwesterly from the curve of the railway at the forks of Skagway River 10 miles above Skagway; on the northerly slope of the mountain two-thirds mile south of the railway, about 200 feet below the extreme limit of vegetation (grass and moss) and just west of a patch of bare, smooth rock about 100 feet square; on an east and west ledge about 30 feet long and 4 feet high, full of seams and cracks, with its top sloping down to the eastward, and 100 feet north of an irregular ledge, facing north, about 200 feet long and 6 feet high; elevation 3,675 feet.

Station mark: a ¾-inch drill-hole ½ inch deep in the bedrock, with three 2-inch grooves radiating from it, marked by a cairn and flag-pole.

"F" (Alaska, Skagway River; O. M. Leland, 1904, 1905). About one-half mile west of the railway on the ridge west of the White Pass Fork of Skagway River, on the third knoll or serration on that ridge counting northward from the valley near White Pass City; on about the most prominent bedrock on the south end of the knoll; elevation 3,720 feet.

Station mark: a ⅜-inch drill-hole with three 4-inch grooves radiating from it, marked by a cairn and flag-pole.

"L" (Alaska, Skagway River; O. M. Leland, 1904, 1905). About one-third mile east of the railway. The "Old Sumner Trail" zigzags from White Pass City directly up the steep mountain side on the east, past the railway tunnel and through a gully on the brow of the hill, which is about the highest point in this locality. The station is situated 75 or 100 metres above the gully, on the brow of the hill; elevation 3,435 feet.

Station mark: a ⅜-inch drill-hole ½ inch deep in the bedrock, with two 2½-inch grooves extending from it to the north and east, marked by a cairn and flag-pole.

Bluff (Alaska, Skagway River; O. M. Leland, 1904, 1905). About 10 miles above Skagway and 1 mile southerly from the curve of the railway at the forks of Skagway River; it is on the convex top of the bedrock about 20 feet long nearly flush with the ground on the east side, and it is about 15 feet southeast of a 12-foot bluff. It is 353·1 metres from triangulation station "Marshall" in azimuth 187° 39′ 22″.

Station mark: a shallow ⅜-inch drill-hole in the bedrock with two 2½-inch grooves extending from it, marked by a cairn and flag-pole.

Boundary Point 114 (*See* p. 168).

Boundary Point 113 (*See* p. 168).

Boundary Point 112 (*See* p. 168).

McCrory (British Columbia, Skagway River; O. M. Leland, 1905). About 2 miles east and a little north of Boundary Point 117 at White Pass, on a ridge extending about S 50° W from the railway bridge across White Fork; it is on the third big hump on the ridge on a large round-topped granite ledge, about 20 feet north of a small narrow gorge.

Station mark: a copper bolt set in the rock, marked by a cairn.

Turning Point (Alaska, Skagway River; O. M. Leland, 1904). About one-half mile east of the railway near the summit of White Pass; 688·6 metres from Boundary Point 116 in azimuth 41° 01′ 00″; about 50 metres east of the "Old Bennett Trail" where it passes between two ponds. It is on top of a granite outcrop 18 feet long and 6 to 10 feet wide, bearing NE. by N., the outcrop having the appearance of a quarter of a horizontal cylinder.

Station mark: a ½-inch drill-hole 1 inch deep, with four 4-inch grooves radiating from it. Five witnesses are as follows:

(1) A 4-inch cross cut in the top of flat bedrock about 2 feet west of face of rock is in azimuth 238° distant 10·43 metres from the station.
(2) A 3-inch cross cut in top of flat rock 4 inches from edge and 3 inches above moss is in azimuth 268° distant 2·57 metres from the station.
(3) A 4-inch cross cut on bedrock about 1 foot above ground and 8 inches from westerly edge is in azimuth 340° distant 7·23 metres from the station.
(4) A 4½-inch cross cut in easterly vertical face of bedrock 2 feet above ground and 1 foot below upper edge of rock is in azimuth 64° distant 12·47 metres from the station.
(5) A 4½-inch cross cut in bedrock 8 inches from easterly edge and 2 feet above ground is in azimuth 124° distant 13·98 metres from the station.

All distances are slope measurements.

"A" (Alaska, Skagway River; O. M. Leland, 1904). On the first ridge east of the small lake that lies just east of the railway and the section house at the south end of the snow shed at Summit Station; on the slope at the southern part of the ridge, and about 100 feet southerly from the old trail that goes in a southeasterly direction to the "Old Bennett Trail" about half a mile away. It is 219·4 metres from Boundary Point 117 in azimuth 313° 03′ 48″.

Station mark: a drill-hole and cross in a rock of 3 cubic feet or more; a small cairn supporting a short flag-pole was erected over the point. Three witness crosses were put on rocks about 3 metres distant, one south, one N 10° W, and one approximately east.

Boundary Point 116 (*See* p. 169).

Boundary Point 115 (*See* p. 169).

Boundary Point 118 (*See* p. 169).

Boundary Point 117 (*See* p. 169).

Fin (Alaska, Taiya River; O. M. Leland, 1906). On a peak about 2 miles west of Taiya River 4 miles above Dyea. The peak is the highest one accessible from the ridge to the southeast. The east side is a steep snowslide, the northwest and south sides are perpendicular for several hundred feet, and the peak itself is crumbling. The station is on the most solid rock near the top of the peak.

Station mark: a drill-hole in the rock from which extend two lines chiselled in the rock. A stove-pipe signal was erected over the point.

Hoff (Alaska, Taiya River; O. M. Leland, 1906). About 4 miles due north of the mouth of the fork of Taiya River that flows from the direction of Chilkoot Pass; on the highest point of Mount Hoffman, a rocky ridge between two glaciers, which is covered with snow to the top on the northeast face; the southwest face of the summit is a precipitous ledge of rock that rises about 300 feet above the snow on the glacier between it and the other ridge to the southwest (which extends directly northwest from Canyon). The peaks on the ridge to the southwest are about the same elevation as to the station, and are the highest peaks between the two branches of Taiya River and Chilkoot Pass. The elevation of the station is 6,080 feet.

Station mark: a copper bolt driven into a drill-hole about 2 inches deep in the rock. A stove-pipe signal was erected over the point.

Boundary Point 120 (*See* p. 169).

Gracey (Alaska, Taiya River; O. M. Leland, 1906). On the west side of Chilkoot Pass, 26·48 metres from Boundary Point 121 in azimuth 32° 18′ 21″.

Station mark: a drill-hole in the rock with a stove-pipe signal over it.

Boundary Point 121 (*See* p. 169).

Ora (British Columbia, Taiya River; O. M. Leland, 1906). About 1½ miles east of Chilkoot Pass; on the long rocky ridge that extends between the two glaciers whose streams empty into Crater Lake. The station is on a large, high granite rock where the ridge makes a distinct bend to the south; elevation 5,925 feet.

Station mark: a drill-hole in bedrock with a stove-pipe signal over it.

"T 1" (British Columbia, Taiya River; O. M. Leland, 1906). About 3 miles northwest of Chilkoot Pass and about 3 miles east of Boundary Point 122; on the southeast end of Mount Van Wagenen. The station is not quite on the top of the ridge, but on the top of a series of ledges on the southeast face, where the slope changes from a steep to a gradual incline; elevation 5,535 feet.

Station mark: a drill-hole in bedrock with a stove-pipe signal over it.

Boundary Point 122 (*See* p. 169).

Boundary Point 123 (*See* p. 170).

CHILKAT RIVER, FIRST-ORDER NET

Knob (Alaska, Klehini River; J. A. Flemer, 1904; U.S. Coast and Geodetic Survey, 1936). On the south side of Klehini River 4 miles west from its junction with Chilkat River; on a low wooded knoll on the crest of the ridge where the timber is light, and about 100 yards east of the highest point; elevation 1,710 feet.

The station may be approached by crossing Klehini River on the cable at mile-post 28. From there the old road may be followed until directly under the station.

Station mark: a standard U.S.C. and G.S. bronze disk set in a boulder rising 2 inches above the ground.

Emerge (Alaska, Chilkat River; J. A. Flemer, 1904; U.S. Coast and Geodetic Survey, 1936). On the west side of Chilkat River on the southern shoulder of the first peak northwest of the mouth of Klehini River; about 400 feet above the brush; elevation 3,401 feet. Two small cairns were left on the crest of the ridge, the station lying between them.

The station may be reached from the ranch near mile-post 30 on the road from Haines by passing behind the ranch buildings and proceeding up the slope along the small stream until a grassy and treeless ridge appears above and to the right; climbing through the brush on this ridge and following it upwards until it narrows to a very few feet, the station will be found.

Station mark: a standard U.S.C. and G.S. bronze disk set in bedrock 2 inches below the surface of the ground. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk set in exposed rock on the eastern slope, distant 8·976 metres in azimuth 276° 41′ 06″. Reference mark No. 2 is a similar disk on the same slope, distant 20·223 metres in azimuth 156° 44′ 59″.

Hen (Alaska, Chilkat River; J. A. Flemer, 1904; U.S. Coast and Geodetic Survey, 1936). On the east side of Chilkat River about 4½ miles above Wells; on the steep, round-faced, southwest end of the first ridge north of Goats Hollow; on a slight bench towards the northern side of the round face; elevation 3,240 feet.

The rather large stream from Goats Hollow empties into the river flat through a gorge about 500 feet deep, and then spreads over the flats so that no stream of any size enters the river.

Station mark: a standard U.S.C. and G.S. bronze disk wedged in a large boulder firmly placed with its top about the same level as the surrounding boulders. Reference mark No. 1 is a standard U.S.C. and G.S. bronze disk set in bedrock below the station at the edge of the bench, distant 3·92 metres in azimuth 59° 21′ 30″.

CHILKAT RIVER, MINOR NETS

Cliff (Alaska, Chilkat River; J. A. Flemer, 1904). About 1½ miles west of Chilkat River 6 miles above Wells. Just west of the station there is a granite boulder, and west of the boulder there is a deep fissure. Elevation 3,050 feet.

The station is 10½ feet distant from the northwest corner of the granite boulder on a right line passing through a ¼-inch drill-hole in white rock, just showing above the surface of the moss, to the southern end of a large lake on an island in the river.

Station mark: a cairn. The drill-hole is 1½ feet distant on the line produced through the station from the northwest corner of the boulder.

Martin (Alaska, Chilkat River; J. A. Flemer, 1904). About 1½ miles northwest of Chilkat River 2 miles above the mouth of Kelsall River, on the southwest face of Mount Martin; elevation 3,540 feet.

The station is about 100 feet above the second channel or pit on the mountain side, apparently formed by the lateral moraines of a glacier that may have filled the valley at one time. The lower ridge, forming the lower channel, is more pronounced than the upper and older one.

Station mark: a ¼-inch drill-hole on the southeast sloping face of a granite boulder.

Upeat (Alaska, Chilkat River; J. A. Flemer, 1904). About 2 miles east of Chilkat River opposite the mouth of Kelsall River, on a spur of the northwesterly slope of Mount Eaton; elevation 3,560 feet.

Station mark: a ¼-inch drill-hole in granite rock under a cairn.

Cache (Alaska, Chilkat River; J. A. Flemer, 1905). On the southeast side of Kelsall River about 2 miles above its junction with Chilkat River; about 6 feet from the edge of the bluff 500 yards northwest of the Kelsall River trail and the trail leading to the mouth of Klehini River.

The approximate position of the station can be located when the line in azimuth 236° 51′ is tangent to the foot of the mountain on the south side of Chilkat River, and intersects a point on the second peak north of a summit in the shape of a truncated cone. The truncated cone summit is on the next mountain northeasterly beyond the mountain on the south side of the river, and the point of intersection is about midway down from the top of the described peak to a sharp dip on its south slope.

Station mark: a ½-inch drill-hole in a small boulder buried 2 feet underground. Five spruce trees were marked with a triangle cut in the bark on the sides facing the station as follows: No. 1, distant 7½ feet in azimuth 335°; No. 2, in azimuth 28°; No. 3, distant 63½ feet in azimuth 35°; No. 4, distant 8½ feet in azimuth 89°; and No. 5 distant 18¾ feet in azimuth 145°.

Brown (Alaska, Chilkat River; J. A. Flemer, 1904). Easterly from station "Martin" 482·5 feet on line to Boundary Peak 141. (The distance and azimuth from "Brown" to "Martin" as determined by a triangle, the 3rd station being "Upeat", is 479 feet in azimuth 78° 31′.)

Station mark: a Winchester ·33 calibre shell placed 2 feet below the surface of the ground.

Williams (Alaska, Chilkat River; J. A. Flemer, 1905). About 2 miles west of Chilkat River 4 miles above the mouth of Kelsall River; above a steep bluff on the west side of the Chilkat; it is 500 or 600 feet above a small pond west of a wooded knoll on the mountain. The station is on a prominent knoll covered with alders and willows; elevation about 2,530 feet. It is a little over one-half mile southwesterly from station "Bob".

Station mark: a tin can filled with cement inserted between loose rocks about 1½ feet below the surface of the ground.

Bob (Alaska, Chilkat River; J. A. Flemer, 1905). About 2 miles west of Chilkat River 5 miles above the mouth of Kelsall River, above a steep bluff on the west side of the Chilkat; it is in the general trend of the rocky ridge that terminates in the bluff. The station is on a nose of the mountain and is about 1,000 feet above a wooded knoll on the west side of which is a small pond; elevation about 3,400 feet.

Station mark: a drill-hole in the rocky ledge, close to a fissure.

Cascade (Alaska, Chilkat River; J. A. Flemer, 1905). About three-quarters mile east of Chilkat River 6 miles above the mouth of Kelsall River; on a small rocky knoll southwesterly from a cascade that is distinctly visible from the Chilkat Valley until in the late summer when the snow fields that feed the stream have melted away.

Station mark: a drill-hole in the rock. The station is referenced by triangular blazes on the trunks of three spruce trees: No. 1, distant 48·2 feet in azimuth 55° 42′; No. 2, distant 13·3 feet in azimuth 260° 12′; and No. 3, distant 41 feet in azimuth 345° 16′.

Turn (Alaska, Chilkat River; J. A. Flemer, 1905). About 1½ miles west of the shore opposite the westerly point of the most northerly island of the group of large islands at the confluence of Chilkat and Tahini Rivers. The station is on a projecting spur covered with tundra growth and bare of willows and alders; elevation 3,500 feet.

Station mark: a tin can filled with cement.

Jay (Alaska, Chilkat River; J. A. Flemer, 1905). About 2 miles easterly from the shore of Chilkat River opposite the large island of the group of islands at the confluence of Chilkat and Tahini Rivers about a mile below the narrows of Chilkat River; on a rocky spur between two streams, one of which empties into the narrows and the other about one-half mile farther down stream; elevation 3,800 feet.

Station mark: a drill-hole in the rock under a cairn.

Pseudo (Alaska, Chilkat River; J. A. Flemer, 1905). On the rocky point between the waters of Chilkat and Tahini Rivers at their confluence, about one-half mile northwesterly from the most southern part of the point and one-quarter mile east of the shore; on the highest ledge of the point at about elevation 900 feet.

Station mark: a drill-hole in the rock marked by an arrow and the figure "1905" cut into the rock. The station is referenced by the highest part of a boulder distant 1·4 metres in azimuth 89°43′; a triangle cut in the bole of a pine tree distant 14·3 metres in azimuth 144° 20′; and a pine tree blazed on four sides distant 6·75 metres in azimuth 210° 16′.

Stria (Alaska, Chilkat River; J. A. Flemer, 1905). On the north side of the creek from the west emptying into Tahini River about a mile above the most northerly island of a group of large islands at the confluence of Chilkat and Tahini Rivers; about one-half mile west of the river; elevation 750 feet. It is about 2 miles southerly from Boundary Points 129 and 130.

The station can be approached from the west shore of the river opposite the south end of the most northerly of the small islands at the mouth of the creek. From this island a knoll can be seen on which there is a large boulder; the station is on the next knoll southerly.

Station mark: a cairn. A lone pine tree stands southeast at a distance of 154·8 feet.

Brulé (Alaska, Chilkat River; J. A. Flemer, 1905). On a northerly knoll on the ridge on the north side of the creek from the west emptying into Tahini River about a mile above the most northerly island of a group of large islands at the confluence of Chilkat and Tahini Rivers; about one-half mile above the mouth of the creek and one-quarter mile west of the river; elevation about 400 feet. It is about 1½ miles south of Boundary Points 129 and 130.

Station mark: a drill-hole in the solid ledge.

McKee (British Columbia, Chilkat River; J. A. Flemer, 1905). On the ridge between the east and west forks of Tahini River about 3 miles above its confluence with Chilkat River; about 1½ miles northwesterly from Boundary Point 129; elevation 2,470 feet. (The east fork has recently been named Flemer River.)

The station is in a rock cleft close to the edge of a cliff and there are a number of large loose rocks to the eastward.

Station mark: the station is 4½ feet from a drill-hole on the line produced from another drill-hole in a ledge, 7¼ feet from the first drill-hole.

Boundary Point 132 (*See* p. 171).

Boundary Point 128 (*See* p. 170).

Low Bend (Alaska, Chilkat River; J. A. Flemer, 1905). About one-half mile south of Chilkat River just above the northeasterly end of the canyon above the mouth of Tahini River; on a cliff, and about 500 feet above a small lake seen to the right; elevation 985 feet.
Station mark: a ½-inch drill-hole with a cross and the figures "1905" cut in the rock.

Fiedler (Alaska, Chilkat River; J. A. Flemer, 1905). About one-half mile north of Chilkat River just east of the first creek above the canyon above the mouth of Tahini River; on top of a pine-covered knoll; elevation 1,635 feet.
Station mark: a ½-inch drill-hole with a cross and the figures "1905" cut in the rock.

Albus (Alaska, Chilkat River; J. A. Flemer, 1905). On the northwesterly end of the knoll on the northwesterly side of Chilkat River at the bend of the river 3 miles northwesterly above the canyon above the mouth of Tahini River, and about 3 miles south of Boundary Point 126. The station is above a cliff on the west side of the knoll.
Station mark: a ½-inch drill-hole with a cross and the figures "1905" cut in the rock.

Lupus (Alaska, Chilkat River; J. A. Flemer, 1905). About one-quarter mile southwesterly from the west side of Chilkat River opposite the south end of the first island about a mile above the bend of the river 3 miles northeasterly above the canyon above the mouth of Tahini River, and about 2½ miles south of Boundary Point 126. The station is on bare rock on a knoll above a cliff; elevation 800 feet.
Station mark: a ½-inch drill-hole with a cross and the figures "1905" cut in the rock.

Southeast (Alaska, Chilkat River; D. W. Eaton, 1906). About a mile east of Chilkat River opposite the south end of the long narrow island about 2 miles above the sharp bend of the river from north to west, and a mile southerly from Boundary Point 126. The island is the most northerly of the group south of the boundary. The station is on the mountainside just north of a creek that empties into the river opposite the next island to the south on a bench that can be recognized from the river by a few single spruce trees: elevation about 2,825 feet.
Station mark: a cairn.

Boundary Point 127 (*See* p. 170).

Boundary Point 126 (*See* p. 170).

Goat (Alaska, Chilkat River; J. A. Flemer, 1905). About one-third mile northwesterly from station "Turn" and about the same elevation.
Station mark: a tin can filled with cement buried 2 feet underground.

Boundary Point 125 (*See* p. 170).

Boundary Point 124 (*See* p. 170).

Darby (Alaska, Chilkat River; J. A. Flemer, 1904). About 2 miles east of Chilkat River 11 miles above the mouth of Kelsall River, on the north side of the valley that heads in the saddle separating Chilkat and Chilkoot River Valleys. The station is on a ridge about 250 feet above a long snow field and just above some clumps of dwarf juniper or mountain cedar; elevation 3,550 feet.
Station mark: the station is 0·35 foot, in azimuth 224°, from a drill-hole.

Glave (Alaska, Chilkat River; J. A. Flemer, 1904). About a mile southwest of Kelsall River 9 miles above its junction with Chilkat River; on the ridge west of Kelsall River; about a mile southeast of station "Tarn" and 200 or 300 feet lower in elevation.
Station mark: a cairn.

Tarn (Alaska, Chilkat River; J. A. Flemer, 1904). About a mile southwest of Kelsall River at the boundary crossing, about 10 miles above the junction of Kelsall River with Chilkat River; about three-quarters mile south of Boundary Point 138; elevation 3,075 feet.
Station mark: a cairn.

Boundary Point 140 (*See* p. 171).

Boundary Point 134 (*See* p. 171).

Boundary Point 141 (*See* p. 171).

Summit (Alaska, Klehini River; J. A. Flemer, 1904). About 2 miles south of Klehini River at the mouth of Porcupine Creek, about 10 miles above Wells; on a knoll northwest of the ridge between Porcupine and McKinley Creeks; elevation 2,650 feet.
Station mark: a cairn.

Rain (Alaska, Klehini River; J. A. Flemer, 1904). About a mile north of Klehini River 11 miles above Wells; on the ridge between Klehini River and Yokeak Creek; elevation 3,145 feet.

Station mark: a cairn.

Flower (Alaska, Klehini River; J. A. Flemer, 1904). About $2\frac{1}{2}$ miles south of Klehini River 13 miles above Wells; on the north side of the flat ridge between Glacier and Porcupine Creeks; elevation approximately 3,000 feet.

Station mark: a cairn.

Boundary Point 144 (*See* p. 172).

Boundary Point 147 (*See* p. 172).

Boundary Point 142 (*See* p. 172).

Boundary Point 150 (*See* p. 172).

Boundary Point 154 (*See* p. 173).

Boundary Point 156 (*See* p. 173).

Boundary Point 155 (*See* p. 173).

Boundary Point 157 (*See* p. 174).

Boundary Point 151 (*See* p. 173).

Windy (British Columbia, Tsirku River; O. M. Leland, 1910). About 2 miles westerly from Boundary Peak 155. About one-half mile southeast of the head of the first glacier valley on the south side of the Tsirku Glacier that goes through to the great snow field. The station is at an old camp-site.

Station mark: a small cairn and flag-pole.

Boundary Point 152 (*See* p. 173).

Boundary Point 153 (*See* p. 173).

Ed (British Columbia, Tsirku River; O. M. Leland, 1910). About 10 miles southerly from the Tsirku Glacier; on a small peak about half-way between Boundary Points 156 and 157, and just west of the line joining them. It was climbed from the north, over snow.

Station mark: a large cairn and length of stove-pipe.

Art (Alaska, Tsirku River; O. M. Leland, 1910). About 10 miles southerly from the Tsirku Glacier; on a peak about half-way between Boundary Points 156 and 157, and just east of the line joining them; the line crosses the peak just west of the station. It is about one-quarter mile northeast of station "Ed". The peak is in the southwest wall of the Muir Glacier Valley. It was climbed by way of the steep snow gully on its western side.

Station mark: a large cairn and length of stove-pipe.

Walt (British Columbia, Tsirku River; O. M. Leland, 1910). On the first peak about 4 miles southwest of station "Windy", and the same distance on a perpendicular line drawn westerly from a point half-way between Boundary Points 156 and 157. Just north of the station is a high rock that appears like a cairn; northeast of the station the ridge breaks off abruptly. It was climbed from the south.

Station mark: a tin can set in a cairn surmounted by a length of stove-pipe.

Nugget (Alaska, Tsirku River; O. M. Leland, 1910). On a high ridge about one-half mile northeast of Nugget Creek $1\frac{1}{2}$ miles above its junction with Tsirku River. It is reached by climbing the Porcupine Creek trail from Nugget Creek, and then branching off to the summit. The ridge is very steep on the north and northeast; elevation 5,305 feet.

Station mark: a cairn and flag-pole.

Hall (Alaska, Tsirku River; O. M. Leland, 1910). About $1\frac{1}{2}$ miles northerly from Tsirku River and opposite the De Blondeau Glacier, and approximately 2 miles southwest of Cottonwood Creek. On a grey projecting spur overlooking Tsirku and Tahkin Rivers. Above, on the north, the ridge continues up about 600 or 700 feet, to a shoulder, also grey in colour; northeast of this is a red ridge; elevation 3,780 feet.

Station mark: a cairn and flag-pole.

Boundary Point 158 (*See* p. 174).

GLACIER BAY, MAJOR NET

Top (Alaska, Glacier Bay; Fremont Morse, 1907). About $1\frac{1}{2}$ miles west of the point west of the entrance of the creek into Icy Strait about $1\frac{1}{2}$ miles southwest of Point Carolus. The station is on the east slope of the highest peak, 50 feet from the summit and 15 feet vertically below it.

Station mark: a 1-inch drill-hole 2 inches deep in the solid rock. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 8 feet in azimuth 288°. Reference mark No. 2 is a similar arrow, distant 14·8 feet in azimuth 41°. Reference mark No. 3 is a similar mark, distant 10·35 feet in azimuth 110°.

Beard (Alaska, Glacier Bay; Fremont Morse, 1907). On the west side of the most westerly island of the Beardsley Islands, about 4 miles southeasterly from Willoughby Island. It is on the next to the highest point of the bluff, near the edge. (A note to the description written in 1907 says that the bluff is washing away, and may disappear in a few years.)

Station mark: a ½-inch drill-hole 1 inch deep in a granite rock about 18 inches below the surface of ground. Reference mark No. 1 is a crossed arrow on a round granite rock distant 51·3 feet in azimuth 272°. Reference mark No. 2 is a similar arrow cut in a larger rock distant 57 feet in azimuth 304°. Reference mark No. 3 is a similar arrow in a rock distant 51·2 feet in azimuth 26°.

Will (Alaska, Glacier Bay; Fremont Morse, 1907). On the summit of Willoughby Island; elevation 1,610 feet.

Station mark: a drill-hole 1 inch deep in solid rock. Reference mark No. 1 is a crossed arrow cut in the rock pointing to the station, distant 37·9 feet in azimuth 318°. Reference mark No. 2 is a similar arrow distant 28·9 feet in azimuth 137°. Reference mark No. 3 is a similar arrow distant 44·4 feet in azimuth 254°.

Cliff (Alaska, Glacier Bay; Fremont Morse, 1907). On the highest part of the ridge between Geikie Inlet and the small inlet west of Willoughby Island; elevation 3,390 feet.

To reach the station go up the slope west of Drake Island to a succession of small cliffs, above which is located a camera station marked by a drill-hole and small cairn; continue 1½ miles to the top of the ridge, crossing a ravine where a rope is necessary to get up the cliff.

Station mark: a drill-hole in the rock and a cairn 5 feet high. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 23·3 feet in azimuth 236°. Reference mark No. 2 is a similar arrow distant 14·0 feet in azimuth 177°.

Marble (Alaska, Glacier Bay; Fremont Morse, 1907). On top of South Marble Island, on a flat space 5 metres west of the highest point.

Station mark: a ½-inch drill-hole 1¼ inches deep in the solid, glacier-worn rock. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 16·75 feet in azimuth 101°. Reference mark No. 2 is a similar arrow distant 10·6 feet in azimuth 352°. Reference mark No. 3 is a similar arrow distant 10·5 feet in azimuth 262°.

Point (Alaska, Glacier Bay; Fremont Morse, 1907). About 2 miles northwest of the creek emptying at the point between Glacier Bay and Muir Inlet; on the rounded top of the hill facing Glacier Bay; elevation 3,215 feet.

Station mark: a drill-hole, not very well defined, in rotten ledge-rock. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant about 30 feet east. Reference mark No. 2 is a similar arrow, distant about 18 feet northwest. Reference mark No. 3 is a similar arrow about 12 feet south. Four piles of rock will be found where the braces of the signal stood.

Happy (Alaska, Glacier Bay; Fremont Morse, 1907). About a mile west of Glacier Bay midway between the Hugh Miller and Geikie Inlets. The mountain has two summits, about one-half mile apart, and the station is on the first knoll or ledge east of the southern and lower summit; elevation 2,680 feet.

There is a mass of broken ledges and rocks around the station.

Station mark: a ½-inch drill-hole 1 inch deep in a solid rock ledge. Reference mark No. 1 is an arrow cut in the rock, probably pointing to the station, distant 8·5 feet northwesterly. Reference mark No. 2 is a similar arrow 17 feet northerly. Reference mark No. 3 is a similar arrow 38·7 feet southerly.

Gloomy (Alaska, Glacier Bay; Fremont Morse, 1907). On the summit of the limestone mountain on the promontory between Tidal and Queen Inlets. The station is about a mile northwesterly from the mouth of a creek draining a small lake just east of the mountain, and the mouth of the creek is about a mile northwesterly from the north side of the entrance to Tidal Inlet; elevation 1,330 feet.

Station mark: a 1-inch drill-hole in solid limestone. Reference mark No. 1 is an arrow cut in the rock and pointing to the station, distant 9·1 feet in azimuth probably 102°. Reference mark No. 2 is a similar arrow, distant 10·25 feet in azimuth probably 244°. Reference mark No. 3 is a similar arrow, distant 11·5 feet in azimuth probably 326°.

Slide (Alaska, Glacier Bay; Fremont Morse, 1907). On the double-top mountain about 2 miles southwest of the south side of the entrance of Muir Glacier to the bay; on the higher of the two peaks, and on the north side; elevation 3,350 feet.

Station mark: a drill-hole in the rock under a cairn. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 44·5 feet in azimuth about 180°. Reference mark No. 2 is a similar arrow, distant 38·7 feet in azimuth about 225°. Reference mark No. 3 is a similar arrow, distant 23·9 feet in azimuth about 0°.

Wright (Alaska, Glacier Bay; Fremont Morse, 1907). On the northwest shoulder of rugged-topped Mount Wright, about 400 feet lower than the summit; at the east side of the entrance to Muir Inlet; elevation 4,000 feet.

Station mark: a drill-hole in the rock under a small cairn. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 50 feet in azimuth 181°. Reference mark No. 2 is a similar arrow distant 35 feet in azimuth 266°. Reference mark No. 3 is a similar arrow distant 65 feet in azimuth 341°.

Canadian 189 (Alaska, Glacier Bay; Fremont Morse, 1907). On the westerly summit of a ridge of decayed rock on the north side of Tidal Inlet. The southwesterly end of the base of the ridge is about a mile northeast of the point at the south side of the entrance to Tidal Inlet, and the station is about 1½ miles farther northeasterly. Elevation 3,710 feet.

Station mark: a 1½-inch drill-hole 1 inch deep in a limestone rock set in the ground, under a cairn.

Canadian 190 (Alaska, Glacier Bay; Fremont Morse, 1907). About a mile west of Glacier Bay midway between Hugh Miller and Geikie Inlets. The mountain has two summits, about one-half mile apart, and the station is on the northern and higher summit; elevation 2,765 feet.

The station is 6 feet northwest of the cairn built by A. J. Brabazon, D.L.S., in 1894.

Station mark: a 1-inch drill-hole 1 inch deep in solid granite rock under a cairn. Reference mark No. 1 is a cross cut in rock, distant 3·8 feet southerly. Reference mark No. 2 is a cross cut in rock, distant 3 feet westerly. Reference mark No. 3 is a cross cut in rock, distant 16·3 feet northerly.

Slip (Alaska, Glacier Bay; Fremont Morse, 1907). About 2 miles south of the mouth of the creek 2 miles east of the face of Reid Inlet; on the flat top of the southern summit of the double-topped mountain; elevation 3,545 feet.

Station mark: a drill-hole in the rock. There are probably three arrows cut in the rock and pointing to the station. In 1907 the remains of an old cairn were found about 25 feet southwest of the station.

Dix (Alaska, Glacier Bay; Fremont Morse, 1907). About 3 miles northwesterly from the most southerly point of the peninsula between Glacier Bay and Rendu Inlet; about a mile easterly from the shore of Glacier Bay. The station is on a small granite knoll about 100 feet south of the highest knoll in the immediate vicinity, and it overlooks the bay and the inlet; there are numerous knolls of granite and large boulders around the station; elevation 2,780 feet.

Station mark: a 1-inch drill-hole in solid granite. Reference mark No. 1 is a cross in the rock, distant 11 feet on line to an island in a southeast direction. Reference mark No. 2 is a similar cross, distant 8·3 feet on line to the head of Rendu Inlet. Reference mark No. 3 is a similar cross, distant 8·8 feet in azimuth 328°.

Pauline (Alaska, Glacier Bay; Fremont Morse, 1907). About a mile south of the mouth of a small creek 5 miles north of the north side of the entrance to Hugh Miller Inlet; on the highest point on the northwesterly end of the ridge between Glacier Bay and Hugh Miller Glacier; elevation 2,410 feet.

Station mark: a cross cut in the rock and a small cairn. Reference mark No. 1 is an arrow cut in the rock and pointing to the station, distant 14·7 feet in azimuth about 270°. Reference mark No. 2 is a similar arrow, distant 10·5 feet in azimuth about 90°. Reference mark No. 3 is a similar arrow, distant 9·8 feet in azimuth about 180°.

End (Alaska, Glacier Bay; Fremont Morse, 1907). About a mile west of the face of Reid Glacier; on the second knoll below the top of the ridge west of the glacier; on the west side of a flat rocky ledge; elevation 2,480 feet.

Station mark: a ½-inch drill-hole in solid rock. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 10·5 feet in azimuth about 200°. Reference mark No. 2 is a similar arrow, distant 18·7 feet in azimuth about 250°. Reference mark No. 3 is a similar arrow, distant 9·0 feet in azimuth about 40°.

Wells (Alaska, Glacier Bay; Fremont Morse, 1907). About 2 miles north of the shore of the channel on the north side of the large island in the entrance to Tarr Inlet. The station is near the summit of a high mountain, and on a west shoulder; elevation 4,105 feet.

Station mark: a drill-hole in the centre of a flat rock, under a cairn. No other marks were left as the rocks were loose and constantly falling away.

Camp (Alaska, Glacier Bay; Fremont Morse, 1907). About a mile southeast of a small point at the south side of the entrance to Hugh Miller Inlet; on the north side of a hump on the slope of a ridge facing Glacier Bay; elevation 1,590 feet.

Station mark: a drill-hole in rock. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 33·1 feet in azimuth about 225°. Reference mark No. 2 is a similar arrow, distant 54·9 feet in azimuth about 270°. Reference mark No. 3 is a similar arrow, distant 43·6 feet in azimuth about 0°.

Paul (Alaska, Glacier Bay; Fremont Morse, 1907). About a mile north of the shore at the north end of the entrance to Hugh Miller Inlet; on the southeast end of the rock hill between Glacier Bay and Hugh Miller Glacier; elevation 1,430 feet.

Station mark: a drill-hole in the rock. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 17·6 feet in azimuth about 315°. Reference mark No. 2 is a similar arrow, distant 17·5 feet in azimuth about 135°. Reference mark No. 3 is a similar arrow, distant 14·5 feet in azimuth about 270°.

Bench (Alaska, Glacier Bay; Fremont Morse, 1907). About one-half mile from the shore of Hugh Miller Inlet, at the west side of the entrance to the south arm of the inlet; on the northeast side of a flat hill extending in a southwest direction from the inlet; elevation 1,395 feet.

Station mark: a drill-hole in the rock. Reference mark No. 1 is a crossed arrow cut in the rock and pointing to the station, distant 41·8 feet in azimuth about 90°. Reference mark No. 2 is a similar arrow, distant 38·0 feet in azimuth about 45°. Reference mark No. 3 is a similar arrow, distant 39·9 feet in azimuth about 180°.

Island (Alaska, Glacier Bay; Fremont Morse, 1907). On the most easterly island at the entrance to Hugh Miller Inlet, on the most westerly of several knobs east of the centre of the island; just east of a pond; elevation 545 feet.

Station mark: a drill-hole in solid rock. Reference mark No. 1 is a cross in the rock, distant 5·9 feet in azimuth 268°. Reference mark No. 2 is a similar cross, distant 7·9 feet in azimuth 354°. Reference mark No. 3 is a similar cross, distant 7·4 feet in azimuth 149°.

Hugh Miller East Base (Alaska, Glacier Bay; Fremont Morse, 1907). On the west side of the gravel delta of the creek in the bight inside the southern point of the entrance of Hugh Miller Inlet; just above the extreme high-water mark.

Station mark: a copper tack in a wooden plug set in a drill-hole in a rock set flush with the surface of the ground; the station is further marked by a rock cairn. A low ridge of rock lies to the east of the station and west of the creek; a witness mark was made by drilling a shallow hole in the cracked face of a rock in this ridge, close down to the surface of the gravel; this hole is in the line of the base, and is distant 215 feet from the station. A small cairn was built just above and behind the witness mark.

Hugh Miller West Base (Alaska, Glacier Bay; Fremont Morse, 1907). On the west side of the creek flowing into the southwestern extremity of the bight inside the point at the southern entrance of Hugh Miller Inlet; on what was formerly the lateral moraine of the Charpentier Glacier. By the retreat of the glacier this now forms the east shore of the inlet leading up to the face of the glacier.

Station mark: a pin head in a wooden plug set in a drill-hole in a flat stone level with the gravel. Reference mark No. 1 is a crossed arrow cut in a smooth rounded boulder and pointing to the station, distant 83·7 feet in azimuth about 75°. Reference mark No. 2 is a similar arrow in the largest boulder on the ridge, distant 74 feet in azimuth about 143°.

MINOR NETS

Found (Alaska, Glacier Bay; Fremont Morse, 1907). About a mile east of the shore of Hugh Miller Inlet where a creek flows into the southern arm of the inlet from between two knobs at the northerly end of the mountain east of the junction of the Charpentier and Favourite Glaciers. The station is on the northerly knob, on a granite knoll exposed above the old moraine; elevation about 1,850 feet.

Station mark: a large cairn.

Late (Alaska, Glacier Bay; Fremont Morse, 1907). About one-half mile east of Muir Inlet 2 miles north of a small inlet to the east, which is just above the entrance to Muir Inlet; on the farthest hill in front of Adams Glacier; elevation about 1,000 feet.

Station mark: a drill-hole and cairn.

Boundary Point 157 (*See* p. 174).

Boundary Point 158 (*See* p. 174).

Boundary Point 159 (*See* p. 174).

Boundary Point 160 (*See* p. 174).

Boundary Point 161 (*See* p. 175).

Boundary Point 162 (*See* p. 175).

Boundary Point 163 (*See* p. 175).

Boundary Point 164 (*See* p. 175).

Boundary Point 165 (*See* p. 175).

Boundary Point 166 (*See* p. 175).

Boundary Point 167 (*See* p. 175).

ALSEK RIVER, YAKUTAT BAY, MALASPINA GLACIER, MINOR NETS

Double (Alaska, Alsek River; A. J. Brabazon, Fremont Morse, 1906). About 2 miles easterly from the south end of Alsek Glacier 3 miles south of the first canyon of Alsek River; on the second hill south of the glacier; it is surrounded by moraine on the west, north, and east sides. The mountain appears as a double hill from the river delta, and the station is on the south and highest hill; elevation 1,365 feet.

Station mark: A 3-foot cairn built around a 10-foot telescope iron pipe.

End (Alaska, Alsek River; A. J. Brabazon, Fremont Morse, 1906). About 15 miles from the entrance to Dry Bay on the spur northwest of the first canyon of Alsek River; elevation 2,345 feet.

Station mark: a 5-foot cairn built around a 10-foot telescope iron pipe. There is no other mark as the rocks are all loose and there is no permanent ledge nearby.

Good (Alaska, Alsek River; Fremont Morse, 1906, 1908). On the south side of Alsek River about 7 miles above the first canyon; on an old moraine, overgrown with alders, on the upper side of the first glacier above Alsek Glacier. The station is not on top of the mound, but on the west slope of it.

Station mark: a drill-hole in a large rock set in solid ground under a smaller rock with a drill-hole in it set flush with the surface of the ground. Another drill-hole, one-half inch deep, is in the exposed part of the large rock, due west 0·6 metre from the station.

Windy (Alaska, Alsek River; Fremont Morse, 1906, 1908). About 7 miles above the first canyon of Alsek River, on a bar in the centre of the valley and opposite the first glacier above Alsek Glacier. From appearances in 1908 this bar evidently had not been under water for some time and the station might be permanent for many years.

Station mark: a 12- by 10- by 8-inch rock with 1-inch drill-hole in centre 1 inch deep.

New (Alaska, Alsek River; Fremont Morse, 1908). On the west side of Alsek River opposite the island at the first bend of the river about 13 miles above the first canyon; on the middle one of three hills forming the old terminal moraine of a small glacier. The glacier is the second small one south of the large glacier to the north; a small glacial lake lies behind the hills and the glacial ice comes down to the border of the lake, but the ice is so covered with moraine that at first glance it looks like solid earth; the lake drains through the gap between the middle hill and the one to the south. The station is on the summit of the hill, from which a thick growth of alders was cleared. Elevation 390 feet.

Station mark: a small stone set at the surface of the ground with a $\frac{3}{4}$-inch drill-hole $\frac{1}{4}$ inch deep.

Bend (Alaska, Alsek River; Fremont Morse, 1906). On the southeastern corner of the first bend of Alsek River, about 12 miles above the first canyon; on the mountain side opposite the large glacier; about 400 feet below the line of vegetation on the up-river side of the ridge; elevation 1,065 feet.

Station mark: a cairn built around a small signal.

Flower (Alaska, Alsek River; Fremont Morse, 1908). On the rocky glacier-worn point on the east side of the large glacier at the first bend of Alsek River. The hill is about 200 feet high; the station is on a flat place about $1\frac{1}{2}$ feet lower and to the northwest of the highest point, and about 10 feet from it.

Station mark: a drill-hole in the solid schist rock. Witness mark No. 1 is a crossed arrow, pointing to the station, cut in the rock, distant 8 feet 7 inches from the station in azimuth about 80°. Witness mark No. 2 is similar, distant 13 feet 1 inch from the station in azimuth about 335°. Witness mark No. 3 is similar, distant 6 feet 9 inches from the station in azimuth about 235°.

Club (Alaska, Alsek River; Fremont Morse, 1908). On the north side of Alsek River, on a knob of the ridge opposite the first glacier below the second canyon; elevation 2,370 feet.

Station mark: a drill-hole in solid rock, with three witness arrows. Witness arrow No. 1 is 5 metres distant in azimuth 280°. Witness arrow No. 2 is 3·1 metres distant in azimuth 62°. Witness arrow No. 3 is 4·2 metres distant in azimuth 132°.

Alder (Alaska, Alsek River; Fremont Morse, 1908). On the south side of Alsek River about 4 miles east of the first bend of the river; on a small conical hill that is part of the old lateral moraine of the first glacier east of the bend of the river. The hill is just at the foot of the precipitous mountain side, and is only about 100 yards beneath and to one side of the hanging front of the glacier. It was covered with a thick growth of alders that had to be cleared away. Elevation 575 feet.

Station mark: a $\frac{3}{4}$-inch drill-hole in a stone on the surface.

Rain (Alaska, Alsek River; Fremont Morse, 1908). On the south side of Alsek River, on a projecting knoll on a hillside between the two glaciers below the second canyon; elevation about 1,300 feet above the valley, at about the limit of vegetation; elevation 1,490 feet.

Station mark: a 1-inch drill-hole in the centre of a 10- by 16-inch rock set in the ground.

Knob (Alaska, Alsek River; Fremont Morse, 1908). Northwest of the second canyon of Alsek River; on the east shoulder of the mountain opposite the canyon glacier; about 100 feet below the summit of the mountain; elevation 3,953 feet.

Station mark: a drill-hole in solid rock. A pile of rock used as a wind-break was built on the northeast side of the drill-hole.

Crook (Alaska, Alsek River; Fremont Morse, 1908). On the south side of Alsek River about 8 miles east of the first bend of the river; on an alder-covered hill forming part of the up-river lateral moraine of the large glacier at the second canyon. There are two adjacent hills and the station is on the upper one; it is not on the highest point of the main hill, but on the top of a side part close to the glacier. The little summit is very narrow and there was barely room to set up the theodolite; it was cleared of alders; elevation 639 feet.

Station mark: a stone with a hole drilled in it under a 4-foot cairn.

Nose (Alaska, Alsek River; Fremont Morse, 1908). On the southeast side of the bend of Alsek River above the second canyon; on the southwest side of a flat-top knob on the southeast side of the steep rocky ridge; it is the last knob but one before getting to the ridge; elevation 2,375 feet.

Station mark: a drill-hole in solid rock 6 feet from the nearest end of a large rock 8 feet long and 3 feet wide. Three witness marks (probably arrows cut in the rock) were put in. Witness mark No. 1 is 13·33 feet distant in azimuth about 220°. Witness mark No. 2 is 9·67 feet distant in azimuth about 202°. Witness mark No. 3 is distant 12·5 feet in azimuth about 340°.

Boundary (British Columbia, Alsek River; Fremont Morse, 1908). On the north side of Alsek River, about 5 miles above the second canyon; on the first shoulder below the sharp peak near the boundary; elevation 3,517 feet.

Station mark: 1-inch drill-hole in sloping granite rock, with three witness arrows cut in adjoining ledges. Witness arrow No. 1 is 8·6 feet distant in azimuth 51°. Witness arrow No. 2 is 12 feet distant in azimuth 339°. Witness arrow No. 3 is 15·2 feet distant in azimuth 163°.

Side (Alaska, Alsek River; Fremont Morse, 1908). On the south side of Alsek River about 6 miles above the second canyon; on a projecting ledge of rock near the boundary; just west of a small canyon that has snow on it late in the season; elevation 880 feet.

Station mark: a stone with a hole drilled in it.

Canadian Moraine (British Columbia, Alsek River; A. J. Brabazon, 1906; Fremont Morse, 1908). On the south side of Alsek River on the moraine west of the first glacier east of the boundary; elevation 780 feet.

Station mark: a stone with a hole drilled in it, with three witness arrows cut on neighbouring rocks. Witness mark No. 1 is 8·655 feet from the station in azimuth about 95°. Witness mark No. 2 is 19·58 feet from the station in azimuth about 230°. Witness mark No. 3 is 29 feet from the station in azimuth about 30°.

Boundary Point 168 (*See* p. 176).

Boundary Point 169 (*See* p. 176).

Boundary Point 170 (*See* p. 176).

Boundary Point 171 (*See* p. 176).

Goat (Alaska, Alsek River; Fremont Morse, 1906). About 10 miles northerly from the northwesterly side of the entrance to Dry Bay; on the grassy hill, covered half-way up by a dense growth of alder and devil's club, adjacent to and just east of Rodman Glacier. The southwesterly end of the hill is the best point of approach. It is about 7 miles from the junction of Ustay River and Kakanhini Creek. Elevation of station 2,145 feet.

Station mark: a cross cut in a rock set firmly in the ground, under a 4½-foot cairn.

Chamberlain (Alaska, Alsek River; Fremont Morse, 1906). Between Yakutat Glacier at the head of Dangerous River and Chamberlain Glacier at the head of Akwe River; on the peak on the east side of the small dead glacier from which runs the most northerly branch of Italio River; elevation 3,780 feet. This station is about 3 miles northeasterly from Station "Tip". It is on the southern point of the Brabazon Range.

Station mark: a ½-inch drill-hole in solid slanting rock under a 4-foot cairn.

Tip (Alaska, Alsek River; Fremont Morse, 1906). About 7 miles northerly from the mouth of Akwe (Ahquay) River, which enters the "Inside Passage" about 10 miles northwesterly from Dry Bay; on the highest point near the western end of the mountain range facing the ocean and terminating near Yakutat Glacier. To reach this point go up Akwe River to where the stream forks, the main stream coming from the northeast from Chamberlain Glacier; take the northwest fork, which is a clear water stream; follow it through a narrow slough and a small lake to the foot of the mountain, thence up a small creek and through a dense growth of alder and devil's club to a bench, and up the ridge in a northwesterly direction to the station. Elevation of station 2,835 feet.

Station mark: a cross cut in a solid rock under a 5-foot cairn.

Slate (Alaska, Russell Fiord; Fremont Morse, 1906). About 5 miles southeasterly from the mouth of Beasley Creek at the southeastern end of Russell Fiord; on Slate Peak, the highest mountain in the vicinity. The mountain can be climbed from the plateau above the first tributary of any size flowing down the mountain side; the route looks impossible from half-way up, and a longer but less dangerous one may be found up the south ridge. The elevation of the station is 3,380 feet.

Station mark: a ½-inch drill-hole in a slab of rock projecting out of the highest part of the peak at the face of a steep cliff; under an 8-foot cairn.

Black Sand (Alaska, Yakutat Bay; Fremont Morse, 1906). About 17 miles southeasterly along the ocean shore from Ocean Cape; on a small sand dune, 50 feet from the cut sand bank, on the most southwesterly point of Black Sand Island; near a patch of small spruce timber; about 13 feet above high-water mark.

Station mark: a ½-inch drill-hole 1½ inches deep in a granite boulder, about 12 by 12 by 14 inches, buried 6 inches under ground.

Mount Tebenkof (Alaska, Yakutat Bay; Fremont Morse, 1906). About 3 miles easterly from the shore of Yakutat Bay opposite the eastern point of Knight Island, and about the same distance west of Russell Fiord; on a sharp rocky peak that is a broken slate formation about 50 feet long and from 2 to 7 feet wide; elevation 4,280 feet. The peak is difficult of approach and the mountain is most easily climbed from its western side.

Station mark: a 5-foot cairn.

Ankau (Alaska, Yakutat Bay, Fremont Morse, 1906). On the first small cape south of Ocean Cape about one-half mile, on a wooded hill. The slough of Ankau River comes to the foot of the hill on the east and southeast, and on the sea side there is a cut bank; the slough is divided from the sea beach by a narrow strip of land not more than 100 feet across. Considerable chopping had to be done to clear lines of sight to other triangulation stations; elevation 100 feet.

Station mark: a tower was built around a spruce tree, $1\frac{1}{2}$ feet in diameter 6 feet from the ground, which was cut off 14 metres from the ground. The reference mark is a triangular slab of granite, about 5 inches thick, marked by a drill-hole one-half inch in diameter and one-half inch deep buried 6 inches under ground; this mark is 2·07 metres, horizontal distance, from the centre of the station in azimuth 229° 13′.

Black Tip (Alaska, Russell Fiord; Fremont Morse, 1906). A point on the Brabazon Range about 7 miles easterly from the mouth of Beasley Creek at the southeastern end of Russell Fiord; a sharp pinnacle arising from the top of the highest snow-covered mountain south of the most northeasterly snow field above the glacier emptying into Beasley Creek; elevation 4,640 feet.

There is no station mark, but the point is unmistakable as the sides of the pinnacle are always bare of snow, and from a distance it looks like a cairn on the snow summit; the pinnacle is about 75 feet high and comes to a sharp point, which allows only room to set up the theodolite.

Station A (Alaska, Russell Fiord; Fremont Morse, 1906). About $2\frac{1}{2}$ miles easterly from the mouth of Beasley Creek at the southeastern end of Russell Fiord; on the highest bald knob of the ridge; elevation 3,380 feet.

Station mark: a 4-foot cairn.

Mount Hoorts (Alaska, Yakutat Bay; U.S. Coast and Geodetic Survey, 1892; Fremont Morse, 1906). About a mile easterly from the mouth of the creek emptying into Yakutat Bay opposite the north end of Knight Island; on the westerly shoulder of the mountain north of the creek; elevation 2,100 feet.

Station mark: a bottle filled with earth standing in the ground under a 5-foot cairn.

Ocean Cape 2 (Alaska, Yakutat Bay; Fremont Morse, 1906). On the neck of the peninsula at the southeast of the entrance to Yakutat Bay; on a hill about 107 feet above high-water mark.

To reach the station go up Ankau Inlet past two small islands, turn right through a narrow channel into a small bay, then go to the end of the bay, where the woods come down to a small flat of marsh grass. There is a small freshwater pond at the foot of the hill. The sea face of the hill is a cut bank.

Station mark: a $\frac{1}{2}$-inch drill-hole in a small boulder covered by a flat rock with a triangle battered on it; both buried 1 foot underground under a large spruce stump. The stump, which was used as the station, was 9·0 metres high.

Malaspina southwest base (Alaska, Yakutat Bay; U.S. Coast and Geodetic Survey, 1892; Fremont Morse, 1906). About 4 miles northeasterly from Point Manby at the northern side of the entrance to Yakutat Bay; south of the mouth of Osar Stream on a natural sand levee that parallels the shore between the bay and a thick spruce forest. About 160 metres south of the station the levee turns to the right towards Point Manby; it is not on the highest point of the levee but some distance to the south, so that the base might be as long as possible, and that it might have a clear line of sight to Mount St. Elias. Lotmar Creek flows through the forest westward of the station, and an Indian camping ground is some distance away to the northeast.

Station mark: a granite post 6 inches square at the bottom, $2\frac{1}{2}$ feet high, and 4 inches square at the top, set firmly in the ground. The centre mark is a cross cut in the top of a copper bolt leaded in a drill-hole in the top. The sub-surface mark is a 10-inch granite cube, set below the surface mark, with a centre mark, a copper bolt with a cross cut in its top leaded in a drill-hole.

Malaspina northeast base (Alaska, Yakutat Bay; U.S. Coast and Geodetic Survey, 1892; Fremont Morse, 1906). On the northwesterly shore of Yakutat Bay about 9 miles northeasterly from Point Manby; on the north side of the mouth of Forney Stream, which flows out through a sand bar and is likely to shift as much as half a mile as a result of severe storms and wave action. The station is near the line of demarcation between grassy land and the wide desert-sand plain that extends northward to Kame Stream; on a small sand knoll about 15 feet across the top and 3 feet above the surrounding plain; just above the high-water mark.

Station mark: a granite post 6 inches square at the bottom, $2\frac{1}{2}$ feet high, and 4 inches square at the top, set firmly in the ground. The centre mark is a cross cut in the top of a copper bolt leaded in a drill-hole. The top of the post also has "U.S.N.B." cut in it. The sub-surface mark is a 10-inch granite cube, set below the surface mark, with a centre mark, a copper bolt with a cross in its top leaded in a drill-hole.

Malaspina middle base (Alaska, Yakutat Bay; U.S. Coast and Geodetic Survey, 1892). On the northwesterly shore of Yakutat Bay about 6 miles northeasterly from Point Manby; near and south of the bend of Forney Stream where it turns northeastward parallel with the shore; on a small knoll in the edge of bushes that line the right bank of the stream. About 80 metres southeast of the station is a dry bed of a stream or slough.

Station mark: no permanent centre mark was established. The reference mark is the centre of a cross cut deep in a large irregularly shaped granite ledge or boulder projecting from the ground 2·503 metres from the station in azimuth 214° 24′ 14″, which is the prolongation of the line from Malaspina southwest base through the station.

Yakutat Astronomical Station (Alaska, Yakutat Bay; U.S. Coast and Geodetic Survey, 1892). On the east side of the entrance to Yakutat Bay, on Khantaak Island near its south shore and on the north side of De Monti Bay. The station is on the south side of a narrow spit of land and about 2,000 feet northwest from its end, which is terminated by Turner Point. Yakutat village is about 1½ miles east-southeast of the station. The station is above high-water mark and about 100 feet west of the west shore of a lagoon.

Station mark: a pier built of brick laid in cement and topped by a capstone, squared and dressed. (No centre mark mentioned.) Reference mark A is a cross cut in a large boulder, which appears as a rocky islet in the lagoon, 87·62 metres from the station in azimuth 311° 42′ 12″. Reference mark B is a cross cut in a boulder near the north edge of the lagoon, 117·81 metres from the station in azimuth 197° 18′ 30″.

Mount Hendricksen (Alaska, Yakutat Bay; Fremont Morse, 1906). About midway on the peninsula between Yakutat Bay and Russell Fiord, about 4½ miles from each shore; on a sharp mountain top of broken slate rock steep down on the south side and snow covered to the northwest; elevation 4,590 feet.

Station mark: a 6-foot cairn.

Mad (Alaska, Russell Fiord; Fremont Morse, 1906). On the east side of Russell Fiord between Nunatak Fiord and Hidden Glacier; on a gravel point close to the snow-covered ridge and about 50 feet from the top; elevation 2,780 feet.

Station mark: a wooden plug marked in the centre with a nail under a 4-foot cairn.

Long (Alaska, Russell Fiord; Fremont Morse, 1906). About 2 miles from the west shore of Russell Fiord 2 miles above Cape Enchantment opposite Nunatak Fiord; on the west flat end of the mountain. The mountain has three peaks, the middle and highest being sharp, and the station is on the west flat one; elevation 3,530 feet.

Station mark: a drill-hole about one-quarter inch deep in a rock under a cairn.

Easy (Alaska, Russell Fiord; Fremont Morse, 1906). About 1 mile east of the east shore of Russell Fiord on the first summit above the entrance to Nunatak Glacier; about 2 miles above the entrance. The summit is elongated in an east and west direction, and the station is about the middle of the length of the ridge, but about 35 feet down on the south side. The elevation of the station is 1,590 feet.

Station mark: a bottle set with its top about level with the surface of the ground under a cairn. Witness mark No. 1 is a cross cut in the west slope of the rock distant 16 feet in azimuth about 210°. Witness mark No. 2 is a cross cut in the rock distant 16·67 feet in azimuth about 100°.

Boundary Point 172 (*See* p. 176).

Gay (Alaska, Alsek River; H. S. Mussell, 1912). About 18 miles west of Alsek River; a rock knob on the first prominent shoulder on the northwesterly corner of the long ridge about 7 miles westerly from the upper end of the prominent nunatak between Vernritchie and Battle Glaciers; elevation 4,835 feet.

Station mark: a 4-foot cairn.

Worm (Alaska, Alsek River; H. S. Mussell, 1912). About 14 miles west of Alsek River; on the low knob about 2 miles northerly from the eastern extremity of the above ridge; elevation 3,665 feet.

Station mark: a 4-foot cairn.

Coffee (Alaska, Alsek River; H. S. Mussell, 1912). About 9 miles west of Alsek River; on the westerly shoulder of the prominent nunatak between the Vernritchie and Battle Glaciers; elevation 3,765 feet.

Station mark: a 4-foot cairn.

Boundary Point 173 (*See* p. 178).

Boundary Point 174 (*See* p. 178).

Boundary Point 175 (*See* p. 178).

Boundary Point 176 (*See* p. 178).

Boundary Point 177 (*See* p. 178).

Boundary Point 178 (*See* p. 178).

Cultus (Alaska, Russell Fiord; W. M. Dennis, 1911). A snow station on the southwest shoulder leading up to Mount Jette (B.P. 177), just to the northwest of a small divide between the Variegated Glacier and the glacier flowing to the south. Ascent should be made from the Variegated Glacier.

Station mark: probably a small cairn.

Boundary Point 179 (*See* p. 178).

Boundary Point 180 (*See* p. 178).

Boundary Point 181 (*See* p. 178).

Boundary Point 182 (*See* p. 178).

Boundary Point 183 (*See* p. 178).

Boundary Point 185 (*See* p. 180).

Boundary Point 186 (*See* p. 180).

She (Alaska, Disenchantment Bay; H. S. Mussell, 1911). On a rock-topped mountain south of Dome Pass, the most easterly peak on the northern side of the Samovar Hills; elevation 5,720 feet. Ascent should be made by the ridge up from the east.
Station mark: a 5-foot cairn.

Shell (Alaska, Disenchantment Bay; H. S. Mussell, 1911). On a rock-topped mountain at the extreme western end of the Pinnacle Pass Hills (an extension of the Hitchcock Hills) overlooking Seward Glacier; elevation 5,520 feet. Ascent should be made by first following up the ridge from Seward Glacier past the shaft, and then completing the ascent from the east.
Station mark: a 5-foot cairn. There is a coal seam about 30 feet west of the station.

Boundary Point 184 (*See* p. 180).

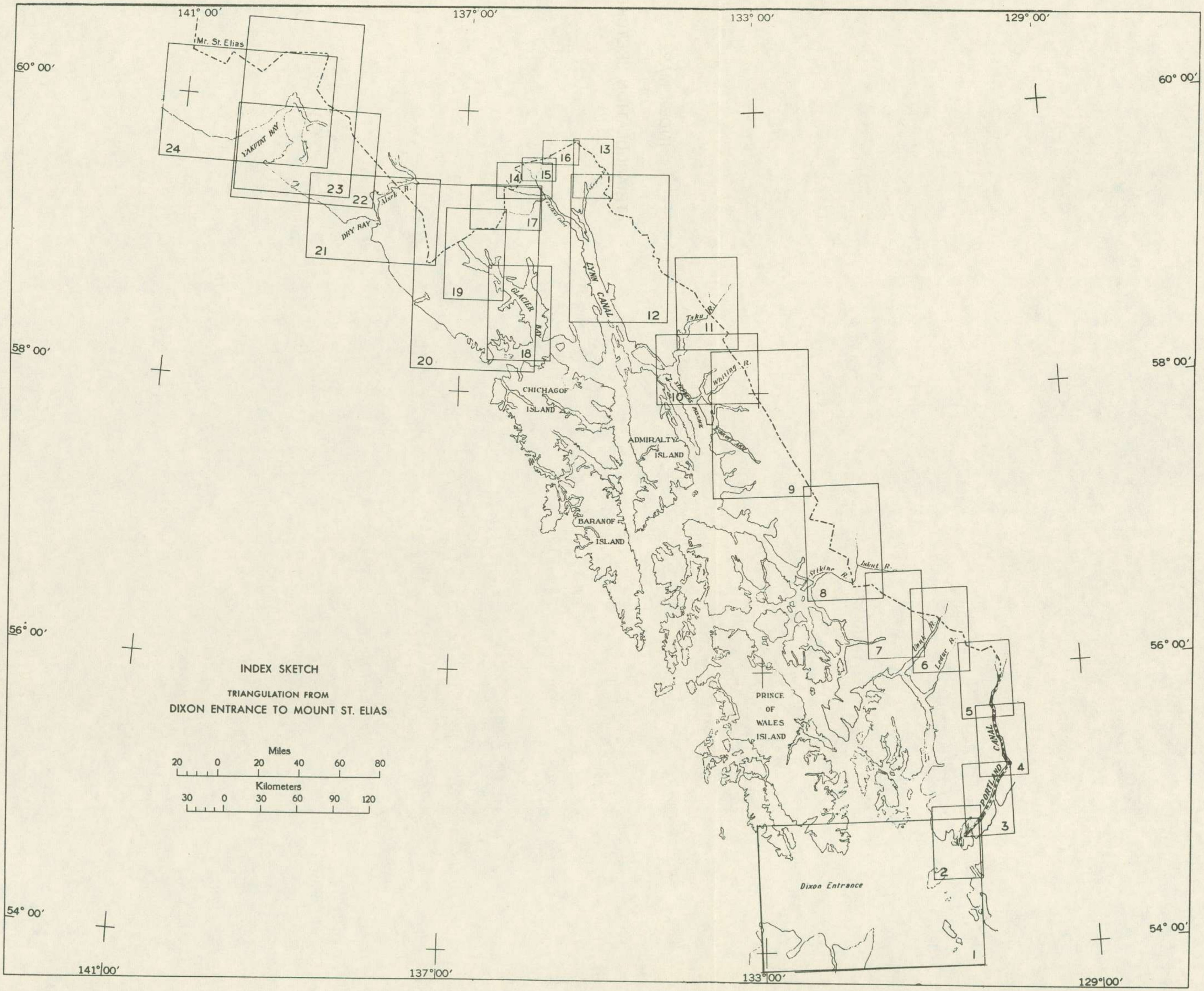
Steve (Alaska, Disenchantment Bay; H. S. Mussell, 1911). About 600 feet above the ice on the southerly tip of the shoulder of Mount Augusta, which projects into Seward Glacier between Augusta and Cascade Glaciers; elevation 4,190 feet.
Station mark: a 4-foot cairn.

Bean (Alaska, Disenchantment Bay; H. S. Mussell, 1911). On a rock-topped peak on the southeastern spur of the Samovar Hills; elevation 4,270 feet. Ascent can be made from either Malaspina Glacier or Seward Glacier.
Station mark: a 4-foot cairn.

INDEX TO BOUNDARY POINTS, REFERENCE MONUMENTS, AND TRIANGULATION STATIONS

GENERAL INDEX

EDMOND CLOUTIER, C.M.G., O.A., D.S.P.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1952


INDEX SKETCH
TRIANGULATION FROM
DIXON ENTRANCE TO MOUNT ST. ELIAS
Miles
20 0 20 40 60 80
Kilometers
30 0 30 60 90 120
141° 00′
137° 00′
133° 00′
129° 00′
60° 00′
58° 00′
56° 00′
54° 00′
Mt. St. Elias
YAKUTAT BAY
DRY BAY
LYNN CANAL
GLACIER BAY
Taku R.
Whiting R.
Stikine R.
Iskut R.
Unuk R.
Leduc R.
CHICHAGOF ISLAND
ADMIRALTY ISLAND
BARANOF ISLAND
PRINCE OF WALES ISLAND
PORTLAND CANAL
Dixon Entrance
1
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4
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6
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8
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10
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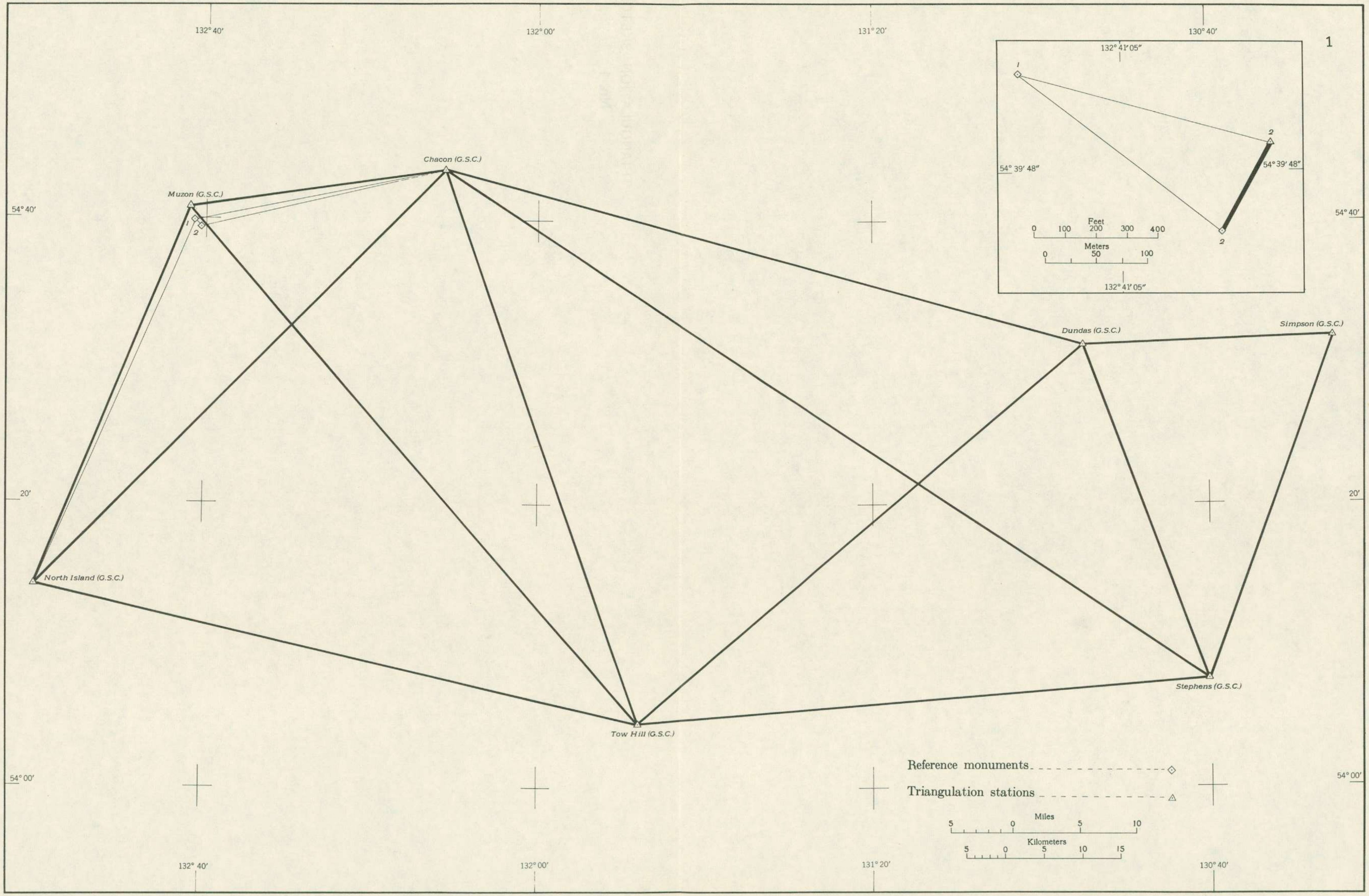
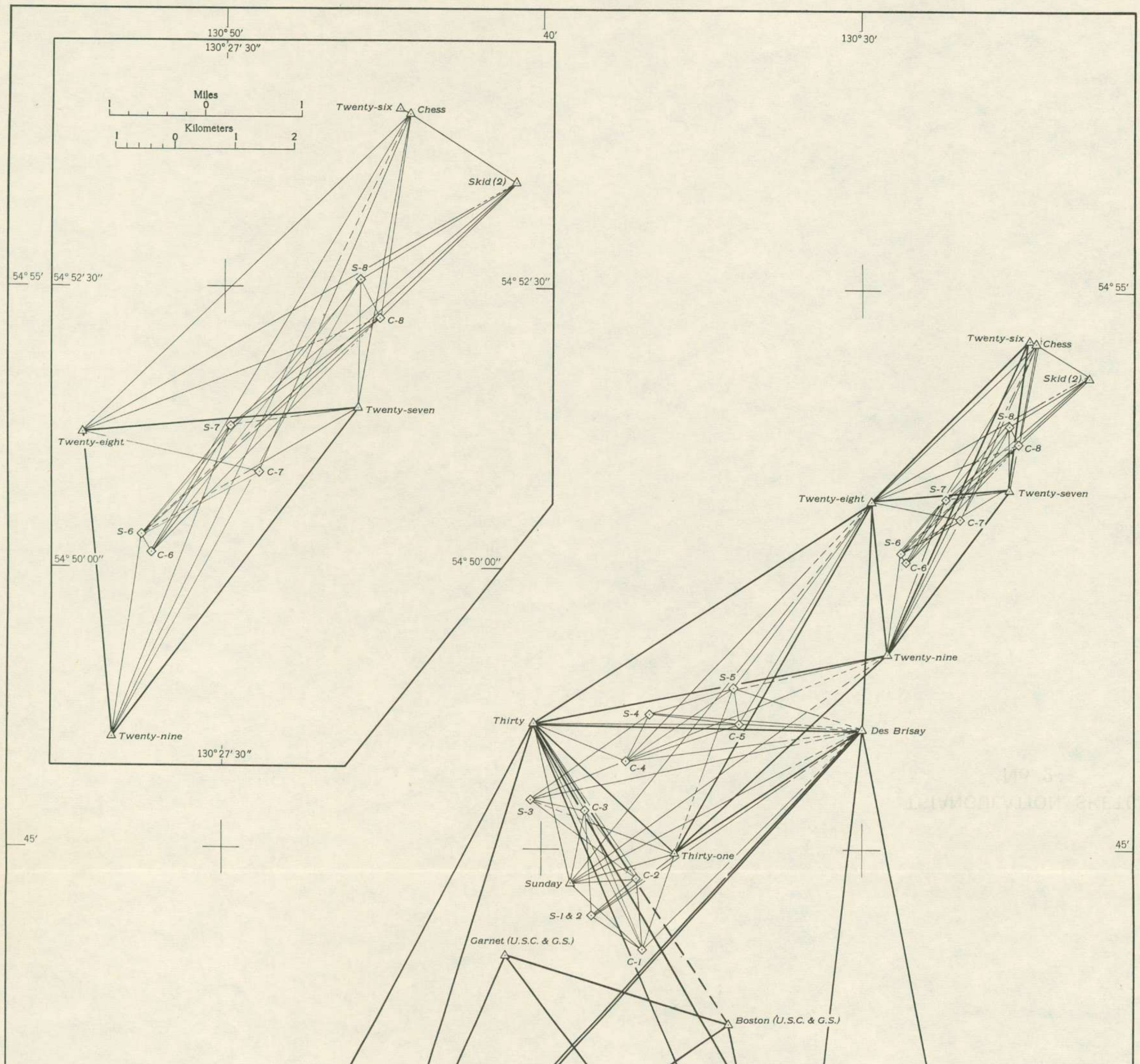
17
18
19
20
21
22
23
24

INDEX MAP
OF
TRIANGULATION SKETCHES



1
132° 40′
132° 00′
131° 20′
130° 40′
54° 40′
20′
54° 00′
Muzon (G.S.C.)
Chacon (G.S.C.)
North Island (G.S.C.)
Tow Hill (G.S.C.)
Dundas (G.S.C.)
Simpson (G.S.C.)
Stephens (G.S.C.)
132° 41′ 05″
54° 39′ 48″
Feet
0 100 200 300 400
Meters
0 50 100
Reference monuments
Triangulation stations
Miles
5 0 5 10
Kilometers
5 0 5 10 15

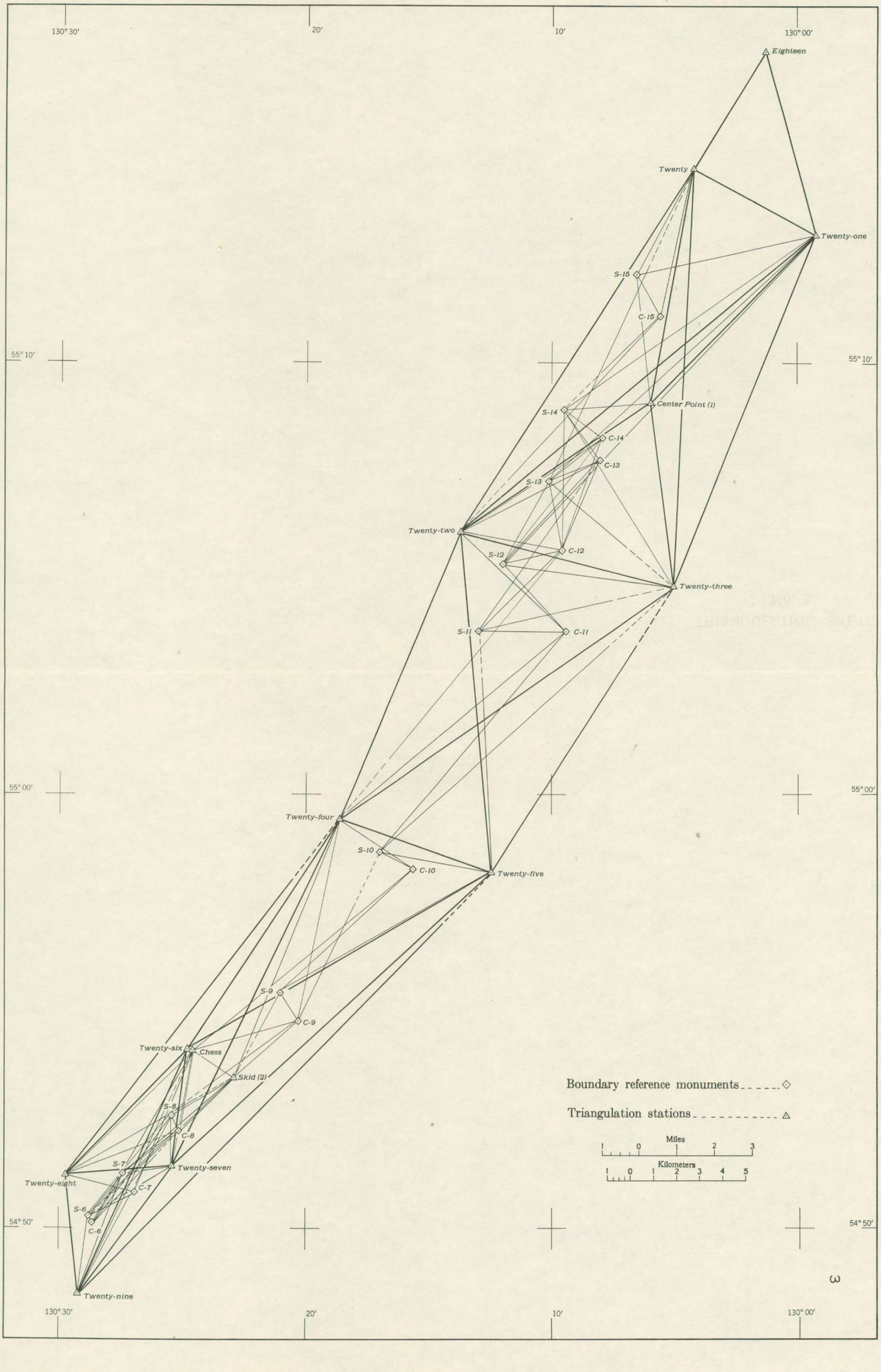
TRIANGULATION SKETCH
No. 1



130° 50′
130° 27′ 30″
40′
130° 30′
Miles
Kilometers
Twenty-six
Chess
Skid (2)
S-8
C-8
Twenty-seven
Twenty-eight
S-7
C-7
S-6
C-6
Twenty-nine
54° 55′
54° 52′ 30″
54° 50′ 00″
45′
54° 35′
Thirty
S-5
S-4
C-5
C-4
Des Brisay
S-3
C-3
Thirty-one
Sunday
C-2
S-1 & 2
C-1
Garnet (U.S.C. & G.S.)
Boston (U.S.C. & G.S.)
Whitly (U.S.C. & G.S.)
Pointers (1913)
Boundary reference monuments
Triangulation stations
Dundas (G.S.C.)
Simpson (G.S.C.)

2

TRIANGULATION SKETCH
No. 2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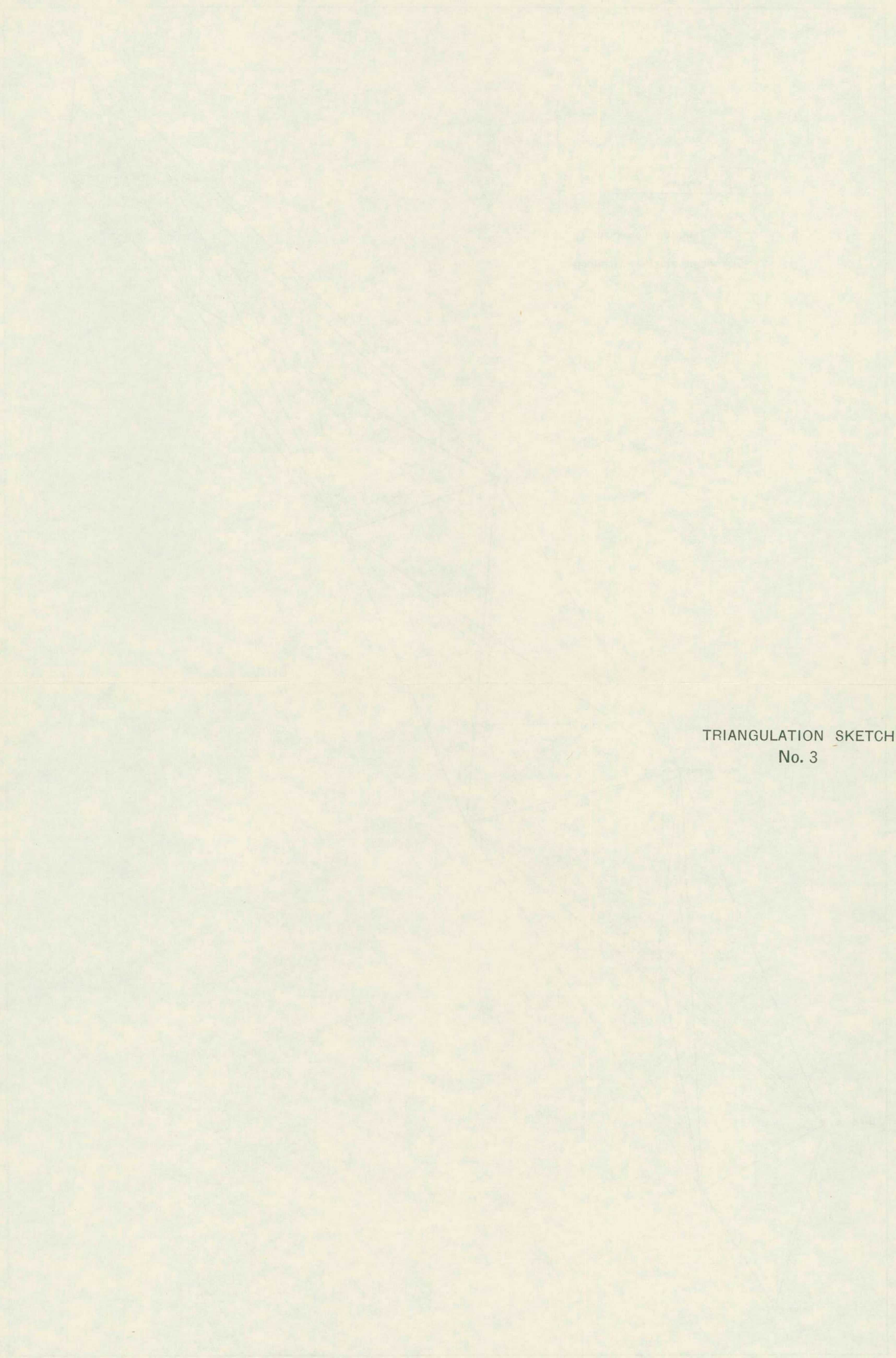
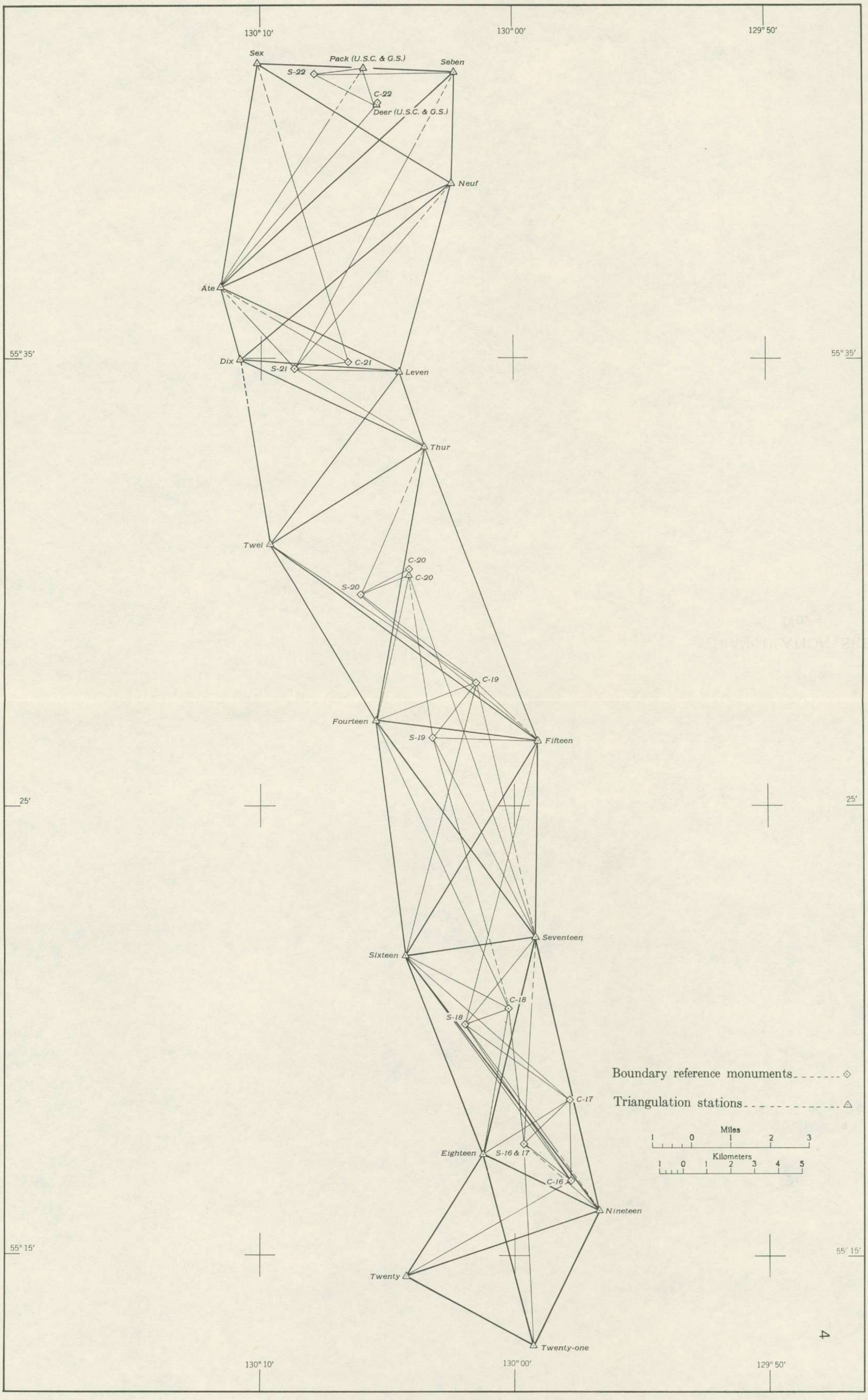
20′
10′
130° 00′
55° 10′
55° 00′
54° 50′
Eighteen
Twenty
Twenty-one
S-15
C-15
Center Point (1)
S-14
C-14
C-13
S-13
Twenty-two
S-12
C-12
Twenty-three
S-11
C-11
Twenty-four
S-10
C-10
Twenty-five
S-9
C-9
Twenty-six
Chess
Skid (2)
S-8
C-8
S-7
Twenty-seven
Twenty-eight
C-7
S-6
C-6
Twenty-nine
Boundary reference monuments
Triangulation stations
Miles
1 0 1 2 3
Kilometers
1 0 1 2 3 4 5

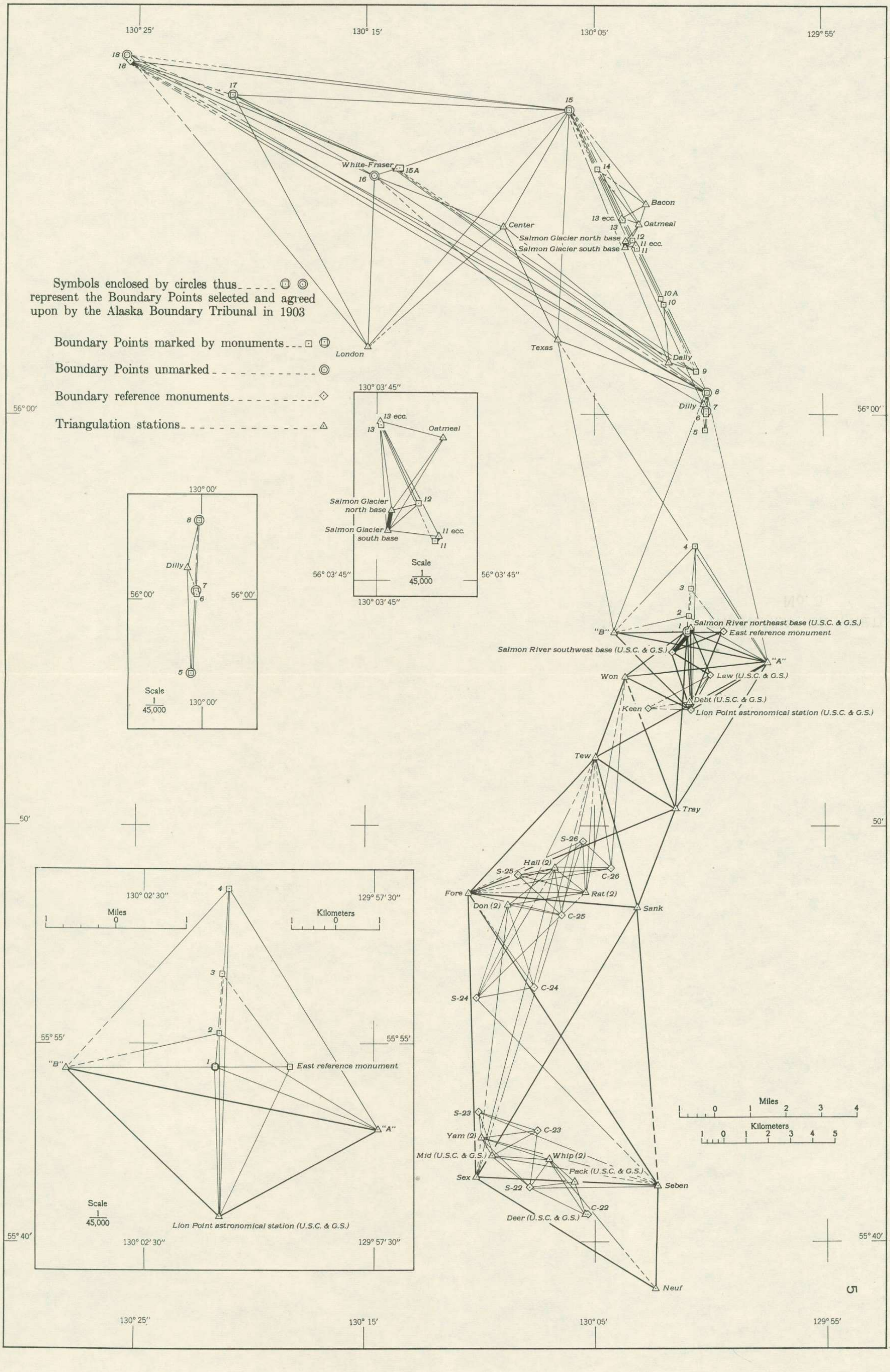


TRIANGULATION SKETCH
No. 3



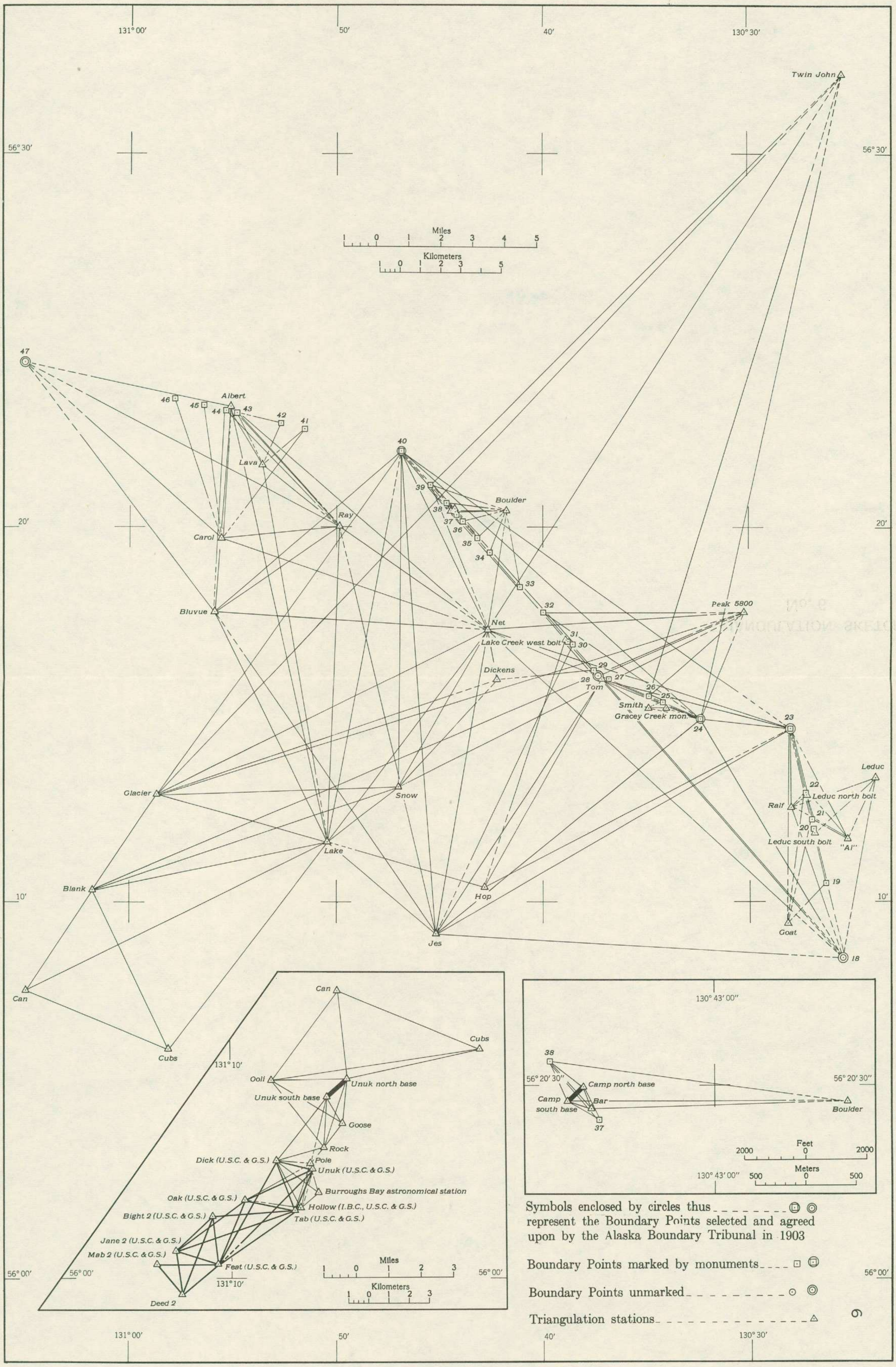
130° 10′
130° 00′
129° 50′
Sex
Pack (U.S.C. & G.S.)
Seben
S-22
C-22
Deer (U.S.C. & G.S.)
Neuf
Ate
Dix
S-21
C-21
Leven
55° 35′
Thur
Twel
C-20
C-20
S-20
C-19
Fourteen
S-19
Fifteen
25′
Seventeen
Sixteen
C-18
S-18
Boundary reference monuments
Triangulation stations
Miles
Kilometers
C-17
Eighteen
S-16 & 17
C-16
Nineteen
55° 15′
Twenty
Twenty-one

TRIANGULATION SKETCH
No. 4



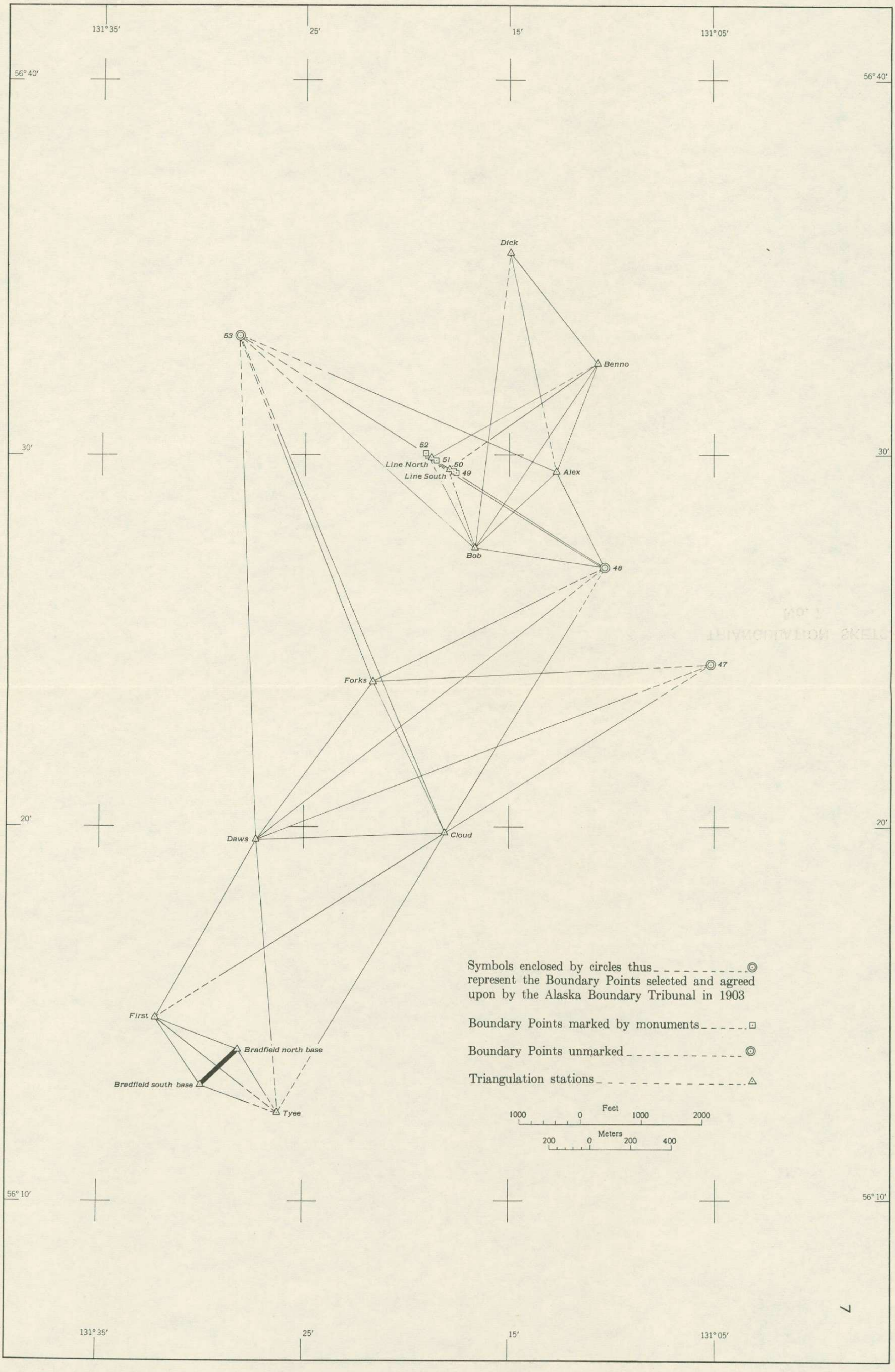
130° 25′
130° 15′
130° 05′
129° 55′
56° 00′
50′
55° 40′
Symbols enclosed by circles thus represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Boundary reference monuments
Triangulation stations
18
17
15
15 A
16
White-Fraser
14
Bacon
13 ecc.
13
Oatmeal
Center
Salmon Glacier north base
Salmon Glacier south base
12
11 ecc.
11
10 A
10
London
Texas
Dally
9
8
Dilly
7
6
5
130° 03′ 45″
56° 03′ 45″
Salmon Glacier north base
Salmon Glacier south base
Scale 1/45,000
130° 00′
56° 00′
4
3
2
1
"B"
Salmon River northeast base (U.S.C. & G.S.)
East reference monument
Salmon River southwest base (U.S.C. & G.S.)
"A"
Won
Law (U.S.C. & G.S.)
Keen
Debt (U.S.C. & G.S.)
Lion Point astronomical station (U.S.C. & G.S.)
Tew
Tray
S-26
Hall (2)
S-25
C-26
Fore
Rat (2)
Don (2)
C-25
Sank
C-24
S-24
S-23
C-23
Yam (2)
Mid (U.S.C. & G.S.)
Whip (2)
Sex
Pack (U.S.C. & G.S.)
S-22
Seben
C-22
Deer (U.S.C. & G.S.)
Neuf
Miles
1 0 1 2 3 4
Kilometers
1 0 1 2 3 4 5
130° 02′ 30″
129° 57′ 30″
55° 55′
Miles
Kilometers
0
East reference monument
Lion Point astronomical station (U.S.C. & G.S.)

TRIANGULATION SKETCH
No. 5

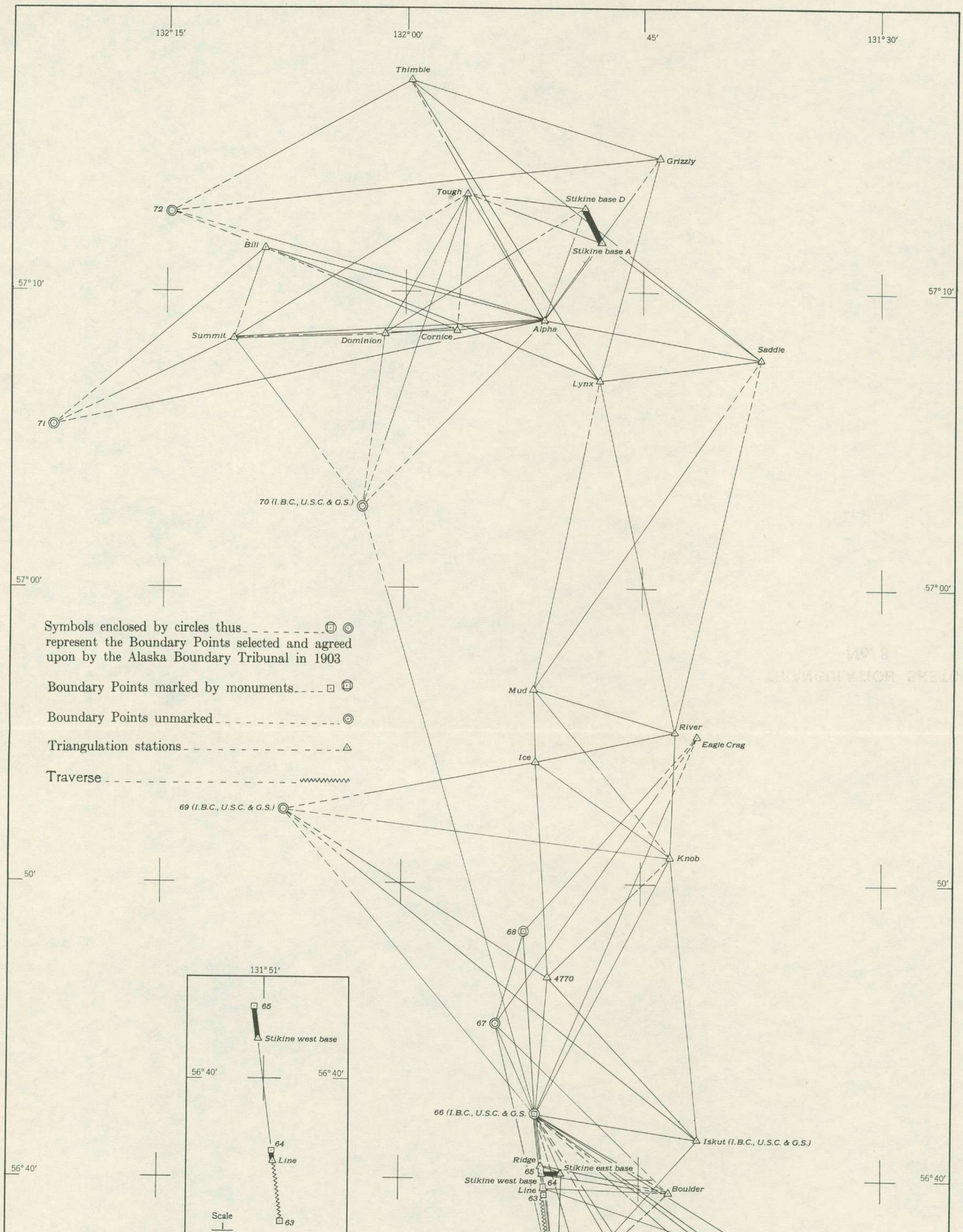


131° 00′
50′
40′
130° 30′
56° 30′
20′
10′
56° 00′
Miles
1 0 1 2 3 4 5
Kilometers
1 0 1 2 3 5
Twin John
47
46
45
44
Albert
43
42
41
Lava
40
39
38
37
36
35
34
33
Boulder
Ray
Carol
Bluvue
32
Peak 5800
Net
31
Lake Creek west bolt
30
29
28
Tom
27
Dickens
26
25
Smith
Gracey Creek mon.
24
23
Leduc
22
Leduc north bolt
Ralf
21
20
Leduc south bolt
"Al"
19
Goat
18
Glacier
Snow
Lake
Blank
Hop
Jes
Can
Cubs
131° 10′
Ooll
Unuk north base
Unuk south base
Goose
Rock
Dick (U.S.C. & G.S.)
Pole
Unuk (U.S.C. & G.S.)
Burroughs Bay astronomical station
Oak (U.S.C. & G.S.)
Hollow (I.B.C., U.S.C. & G.S.)
Tab (U.S.C. & G.S.)
Bight 2 (U.S.C. & G.S.)
Jane 2 (U.S.C. & G.S.)
Mab 2 (U.S.C. & G.S.)
Feat (U.S.C. & G.S.)
Deed 2
130° 43′ 00″
56° 20′ 30″
Camp north base
Camp south base
Bar
Boulder
Feet
2000 0 2000
Meters
500 0 500
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations

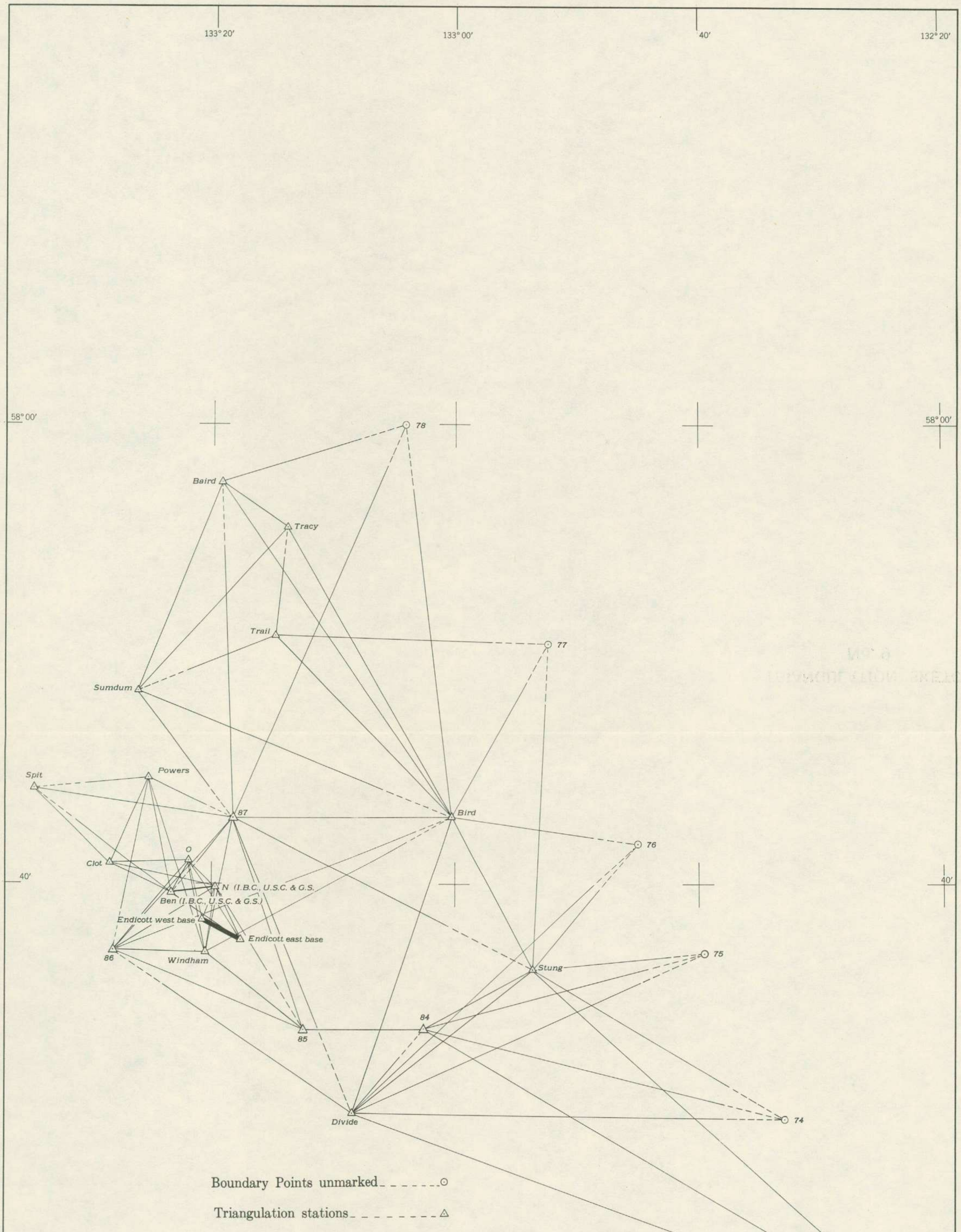
TRIANGULATION SKETCH
No. 6


131° 35′
25′
15′
131° 05′
56° 40′
56° 40′
30′
30′
20′
20′
56° 10′
56° 10′
Dick
Benno
53
52
51
50
49
Line North
Line South
Alex
Bob
48
47
Forks
Daws
Cloud
First
Bradfield north base
Bradfield south base
Tyee
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Feet
1000
0
1000
2000
Meters
200
0
200
400
7

TRIANGULATION SKETCH
No. 7

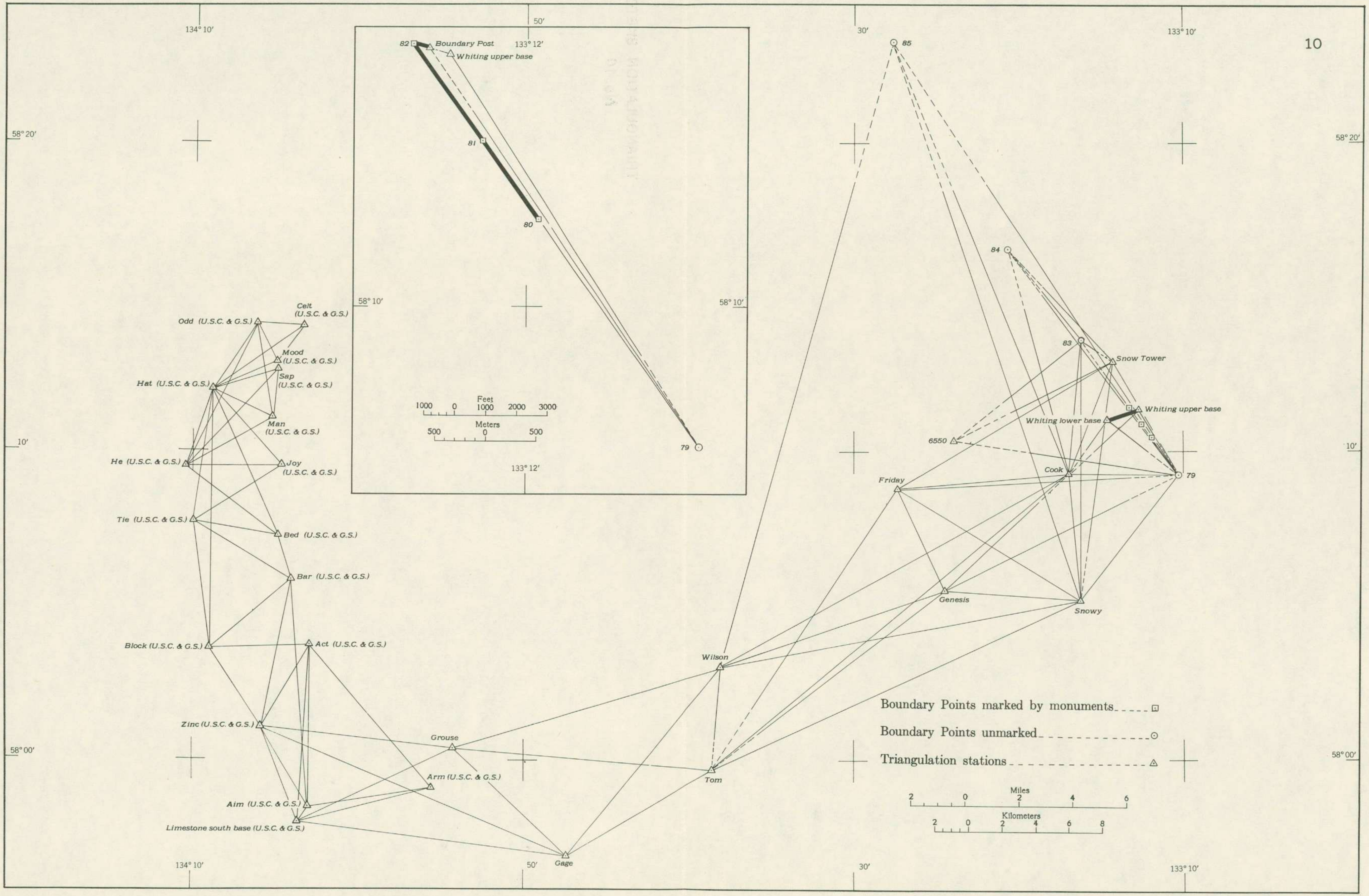

132° 15′
132° 00′
45′
131° 30′
57° 10′
57° 00′
50′
56° 40′
Thimble
Grizzly
Tough
Stikine base D
Stikine base A
72
Bill
Summit
Dominion
Cornice
Alpha
Saddle
Lynx
71
70 (I.B.C., U.S.C. & G.S.)
Symbols enclosed by circles thus represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Traverse
Mud
River
Eagle Crag
Ice
69 (I.B.C., U.S.C. & G.S.)
Knob
68
4770
67
131° 51′
65
Stikine west base
56° 40′
64
Line
63
Scale 1/15,000
66 (I.B.C., U.S.C. & G.S.)
Iskut (I.B.C., U.S.C. & G.S.)
Ridge
Stikine east base
Stikine west base
Boulder
62A
Raven
54
62 (I.B.C., U.S.C. & G.S.)
61
60
59
58
57
56
55
53
Miles
2 0 2 4 6
Kilometers
4 0 4 8
8

TRIANGULATION SKETCH
No. 8



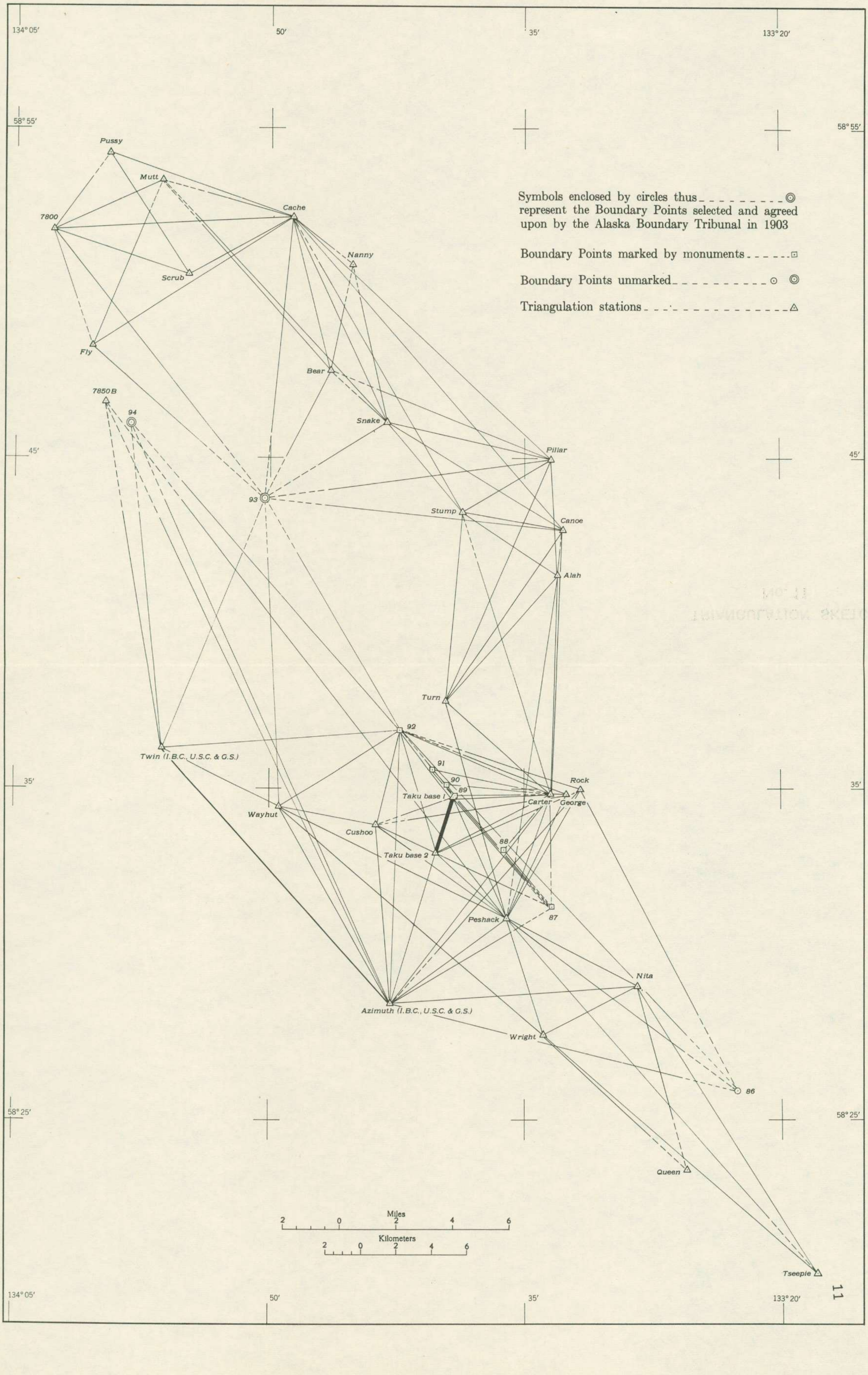
133° 20′
133° 00′
40′
132° 20′
58° 00′
40′
57° 20′
78
Baird
Tracy
Trail
77
Sumdum
Spit
Powers
87
Bird
76
Clot
O
N (I.B.C., U.S.C. & G.S.)
Ben (I.B.C., U.S.C. & G.S.)
Endicott west base
Endicott east base
86
Windham
Stung
75
84
85
Divide
74
73
Boundary Points unmarked
Triangulation stations
Miles
5
0
5
Kilometers
5
0
5
9

TRIANGULATION SKETCH
No. 9



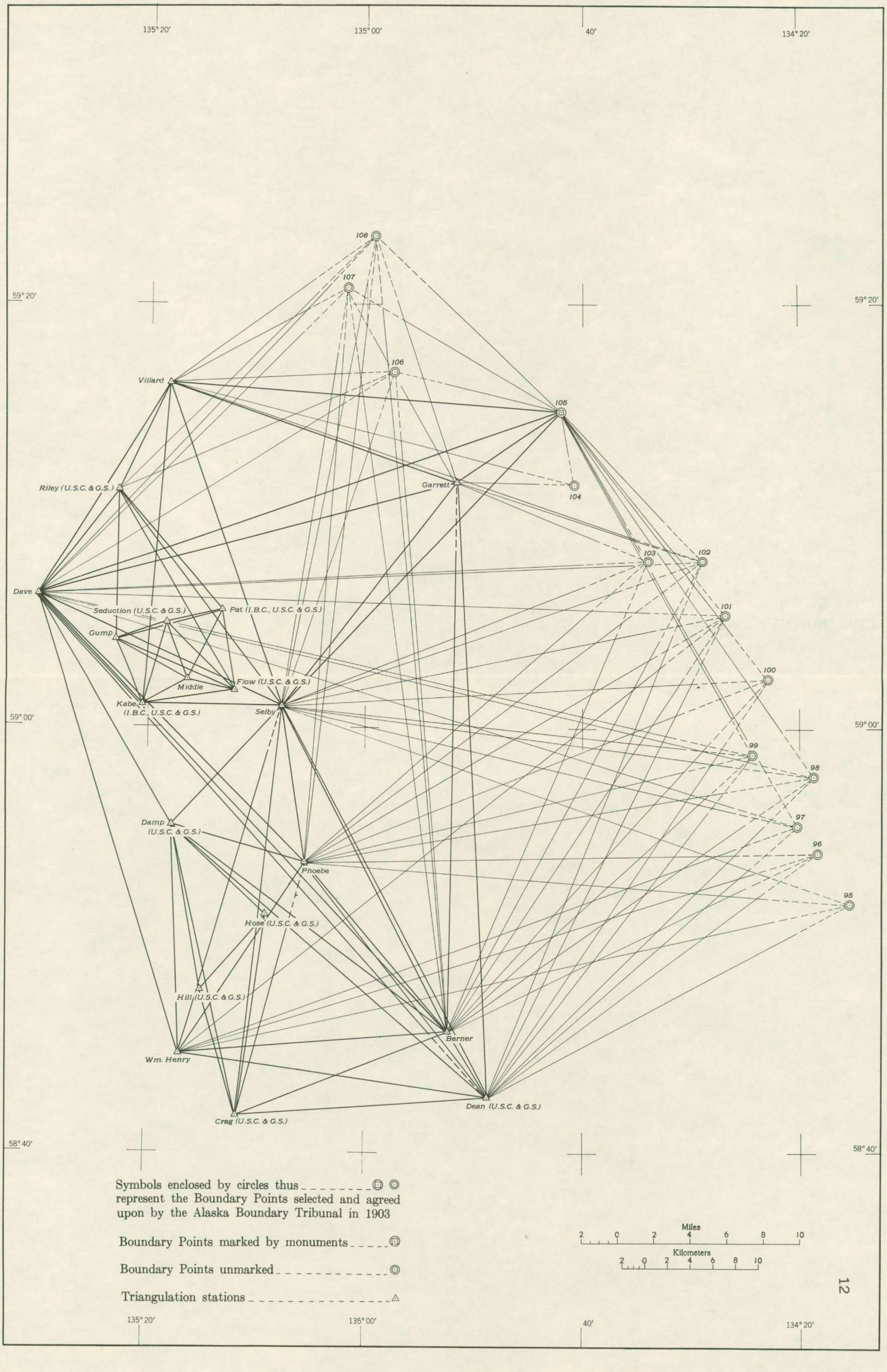
10
134° 10'
50'
30'
133° 10'
58° 20'
58° 20'
10'
10'
58° 00'
58° 00'
85
84
83
82
81
80
79
Boundary Post
Whiting upper base
133° 12'
58° 10'
58° 10'
Feet
1000 0 1000 2000 3000
Meters
500 0 500
Odd (U.S.C. & G.S.)
Celt (U.S.C. & G.S.)
Mood (U.S.C. & G.S.)
Sap (U.S.C. & G.S.)
Hat (U.S.C. & G.S.)
Man (U.S.C. & G.S.)
He (U.S.C. & G.S.)
Joy (U.S.C. & G.S.)
Tie (U.S.C. & G.S.)
Bed (U.S.C. & G.S.)
Bar (U.S.C. & G.S.)
Block (U.S.C. & G.S.)
Act (U.S.C. & G.S.)
Zinc (U.S.C. & G.S.)
Grouse
Arm (U.S.C. & G.S.)
Aim (U.S.C. & G.S.)
Limestone south base (U.S.C. & G.S.)
Gage
Wilson
Tom
Friday
Genesis
Snowy
Cook
6550
Whiting lower base
Whiting upper base
Snow Tower
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Miles
2 0 2 4 6
Kilometers
2 0 2 4 6 8

TRIANGULATION SKETCH
No. 10



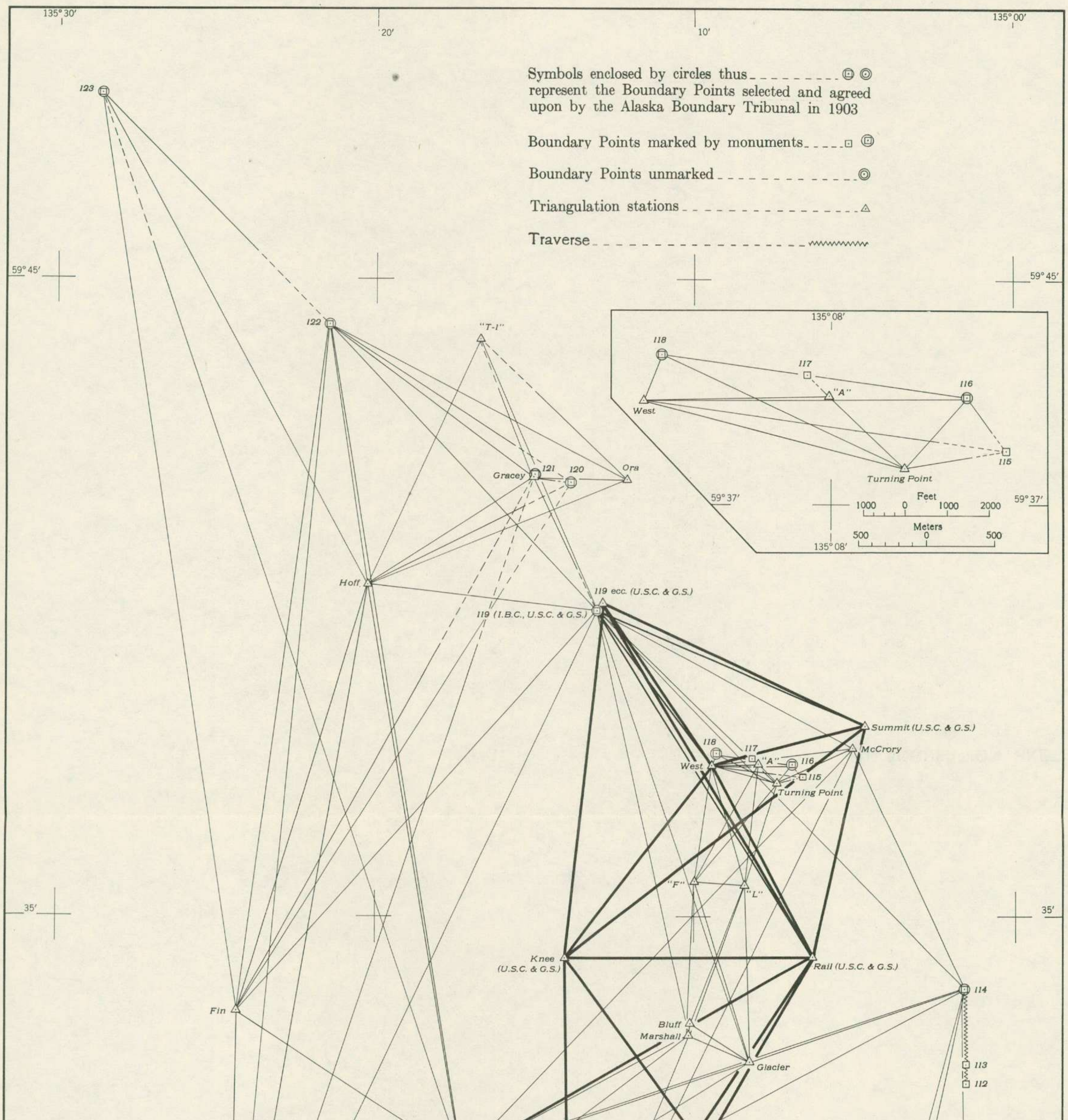
134° 05′
50′
35′
133° 20′
58° 55′
45′
35′
58° 25′
Symbols enclosed by circles thus represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Pussy
Mutt
7800
Cache
Nanny
Scrub
Fly
Bear
7850 B
94
Snake
Pillar
93
Stump
Canoe
Alah
Turn
92
Twin (I.B.C., U.S.C. & G.S.)
91
90
89
Taku base 1
Rock
Carter
George
Wayhut
Cushoo
Taku base 2
88
87
Peshack
Nita
Azimuth (I.B.C., U.S.C. & G.S.)
Wright
86
Queen
Miles
2 0 2 4 6
Kilometers
2 0 2 4 6
Tseepie

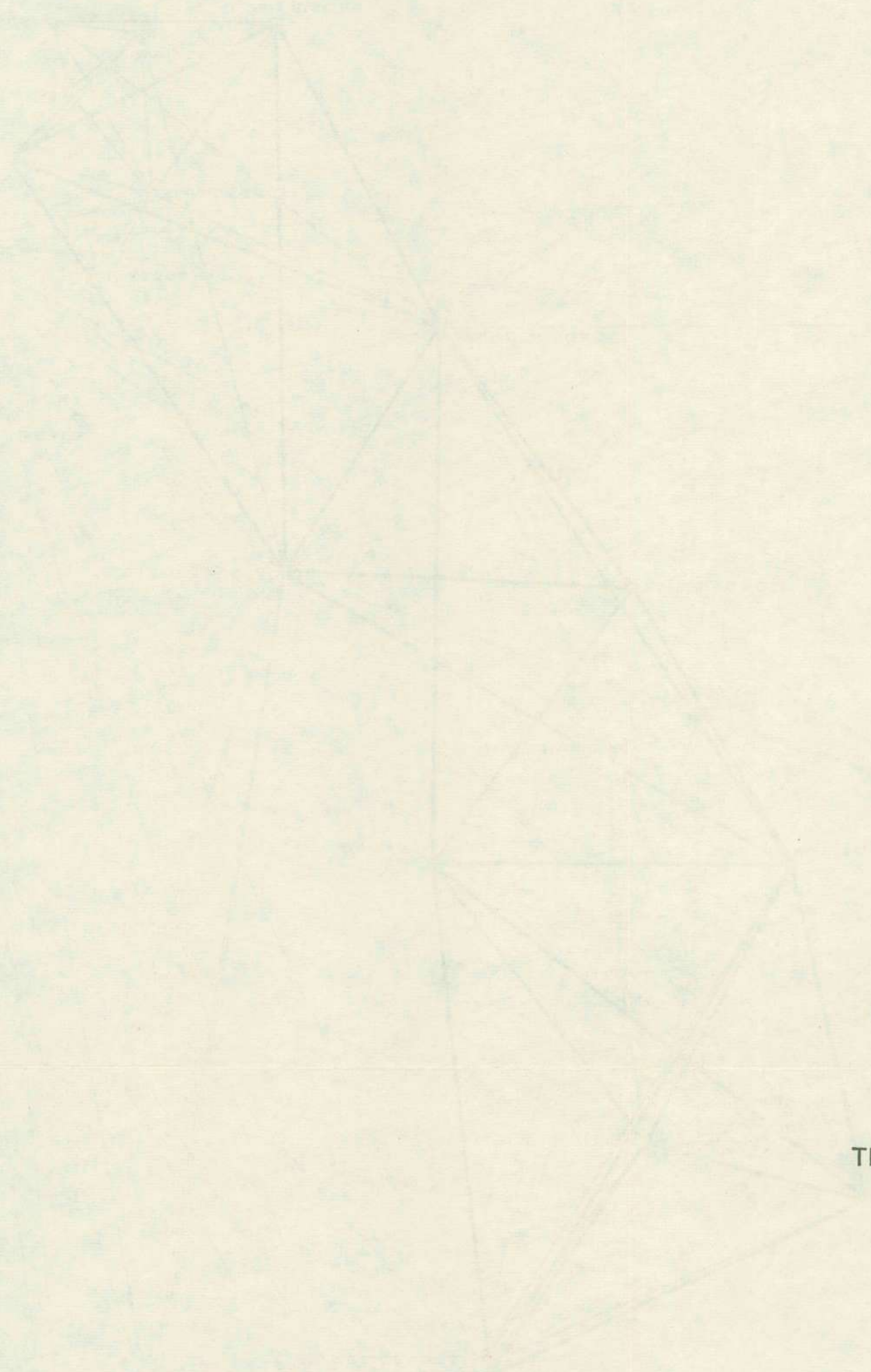
TRIANGULATION SKETCH
No. 11



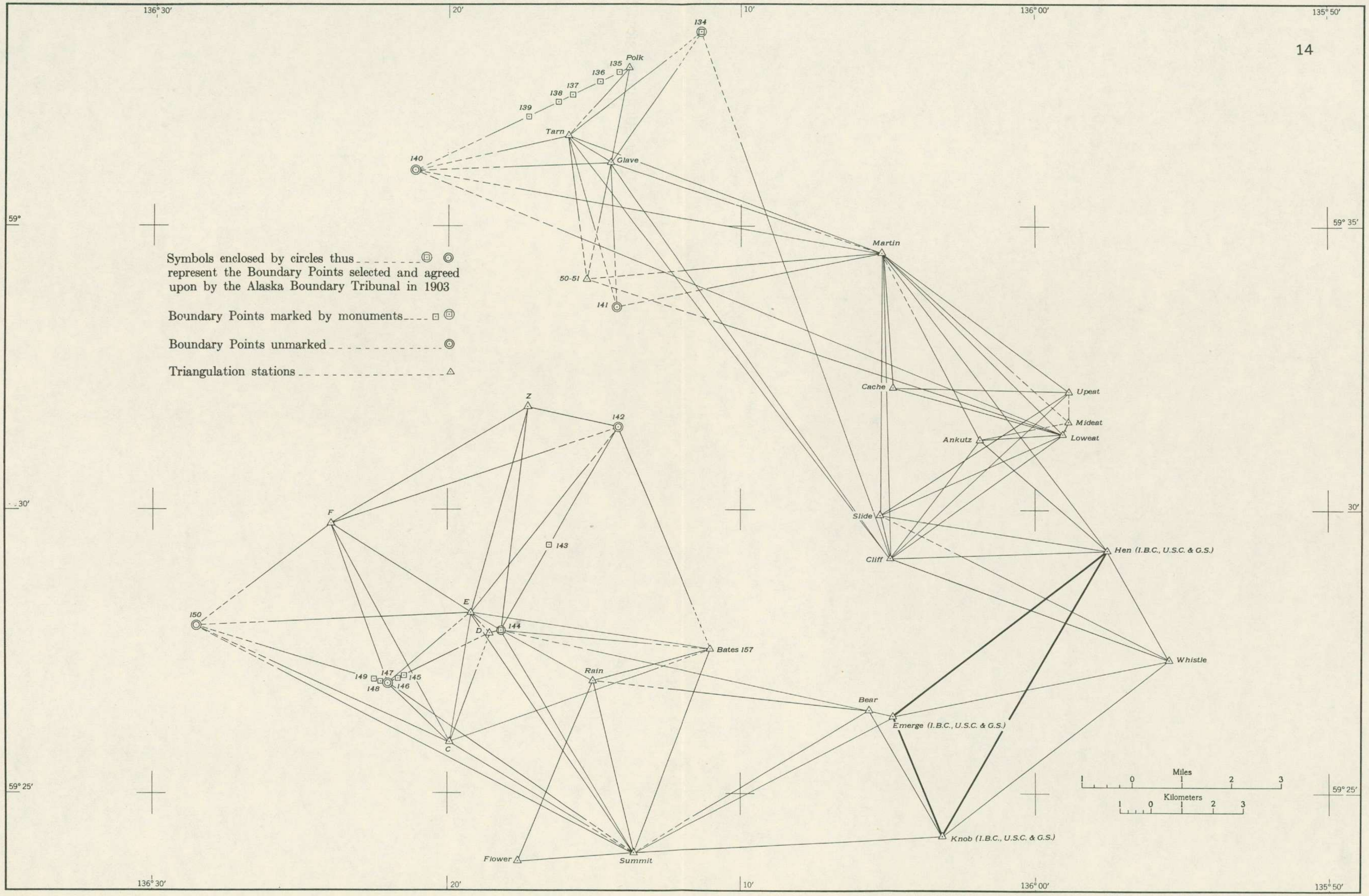
135° 20′
135° 00′
40′
134° 20′
59° 20′
59° 00′
58° 40′
108
107
106
105
104
103
102
101
100
99
98
97
96
95
Villard
Riley (U.S.C. & G.S.)
Garrett
Dave
Seduction (U.S.C. & G.S.)
Pat (I.B.C., U.S.C. & G.S.)
Gump
Middle
Flow (U.S.C. & G.S.)
Kabe
(I.B.C., U.S.C. & G.S.)
Selby
Damp
(U.S.C. & G.S.)
Phoebe
Hose (U.S.C. & G.S.)
Hill (U.S.C. & G.S.)
Berner
Wm. Henry
Dean (U.S.C. & G.S.)
Crag (U.S.C. & G.S.)
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Miles
2 0 2 4 6 8 10
Kilometers
2 0 2 4 6 8 10

TRIANGULATION SKETCH
No. 12


Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Traverse
135° 30′
20′
10′
135° 00′
59° 45′
35′
59° 25′
123
122
"T-1"
Gracey
121
120
Ora
Hoff
119 ecc. (U.S.C. & G.S.)
119 (I.B.C., U.S.C. & G.S.)
Summit (U.S.C. & G.S.)
McCrory
118
117
West
"A"
116
115
Turning Point
"F"
"L"
Knee (U.S.C. & G.S.)
Rail (U.S.C. & G.S.)
Fin
114
Bluff
Marshall
Glacier
113
112
(I.B.C., U.S.C. & G.S.) Hump
Elbow (U.S.C. & G.S.)
Flat (U.S.C. & G.S.)
Bain (I.B.C., U.S.C. & G.S.)
111
Lame (U.S.C. & G.S.)
Oskar
Sharp (U.S.C. & G.S.)
110
Tai (U.S.C. & G.S.)
Frame (U.S.C. & G.S.)
Garb (U.S.C. & G.S.)
109
Pheasant (U.S.C. & G.S.)
Skag (U.S.C. & G.S.)
135° 08′
59° 37′
Feet
1000 0 1000 2000
Meters
500 0 500
Miles
1 0 1 2 3
Kilometers
1 0 1 2 3

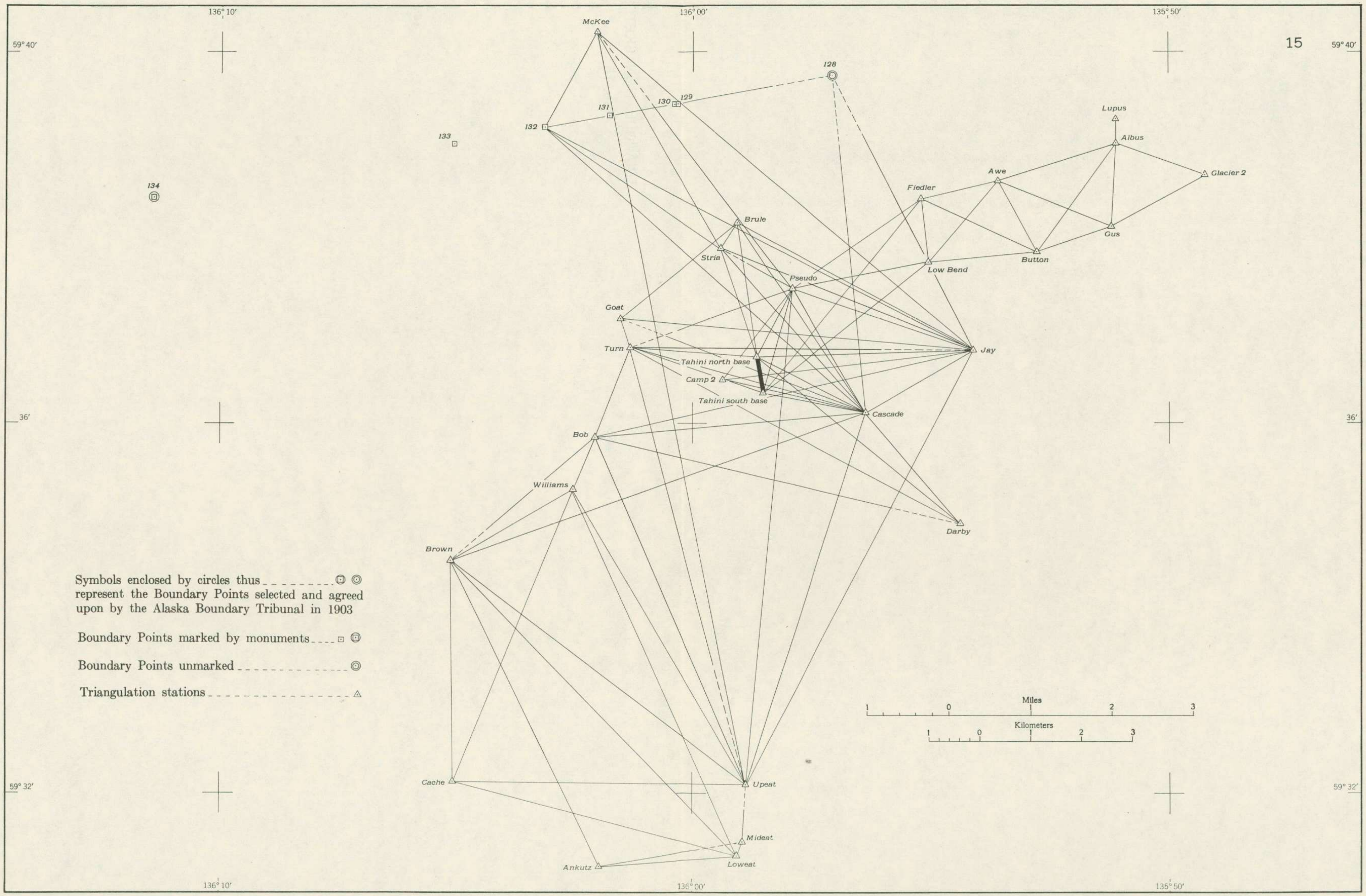


TRIANGULATION SKETCH
No. 13

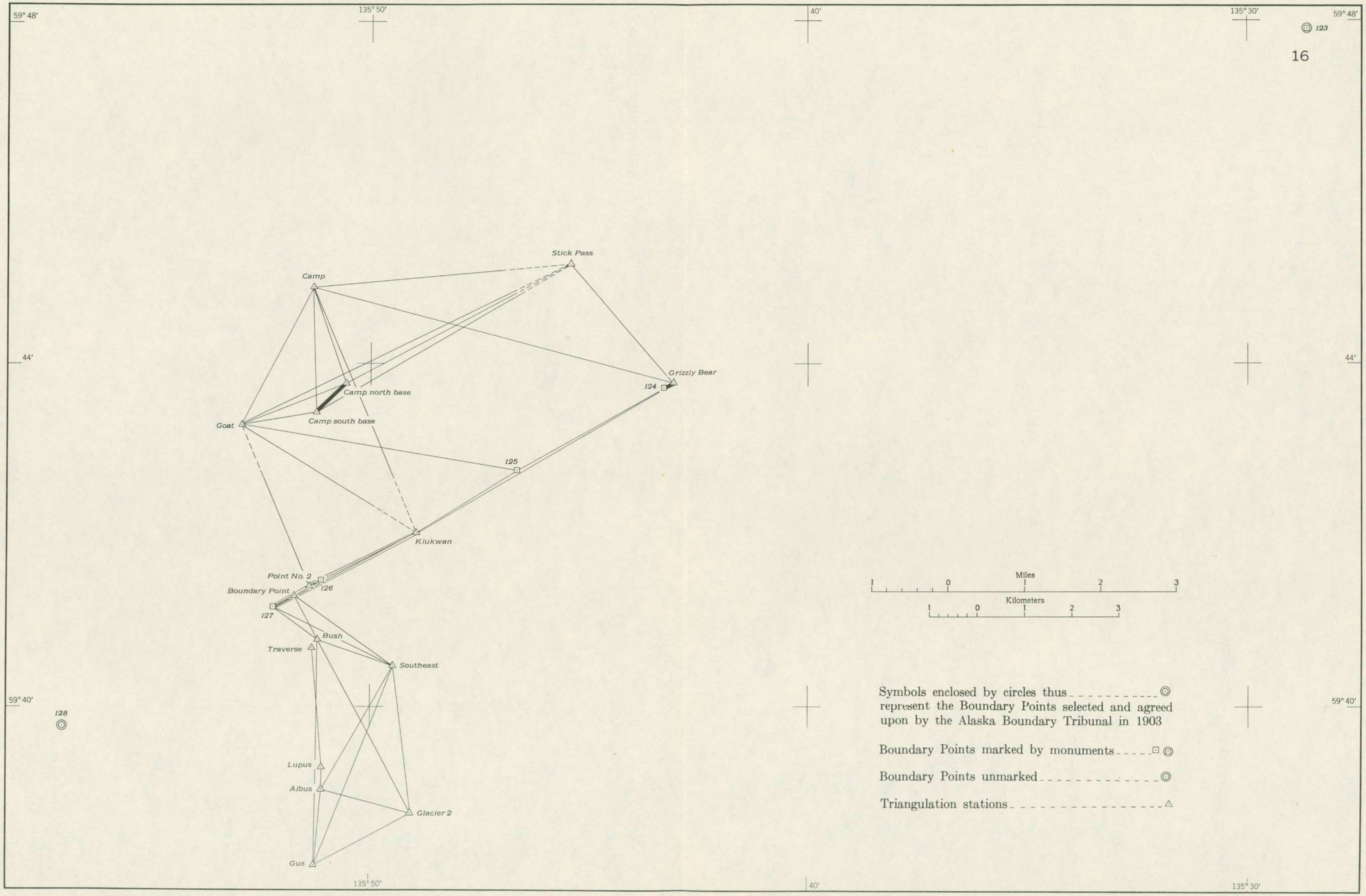


14
136° 30′
20′
10′
136° 00′
135° 50′
59°
59° 35′
30′
59° 25′
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
134
Polk
135
136
137
138
139
Tarn
140
Glave
Martin
50-51
141
Cache
Upest
Mideat
Loweat
Ankutz
Z
142
F
143
Slide
Cliff
Hen (I.B.C., U.S.C. & G.S.)
E
150
D
144
Bates 157
Whistle
149
147
145
148
146
Rain
Bear
Emerge (I.B.C., U.S.C. & G.S.)
C
Miles
1 0 1 2 3
Kilometers
1 0 1 2 3
Knob (I.B.C., U.S.C. & G.S.)
Flower
Summit

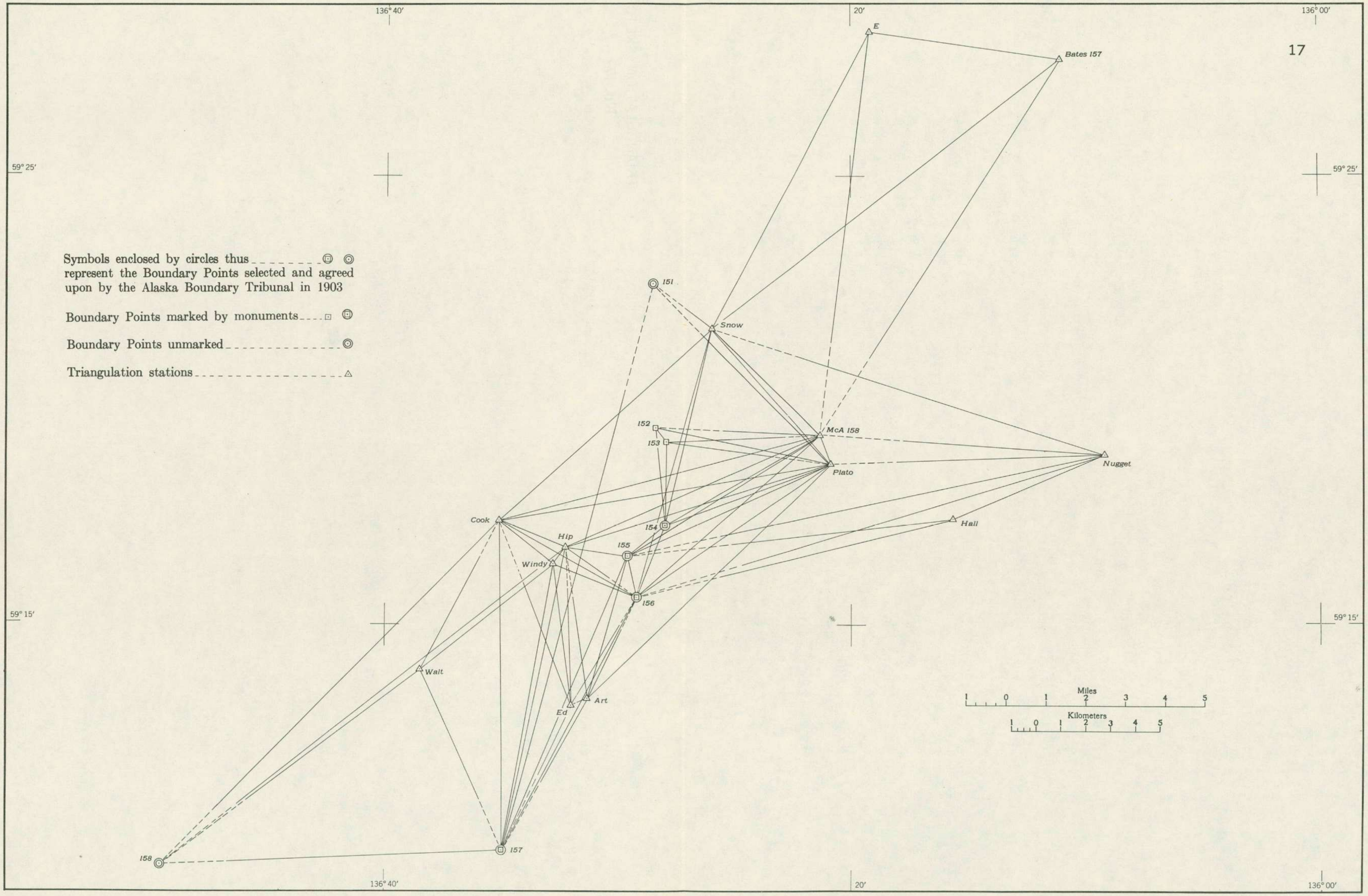
TRIANGULATION SKETCH
No. 14


15
136° 10′
136° 00′
135° 50′
59° 40′
36′
59° 32′
McKee
128
129
130
131
132
133
134
Lupus
Albus
Glacier 2
Awe
Fiedler
Gus
Brule
Stria
Button
Low Bend
Pseudo
Goat
Turn
Jay
Tahini north base
Camp 2
Tahini south base
Cascade
Bob
Williams
Darby
Brown
Cache
Upeat
Mideat
Ankutz
Loweat
Symbols enclosed by circles thus represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Miles
1 0 1 2 3
Kilometers
1 0 1 2 3

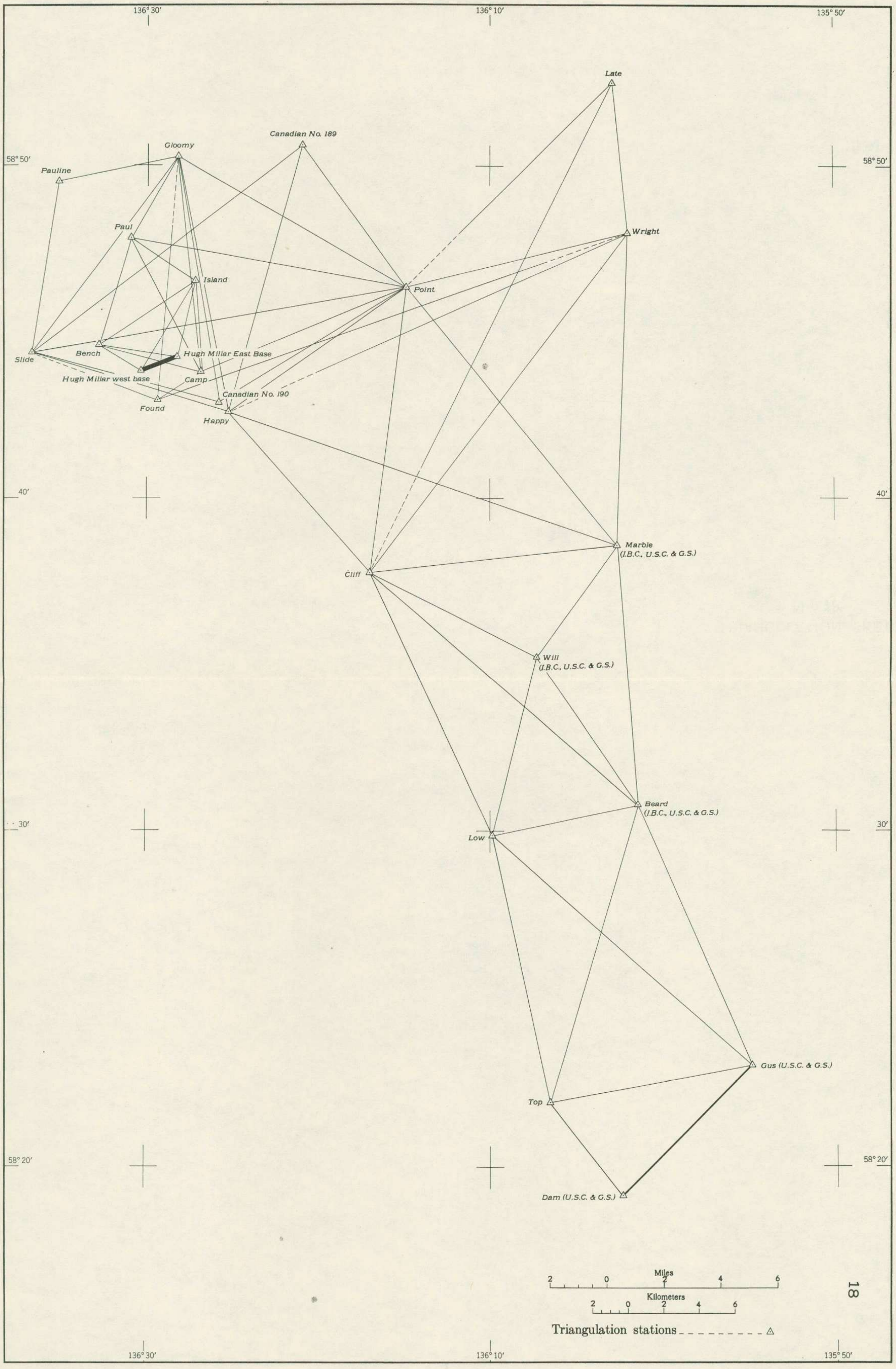
TRIANGULATION SKETCH
No. 15


59° 48′
135° 50′
40′
135° 30′
59° 48′
123
16
Stick Pass
Camp
44′
44′
Grizzly Bear
124
Camp north base
Camp south base
Goat
125
Klukwan
Point No. 2
126
Boundary Point
127
Bush
Traverse
Southeast
Miles
1 0 1 2 3
Kilometers
1 0 1 2 3
59° 40′
128
59° 40′
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Lupus
Albus
Glacier 2
Gus
135° 50′
40′
135° 30′

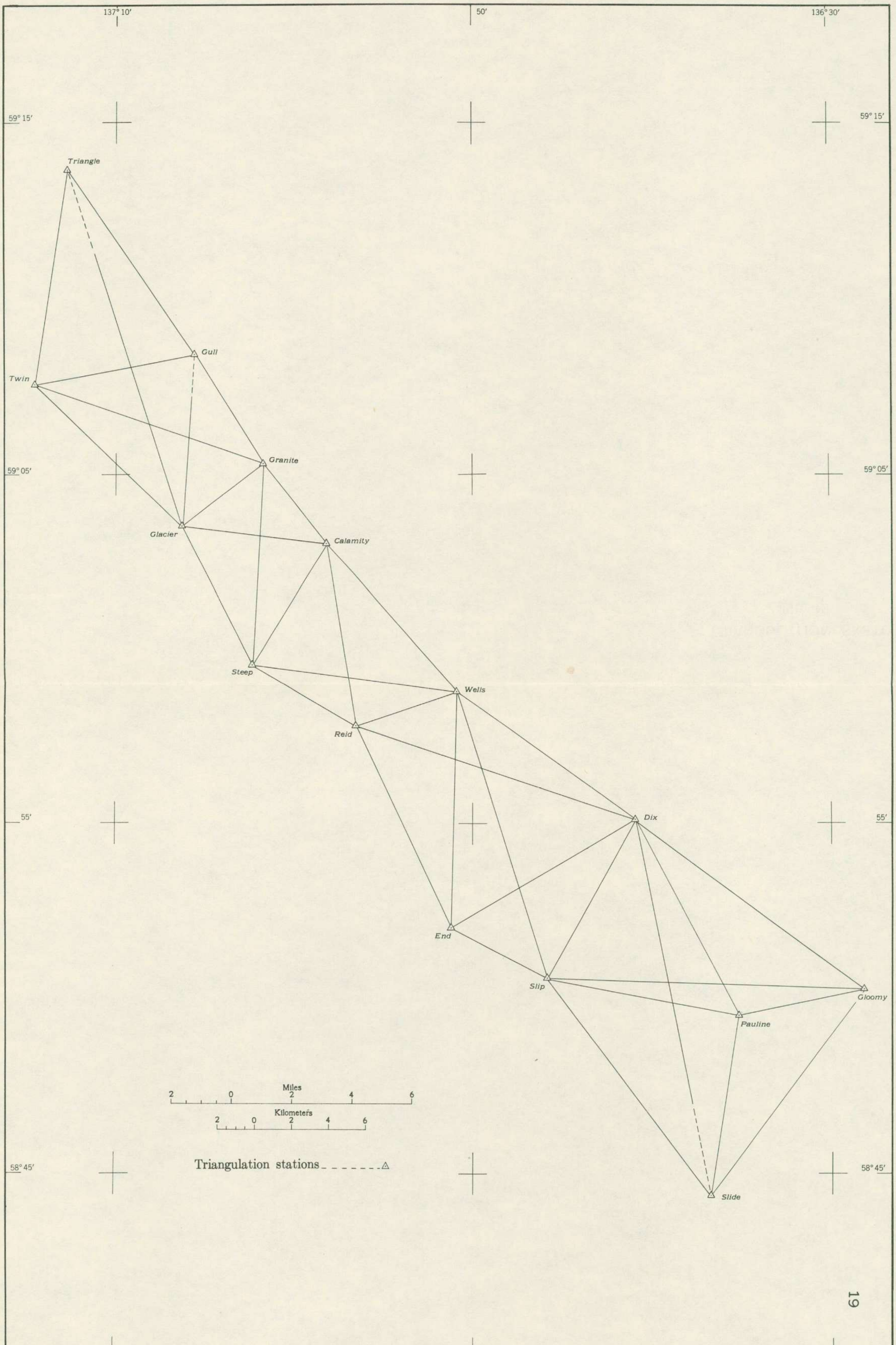
TRIANGULATION SKETCH
No. 16


136° 40′
20′
136° 00′
59° 25′
59° 15′
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
E
Bates 157
151
Snow
152
153
McA 158
Plato
Nugget
Cook
154
Hall
Hip
155
Windy
156
Walt
Ed
Art
158
157
Miles
1 0 1 2 3 4 5
Kilometers
1 0 1 2 3 4 5

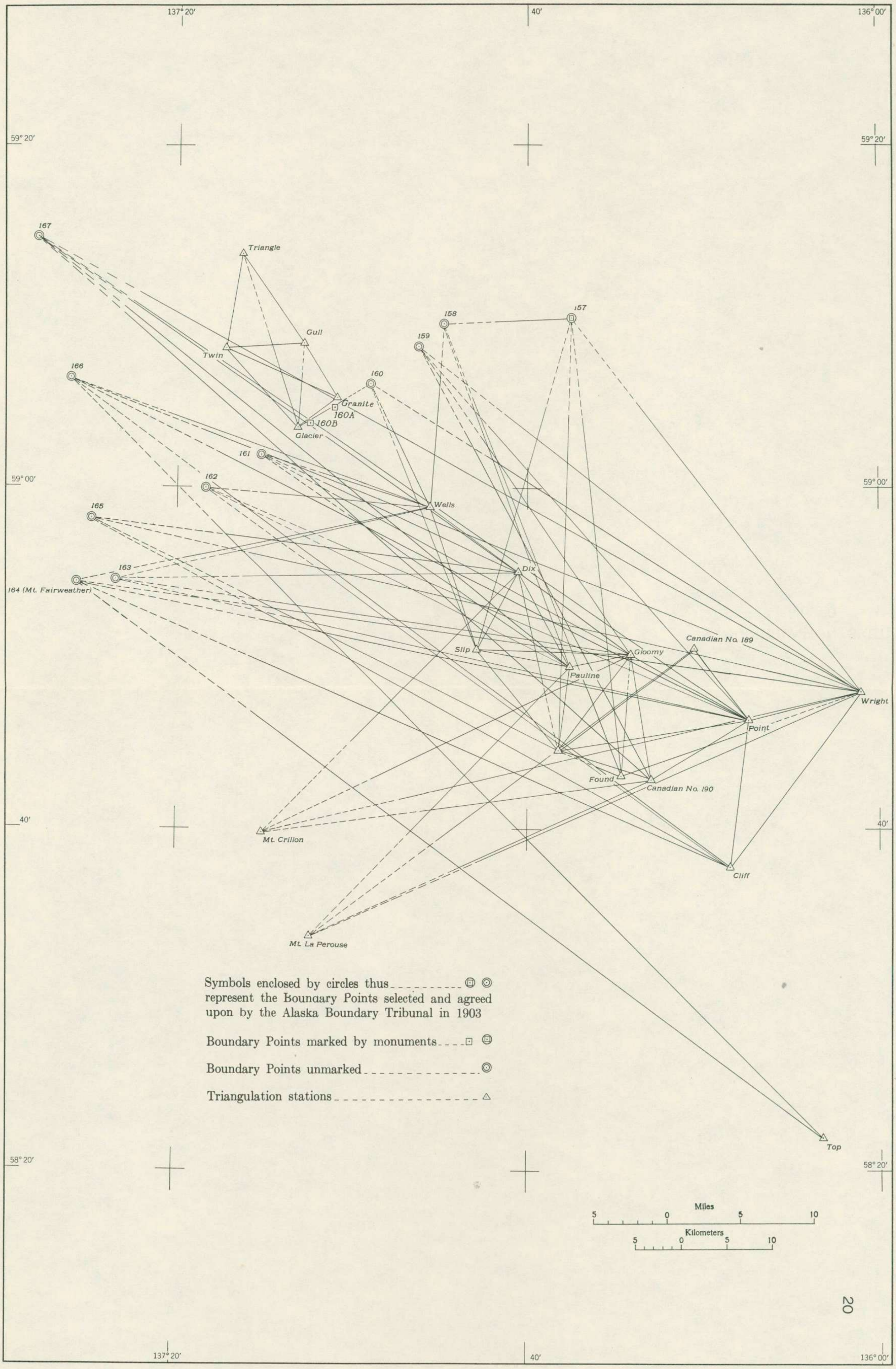
TRIANGULATION SKETCH
No. 17


136° 30′
136° 10′
135° 50′
58° 50′
40′
30′
58° 20′
Late
Canadian No. 189
Gloomy
Pauline
Wright
Paul
Island
Point
Slide
Bench
Hugh Millar East Base
Hugh Millar west base
Camp
Canadian No. 190
Found
Happy
Marble (I.B.C., U.S.C. & G.S.)
Cliff
Will (I.B.C., U.S.C. & G.S.)
Beard (I.B.C., U.S.C. & G.S.)
Low
Gus (U.S.C. & G.S.)
Top
Dam (U.S.C. & G.S.)
Miles
2 0 2 4 6
Kilometers
2 0 2 4 6
Triangulation stations
18

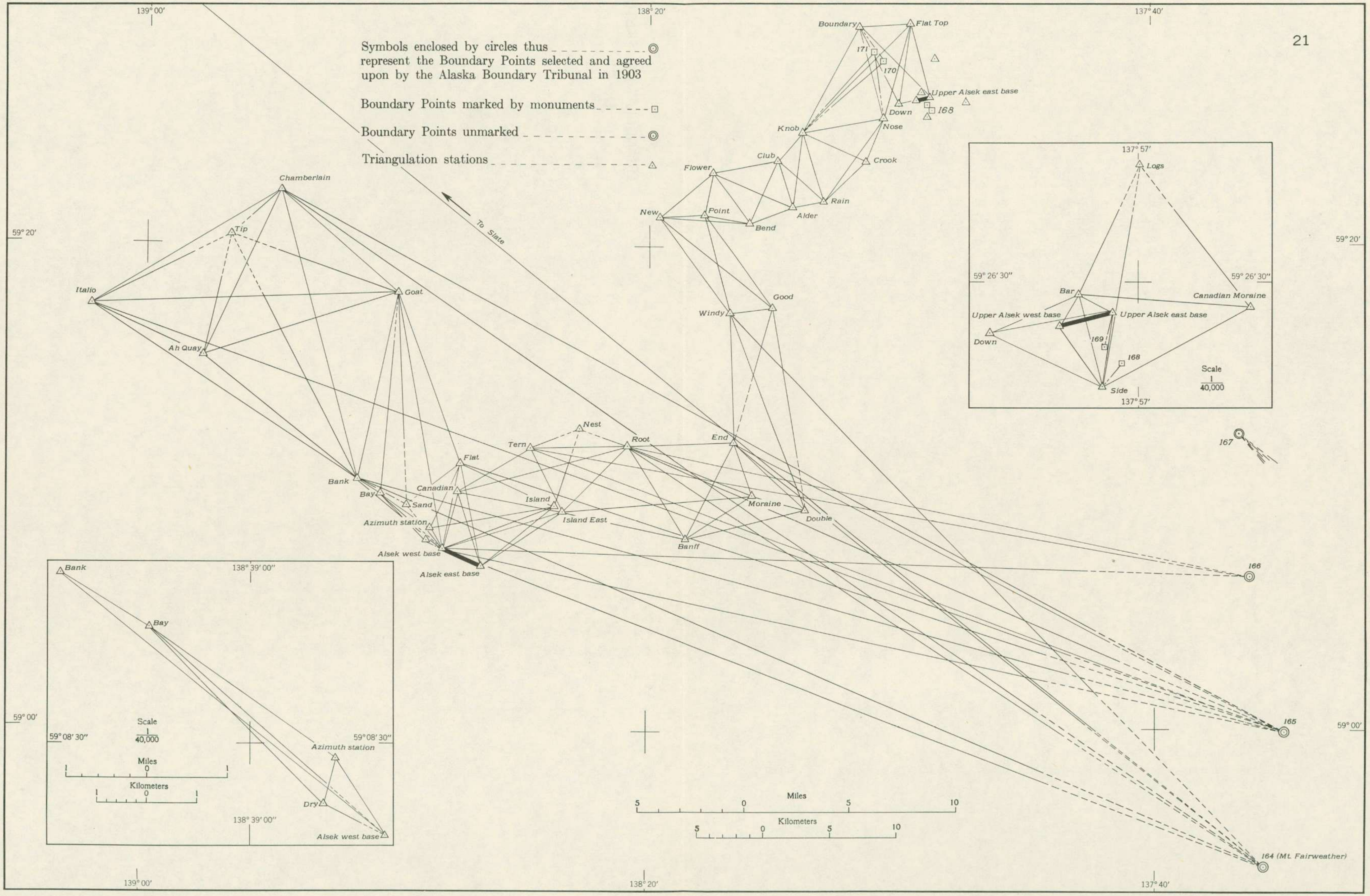
TRIANGULATION SKETCH
No. 18


137° 10′
50′
136° 30′
59° 15′
59° 05′
55′
58° 45′
Triangle
Gull
Twin
Granite
Glacier
Calamity
Steep
Wells
Reid
Dix
End
Slip
Gloomy
Pauline
Slide
Miles
2 0 2 4 6
Kilometers
2 0 2 4 6
Triangulation stations

TRIANGULATION SKETCH
No. 19

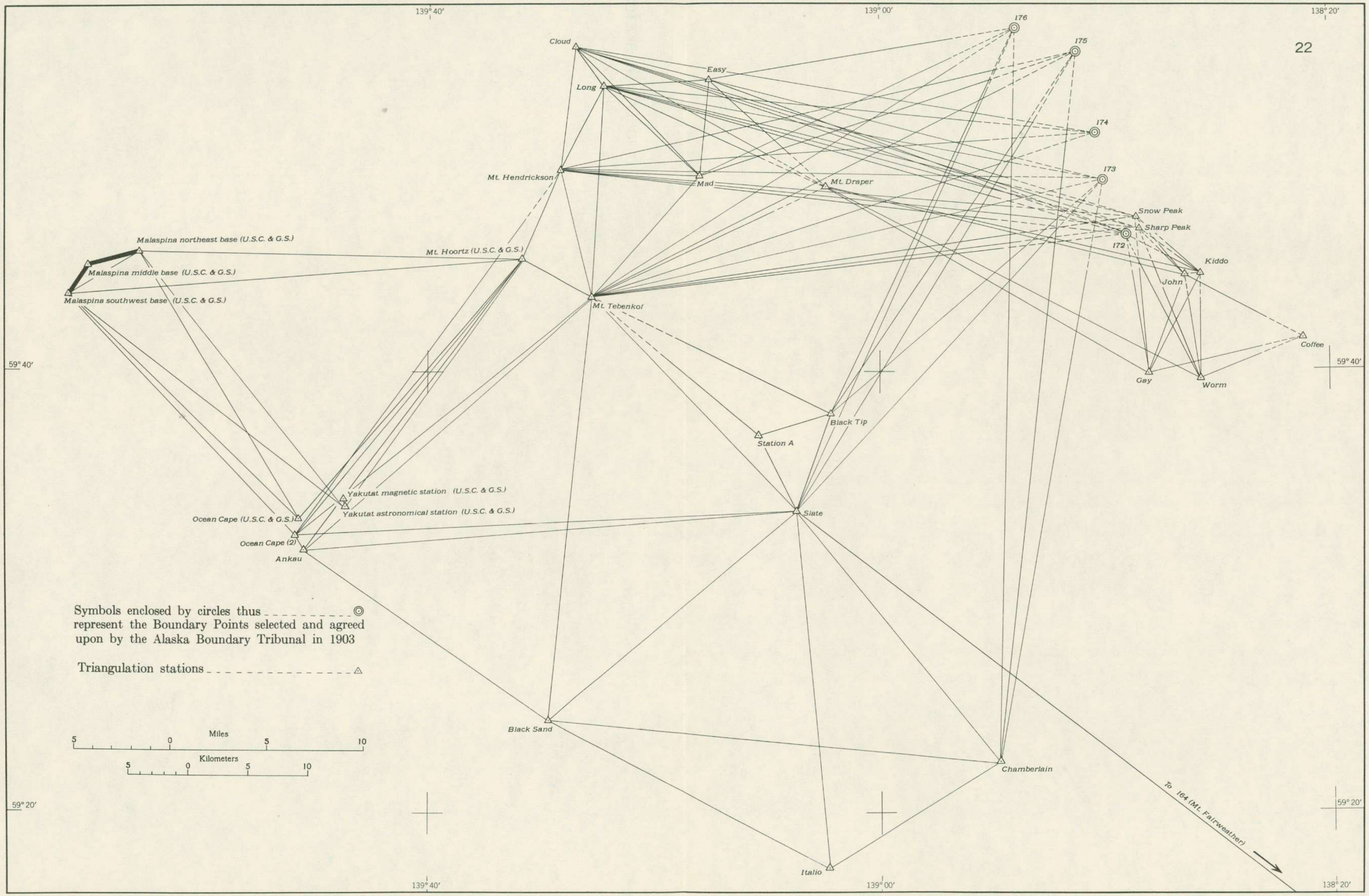

137° 20'
40'
136° 00'
59° 20'
59° 00'
40'
58° 20'
167
Triangle
158
157
Gull
159
Twin
166
160
Granite
160A
160B
Glacier
161
162
Wells
165
163
Dix
164 (Mt. Fairweather)
Canadian No. 189
Slip
Gloomy
Pauline
Wright
Point
Found
Canadian No. 190
Mt. Crillon
Cliff
Mt. La Perouse
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
Top
Miles
5 0 5 10
Kilometers
5 0 5 10
20

TRIANGULATION SKETCH
No. 20

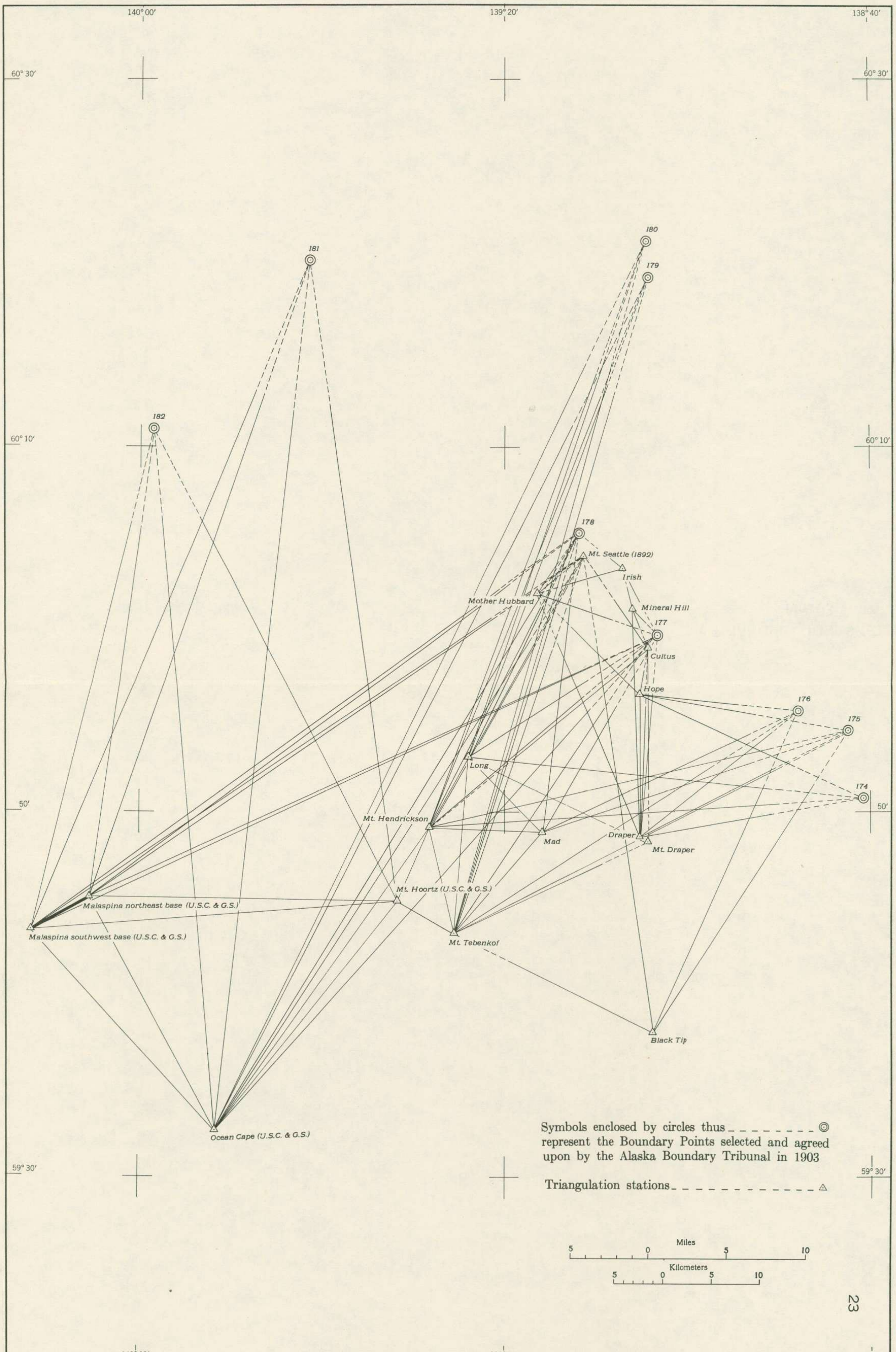


21
139° 00′
138° 20′
137° 40′
59° 20′
59° 00′
Symbols enclosed by circles thus represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Points marked by monuments
Boundary Points unmarked
Triangulation stations
To Slate
Boundary
Flat Top
171
170
Upper Alsek east base
Down
168
Knob
Nose
Crook
Club
Flower
Rain
Alder
New
Point
Bend
Chamberlain
Tip
Italio
Goat
Ah Quay
Good
Windy
137° 57′
Logs
59° 26′ 30″
Bar
Canadian Moraine
Upper Alsek west base
Upper Alsek east base
Down
169
168
Side
Scale
1/40,000
167
Nest
Tern
Root
End
Flat
Bank
Canadian
Bay
Sand
Island
Island East
Moraine
Double
Azimuth station
Banff
Alsek west base
Alsek east base
166
Bank
138° 39′ 00″
Bay
59° 08′ 30″
Scale
1/40,000
Miles
Kilometers
Azimuth station
Dry
Alsek west base
165
Miles
5 0 5 10
Kilometers
5 0 5 10
164 (Mt. Fairweather)

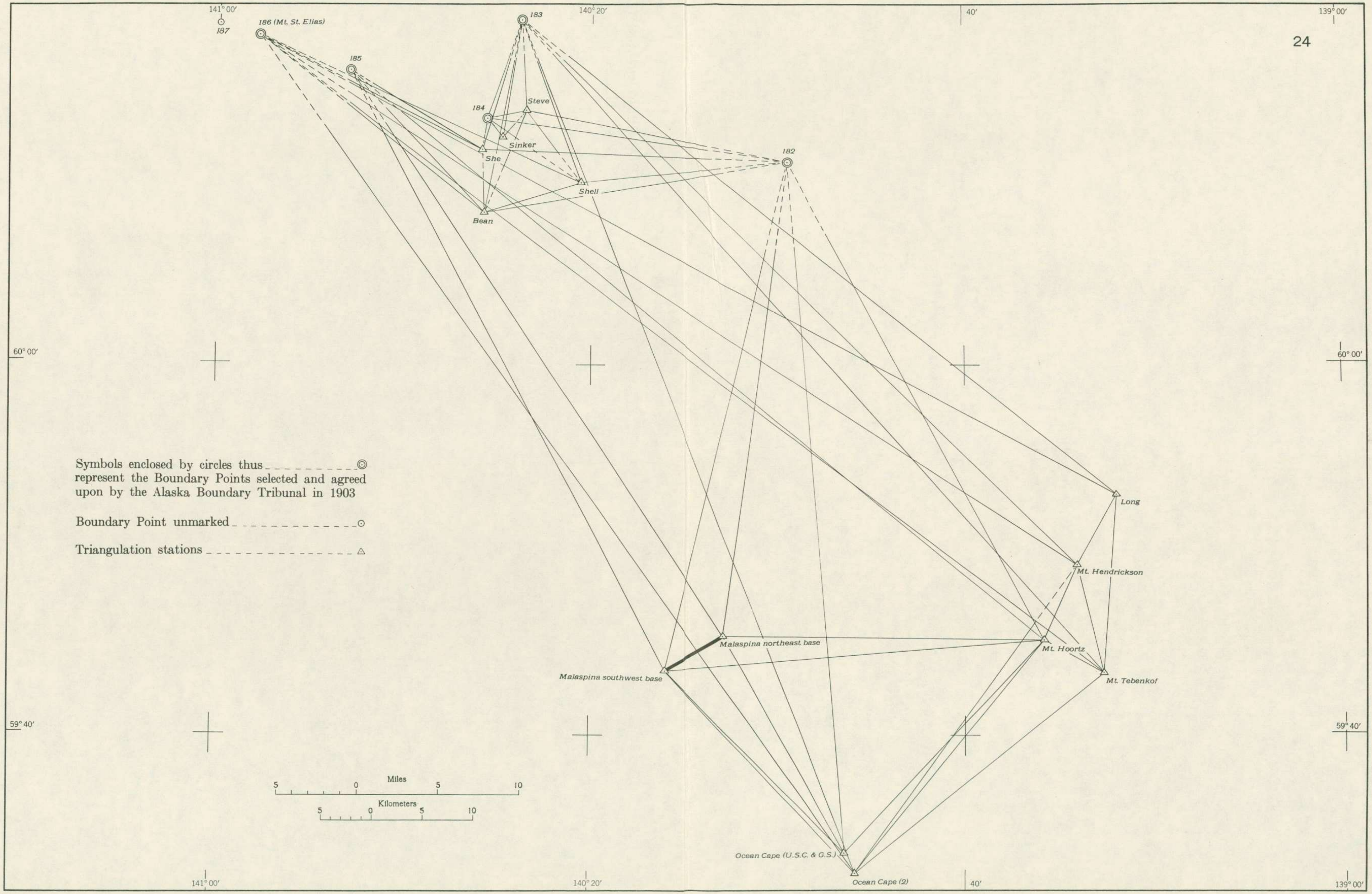
TRIANGULATION SKETCH
No. 21


22
139° 40′
139° 00′
138° 20′
59° 40′
59° 20′
176
175
174
173
172
Cloud
Easy
Long
Mt. Hendrickson
Mad
Mt. Draper
Snow Peak
Sharp Peak
Kiddo
John
Coffee
Gay
Worm
Malaspina northeast base (U.S.C. & G.S.)
Malaspina middle base (U.S.C. & G.S.)
Malaspina southwest base (U.S.C. & G.S.)
Mt. Hoortz (U.S.C. & G.S.)
Mt. Tebenkof
Black Tip
Station A
Yakutat magnetic station (U.S.C. & G.S.)
Yakutat astronomical station (U.S.C. & G.S.)
Ocean Cape (U.S.C. & G.S.)
Ocean Cape (2)
Ankau
Slate
Symbols enclosed by circles thus represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Triangulation stations
Miles
5 0 5 10
Kilometers
5 0 5 10
Black Sand
Chamberlain
Italio
To 164 (Mt. Fairweather)

TRIANGULATION SKETCH
No. 22


140° 00′
139° 20′
138° 40′
60° 30′
60° 10′
50′
59° 30′
182
181
180
179
178
Mt. Seattle (1892)
Irish
Mother Hubbard
Mineral Hill
177
Cultus
Hope
176
175
174
Long
Mt. Hendrickson
Mad
Draper
Mt. Draper
Mt. Hoortz (U.S.C. & G.S.)
Malaspina northeast base (U.S.C. & G.S.)
Malaspina southwest base (U.S.C. & G.S.)
Mt. Tebenkof
Black Tip
Ocean Cape (U.S.C. & G.S.)
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Triangulation stations
Miles
5 0 5 10
Kilometers
5 0 5 10

TRIANGULATION SKETCH
No. 23


24
141° 00′
140° 20′
40′
139° 00′
187
186 (Mt. St. Elias)
185
183
184
Steve
Sinker
She
182
Shell
Bean
60° 00′
59° 40′
Symbols enclosed by circles thus
represent the Boundary Points selected and agreed upon by the Alaska Boundary Tribunal in 1903
Boundary Point unmarked
Triangulation stations
Long
Mt. Hendrickson
Malaspina northeast base
Mt. Hoortz
Malaspina southwest base
Mt. Tebenkof
Miles
5 0 5 10
Kilometers
5 0 5 10
Ocean Cape (U.S.C. & G.S.)
Ocean Cape (2)

TRIANGULATION SKETCH
No. 24