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Department of Commerce and Labor
COAST AND GEODETIC SURVEY

W. T. F. Menn

Superintendent.

State: *Alaska*

DESCRIPTIVE REPORT.

Hyd^c

Sheet No. *2916*

LOCALITY:

*Knights Island
Passage, Prince
William Sound*

1907

CHIEF OF PARTY:

R. B. Derickson

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HYDROGRAPHIC REPORT

of the

SURVEY

of

KNIGHT-ISLAND PASSAGE

PRINCE WILLIAM SOUND

ALASKA

1907

U.S.C. & G. Survey Str. TAKU

R.B. Derickson,
Asst. C. & G. Survey,
Commanding.

To Accompany
Hydrographic Sheet.

REPORT AND SAILING DIRECTIONS TO ACCOMPANY HYDROGRAPHIC SHEET
SHOWING THE PASSAGE WEST AND SOUTH OF KNIGHT ISLAND.

This Hydrographic Sheet , scale 1:40000, shows the hydrography in the channel west and south of Knight Island, together with the reconnaissance lines in Mummy and Herring Bays.

The soundings with the exception of those taken in Herring Bay, which were with the hand-lead, were made with the sounding-reel and wire with twelve pound lead attached. This lead was armed with tallow at each cast, and the character of the bottom obtained. The number of fathoms was read from the dial, which recorded the length of the wire run out, the dial reading zero when the bottom of the lead was at the surface of the water. All soundings, unless otherwise noted in the sounding records, were taken when the vessel was dead in the water and the wire vertical. The position of each sounding made with the wire was determined by sextant angle observations on triangulation stations and hydrographic signals determined by triangulation and the plane table.

Tidal observations were made simultaneously with the soundings, readings being taken from the staff in Drier Bay.

There are shown on this sheet 120 miles of sounding lines with 473 deep-sea soundings.

Description of the Passage west and south of Knight Island, commonly known as Knight Island Passage, as follows.

To the westward of the Island from Pt. Eleanor to Herring Bay and east of a line from Lone Island to Grafton Island, there is an

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open body of water of approximately 42 sq. naut. miles, with depth ranging from 100 to 400 fathoms, and apparently clear throughout this area. From Herring Bay to the south end of Knight Island, the passage is approximately three miles wide. The immediate east side of this channel below Herring Point has numerous menaces to navigation; the west side and centre of the channel are clear. The soundings taken on a line from Herring Pt. to Grafton Island show a depth of 276 fathoms in mid-channel. The water immediately off Herring Pt. is foul, and for a distance of $3/4$ of a mile off Grafton Island the water shoals at irregular intervals and indicates foul bottom. The water west of a line from Grafton Island to Pt. Nowell appeared very foul. Numerous cuts were taken on rocks awash at low water, and were plotted on the topographic sheet. Just south of Pt. Nowell is the entrance to Dangerous Passage, which appeared foul as numerous rocks awash at low water appeared in mid-channel. This entrance is about two miles wide with a small island near the Chenega shore. It narrows to $1/3$ of a mile in width near the west end, and is only used by Indian canoes. The west shore of Chenega Island is clear and steep-to. As aforesaid the east side of Knight Island Passage is generally foul, and from Herring Pt. to the entrance of Drier Bay the foul area extends out $2/3$ of a mile from the general coast line. Five miles north of the entrance of Drier Bay there is a large, detached boulder lying one mile off the entrance to Lower Herring Bay. This boulder is surrounded by deep water, is approximately 15 feet in diameter, and the top surface is about 6 feet above high water mark. It marks the western edge of the foul area along the coast. In the middle of the Passage, between the entrance of

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Drier Bay and Channel Rock, a ledge with a least depth of 41 fathoms was found. The line drawn from the island just south of the entrance to Drier Bay to the point of rocks extending out from the two small islands two miles farther down the passage and shown on the topographic sheet, marks the foul area. This point of rocks is low, but is only covered at extreme high tide. The line of soundings run from the entrance to Drier Bay to within 300 meters of these rocks show an average depth of 70 fathoms. This point of rocks is steep to, and marks the east side of the narrowest part of the main channel in the passage. The Sister Islands directly across from the point of rocks mark the s.w. side, narrowing the channel down to a mile and a half. The channel here is clear with a depth of 200 fathoms in the centre.

The Sister Islands mark the turning point in Knight Island Passage. The main channel lies to the N.E. as described. The soundings taken to the south and N.E. of the Sisters show very deep water. It was said by a squaw-man living in Chenega village that there had been reported a small foul patch lying just south and midway of a line from these islands to the S.E. point of Chenega Island. Nothing was seen of it during the progress of the work, and no information could be elicited from the natives that would warrant a search. The passage from the Sister Islands to the eastward to Montague Straits is apparently clear with no outlying dangers. It has an average width of 3 miles, and the soundings taken show a depth of 100 to 200 fathoms.

During the progress of the work in July and August, considerable drift ice was seen in the passage south of the Sister Islands. It comes from the westward between Pt. Countess and Chenega Island, and

extends as far west as La Touche Passage during ebb-tide.

The tidal currents in Knight Island Passage are light, averaging one to two knots on extreme tides. (The rise and fall cannot be herein given, as the data is not available.)

SAILING DIRECTIONS.

From the northward, entering Knight Island Passage, between Naked Island and Lohé Island on a southerly course, the channel will show clear. The flat-top mountain at the north end of Fleming Island shows clear at the south end of the channel. This mountain is conspicuous and easily picked up. Give Grafton Island a berth of two miles and shape a southerly course in order to take up a position one mile off Pt. Nowell, where the courses entering from Pt. Eleanor join.

Entering the passage between Knight Island and Pt. Eleanor with Pt. Eleanor abeam, distant 1-1/2 miles and heading S.x W. 3/4 W. Pt. Nowell will show directly ahead. Hold this course 8-3/4 miles, and Herring Pt. will be abeam on the port hand, distant 1-1/2 miles. Change course here to S. 1/2 W. for 5-1/4 miles. Pt. Nowell will then be abeam on the starboard hand, distant 1 mile, and Dangerous Passage will open up bearing S.S.W. 1/2 W. This position is approximately the junction with the southerly course used in standing down the passage from the westward of Naked Island. At this point change course to S.x E. heading directly for the Sister Islands, Lone Island appearing directly astern. The centre of Flat-top Mt. will be open 1/2 point to the westward of the Sisters. Hold this course for 10-1/2 miles, when the extreme south end of Chenega Id. will appear on the starboard beam, and nearly in range with the

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north end of the small islands directly off Chenega village. (From this position the entrance to Bainbridge Pass will bear S.3/4 W.) When the islets off Chenega village close in with Chenega Island, you will be in mid-channel, 1-1/4 miles from the north Sister Island. Change course to S.E. 1/2 S. passing mid-channel between the Sister Islands and the Point of Rocks, leaving them approximately one half mile distant on either hand. Follow this course 3-1/2 miles. This will bring you mid-channel south of Knight Island, and half way between the south end of Long Island, which will bear N.x E. 3/4 E.; and the centre of the small wooded island called Near Island, on the south side of the channel will bear S.x W. 3/4 W.

(When approaching this position from the eastward heading for the south Sister on a W.N.W. 1/4 W. course watch for the narrow channel which opens straight through to Drier Bay in a N.x W. 1/2 W. direction. When this channel closes in you will be looking at approximately the south end of Long Island. At the same time Near Island will be on range to Flat-top mountain.)

Continuing from the last position, change course to E.S.E. 1/4 E. Six miles will bring you to the north end of La Touche Passage. Continuing on this course you will have a clear channel to Montgomery Straits.

BAYS AND SMALL PASSAGES LEADING FROM KNIGHT ISLAND PASSAGE.

MUMMY BAY opening on the south side of Knight Island has an approximate area of five square miles. It is one mile in width at the entrance extending 3-1/2 miles inland. There are two prominent arms on the east side. The first arm, locally known as Thumb Bay, extends 1/2 mile with a bend to the N.E. 1/2 mile from its entrance.

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It is about $1/3$ mile in width, and apparently clear. No soundings were made in this arm. The Str. TAKU anchored in the bight of this arm 300 meters from shore in 11 fathoms of water, mud bottom. This bight is about $3/4$ of a mile from the head of Thumb Bay. Calm water was found here during a heavy S.W. blow.

The second arm has a small island at its entrance. It is about $2/3$ of a mile deep, and $1/4$ of a mile wide. No soundings were made, and no information of value could be obtained, although inquiry was made of the miners frequenting the bay. Mummy Bay is apparently free from outlying dangers, and can be easily entered by night or day. Entering the bay midchannel on a N.x E. $1/4$ E. course, three miles will bring you to the anchorage at the head of the bay, 400 meters off shore, in 15 to 20 fathoms of water, mud bottom. Soundings along this course from the entrance to this anchorage showed an average depth of 50 fathoms.

The bay directly to the eastward of Mummy Bay is of no importance. It is open to the south, and the swell from La Touche Passage during westerly weather piles up, making it unsafe. 18 fathoms of water was found at its entrance, mid-channel.

"CUT-OFF CHANNEL!" This channel $2-1/2$ miles west of Mummy Bay connects the passage south of Knight Island with Drier Bay. It is approximately 600 meters wide at its southern entrance, carrying a general width of $1/3$ of a mile to its northern entrance, where it narrows down to 160 meters. The length of the channel is $4-1/2$ miles, and it is used by launches and small craft plying between Drier Bay and La Touche Passage. On the first trip of the Str. TAKU through this channel, en route from Drier Bay to La Touche, the lead

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was kept constantly going, and no bottom at 5 fathoms was found throughout its length in mid-channel. The Str. ELSIE plying between Seward and Valdez, and drawing 10 feet of water, used this channel constantly during the summer, her captain reporting no obstructions. 1-1/4 miles from the south entrance, a line of rocks covered at high water, extend out 200 meters from the west shore. Looking down the channel from Drier Bay, these rocks appear detached at low water. Their bearing S.S.W. 1/2 W. from a prominent point on the east shore, and marked by a large grassy patch free from bushes and trees on the mountain-side directly back of them, will indicate their position at high water. This is the only danger known in the channel with the exception of the ledge off the north entrance described in Drier Bay sheet. The depth and character of the bottom of the bight on the east side one mile from the south entrance, are not known. Three miles from the south entrance, is an undeveloped opening to the westward, 1/2 mile in width with apparently clear water out into Knight Island Passage. Directly opposite this opening on the east side of the channel is the entrance to Copper Bay.

COPPER BAY. The area of Copper Bay is about one square mile, with apparently deep water. It is of no value however, as the entrance is very narrow, and partially choked up with boulders, permitting only small launches to enter. The tidal currents have considerable velocity in this narrow opening.

North of this entrance the Cut-Off Channel broadens out into a basin 2/3 of a mile in diameter, and then narrows down to 160 meters at the entrance to Drier Bay. The shoreline at this narrow part is abrupt, and indicates deep water, steep-to.

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Courses used in passing through Cut Off Channel, as follows:

Entering from the south, mid-channel, on a N.1/2 W. course head directly for the bluff point of land appearing in mid-channel, distant 1-1/2 miles. Hold this course until within 1/4 of a mile of the point, then change to N.x W.3/4 W. This course will keep you approximately in mid-channel for a distance of 1-3/4 miles. When the opening to the westward at the north end of Long Island shows clear, change course to N.N.W. heading directly for the Narrows, distant 1 mile. On leaving the Narrows and having the sharp point of land on the west shore abeam at a distance of about 100 meters, change course to N.1/4 E. holding this course until the mid-channel of Drier Bay is reached.

Very light tidal currents were observed in this channel during the progress of the work.

(For description and sailing directions of Drier Bay, see Report accompanying hydrographic sheet of that place.)

JOHNSON'S BAY. Directly north of Drier Bay entrance, distant 2 miles, is the entrance to Johnson's Bay. This entrance is divided by a large island into two channels. The south channel is 300 meters in width, and the north channel approximately 500 meters. The bay itself extends inland about 1-1/2 miles. Both sides of the channel at the entrance are rocky, uncovering a considerable distance from shore at low water. No soundings were made in this bay. The TAKU entered the north channel, coming to anchor in 4 fathoms of water, in a shallow bight on the north shore 3/4 of a mile from the entrance. The anchor was let go approximately 150 meters from the beach. Exit was made through the same channel, and no obstructions encountered.

LOWER HERRING BAY, 1-1/2 miles north of Johnson's Bay, and 1 mile east of Channel Rock, has an entrance approximately 1/2 mile in width, with a small island in the centre. No information was obtained in regard to the depth of water, or extent of this bay. The area between Channel Rock and this entrance is foul, and considerable development would have to be done before a suitable channel could be found. This foul area extends nearly to Herring Pt. and is only entered by small launches and canoes.

HERRING BAY. The hydrographic reconnaissance of this bay as shown on this sheet, was made while coming out from the anchorage, the line of soundings being taken in what is said to be the main channel, and the channel used by the A.C.Co's. steamers, which have several times safely traversed this route. I believe deeper water is to be found 100 meters south and west of Centre Rock than is shown on this line of soundings. The depth of 7 fathoms must have been on an extension of this rock. The Str. JEANIE, drawing 13 feet, found clear passage to the north and east of this rock. Herring Bay has an area of about 7 sq. miles, with two forks forming its S.E. and S.W. corners. The S.E. corner is at present the principal objective point of vessels entering the bay. A wharf for a Copper Development Co. is here under construction.

The soundings taken show clear water to the head of this fork. The only large steamer to enter this fork during the summer, was the PORTLAND, drawing 16 feet of water, and anchoring 1/2 mile N.W. of the house, at the point showing 17 fathoms on the sounding line. Other vessels entering the bay, did not to my knowledge, enter the fork. The only available anchorage outside of this fork and in its

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immediate vicinity is at the first turn 1-1/4 miles N.W. of the house, in 20 fathoms of water, mud bottom.

No soundings were made in the S.W. portion of the bay. The TAKU anchored in 5 fathoms of water 200 meters off shore. At this point a small stream enters the bay, 800 meters west of the small island in the entrance of the S.W. fork.

Along the west shore of the bay, and midway between the north end of Herring Pt. and the small creek at the TAKU'S anchorage, there is a long reef extending out 400 meters from the shore, uncovering at low water. The S.W. fork is apparently clear but no soundings were taken. Shoal water extends off Herring Pt. 200 to 300 meters.

SAILING DIRECTIONS FOR ENTERING HERRING BAY.

Entering Herring Bay on a S.S.E.3/4 E. course, midway between Herring Pt. and Passage Pt. and proceeding 1-1/2 miles, the first prominent headland on the port hand will be abeam. Change course to S.3/4 E. The N.W. point of the large island will then be open about 1/2 point on the port bow, and the channel to the head of the S.W. fork will show clear. This course for 5/8 of a mile will leave Centre Rock about 500 meters on the port hand. With Centre Rock abeam, change course to S.E.1/4 E. Rounding Centre Rock and holding the course for 1/2 mile, Centre Rock and the west tangent of Passage Pt. will be in range. Change course at this point to E.N.E.3/4 E. heading directly for the east shore. On this course at a point 500 meters from the east shore, the channel down the S.E. fork will be open. If desired an anchorage can be had at this point in 20 fathoms of water, keeping clear of the N.E. point

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of the small island on the starboard hand, as rocks are reported as lying 50 meters off its N.E. point. Entering the S.E. fork on a S.S.E. course, keep mid-channel for a distance of $7/8$ of a mile, then coming to anchor in 17 fathoms of water, 300 meters off the point, $1/3$ of a mile from the house at the head of the fork. Until further survey of this bay is made, it is advisable to proceed with caution, on entering and leaving it, as the bottom is uneven, and there is a possibility of shoaler water on a slight deviation from the line of soundings herein shown.

LOWER PASS at the north end of Knight Island, connecting Knight Island Passage with Montague Straits, is not thoroughly known. The Str. TAKU passed through here en route to Orca at the end of the season, and at this time a sketch of the shoreline was made and courses noted, but no soundings were taken. This pass is used by launches and small craft passing from the east side to the west side of Knight Island. The Str. ELSIE has a regular Port of Call at a mining camp, situated at the head of the second bight of this passage. The Str. PORTLAND has also passed through here.

This Lower Passage is divided into a north and south channel, by a large, mountainous island. This island has a small bay about $1/4$ of a mile in diameter with two narrow openings on the S.W. side into the south channel. The main entrance is 50 meters wide and has a clear channel with 3 fathoms of water. There is ^{a depth of} 13 fathoms in the centre of this little bay. The south channel of the Lower Pass is approximately $3-1/2$ miles long, with an average width of $1/2$ mile. At the turn midway of the pass, there are two bights, extending to the southward for about 1 mile. At the head of the

bight farthest to the eastward, there is a small mining camp. The south channel of the Lower Passage has no visible menaces to navigation except a ledge of rocks awash at low water, lying off the centre of the shallow bight in the south shore $1/2$ mile from the west entrance. This ledge lies out about 200 meters north of the general trend of the coastline, but is well out of the way of mid-channel traffic. It is reported that there is foul ground off the east entrance to this pass. At this point, the TAKU encountered heavy tide-rips, and was forced to turn back on her course. The narrow channel on the north side of the mountainous island is choked with rocks and never used.

For a mid-channel course through Lower Pass, from the westward, approach the western entrance on an E.S.E. $1/4$ E. course. When the two small points at the extreme end of Passage Pt. are in range, and the small island on the port hand which bears N.x W. $3/4$ W. stands clear from the general shoreline, change course to S.E.x S. a distance of $1-3/4$ miles. At this position a prominent point on the south shore will be ahead about 600 to 800 meters distant. Change course here to E.N.E. $1/2$ E. A distance of $1-1/2$ miles will open the channel clear to the eastward. Stand out on an E. $1/2$ S. course heading for Seal Island. No soundings were taken along the courses herein given, but the waters appeared clear from the bridge of the TAKU. Considerable tidal current was observed in this pass, and it should be navigated with the utmost caution until developed.

UPPER PASS, nearly parallel to Lower Pass, with an entrance $1-1/2$ miles farther north, was not entered, but from a position at its western entrance in mid-channel, a line bearing S.E. $3/4$ E. shows

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through to Montague Straits.

THE BAY just S. and W. of Pt. Eleanor was entered by the Str. TAKU. It is approximately 1-1/2 miles deep and open to the N.W. The TAKU stood in on a S.S.E. course straight to the head of the bay, coming to anchor 400 meters from shore in 6 fathoms of water. A sketch was made of the shoreline, but no information was obtained aside from this.

LONE ISLAND. While at work in the vicinity of Lone Island, the TAKU anchored off the west side in a shallow bight 1 mile from the south end, 100 meters off shore, in 5 fathoms of water, sticky bottom. While at anchor here a strong easterly blow swept the seas around both ends of the island making the anchorage very uncertain for a vessel of this size.

AT PT. NOWELL there is a good anchorage for small craft, directly south of the extreme point. The bight is 300 meters wide at its entrance and approximately 400 meters deep, extending north and south. It is apparently clear throughout. The TAKU anchored a little inside of the centre of the bight in 5 fathoms of water. Pt. Nowell is steep-to on the east side, but shoals slightly on the south and west. The main shoreline shoals gradually.

CHENEGA BAY at the south end of Chenega Island is directly north of two small low lying islands, close to the Chenega shore. This bay was not entered during the season, but from information received it should be approached on a northerly course from the main passage passing to the westward of the small islands. There were reported

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one white man and six Indians living at Chenega village.

BAINBRIDGE PASS. A topographic reconnaissance of the shoreline at the north entrance to Bainbridge Pass was made, but no soundings were taken. The TAKU anchored in a small bight at the extreme N.W. point of Fleming Island, 200 meters off shore in 4 fathoms of water. Considerable drift ice came in here on ebb-tide during July.

The entrance to Bainbridge Pass is from the west side of a deep bay extending from Pt. Countess and the N.W. point of Fleming Island in a southerly direction. The bay is 1 mile wide and 5 miles deep. Bainbridge Pass enters from the west side 3 miles south of Pt. Countess. The pass here is $\frac{3}{8}$ of a mile wide, and it is reported to have a dangerous ledge mid-channel, near the bend 2 miles from this entrance. The water from Knight Island Passage to Bainbridge Pass is apparently clear. At the head of the entrance bay there are several small islands, but no soundings were taken in their vicinity. To approach this pass from the northward, enter the bay on a S.x W. $\frac{1}{4}$ W. course, midway between Pt. Countess and the north end of Fleming Island. When a prominent point on the port hand 1 mile from the entrance is abeam, change course to S.x E. $\frac{1}{4}$ E. In $1\frac{3}{4}$ miles the entrance to Bainbridge Pass will open clear, the mid-channel bearing S.W. $\frac{1}{4}$ S..

(No information was obtained in regard to Prince of Wales Pass other than that it is open throughout on a line bearing S.x W. from its north entrance, and is reported foul. The large island in the north end of Prince of Wales Pass forms a passage between it and the N.E. end of Fleming Island. This passage is $2\frac{1}{2}$ miles long, $\frac{1}{3}$ of a mile wide at the north end, and approximately $\frac{2}{3}$ of a mile at

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the south end. No soundings were made in this pass. As viewed from Flat Top Mt. it is choked with several small islands at the south entrance. There is an old, abandoned, saw-mill on its east shore near this entrance. No boats nor launches were known to use this pass. The bays at the north end of Evans Island were not entered and no information in regard to them was obtained.)

NOTE.

All directions given in this report are in nautical miles, and bearings and courses, magnetic. The soundings plotted on this sheet are shown without tidal reduction.

In the anchorages used by the TAKU along the coast of Knight Island, there were heavy willi-waws felt during S.E. and S.W. winds.

It may be taken for granted that the survey represented on this sheet was not in greater detail owing to the short time available to cover the entire field. In writing the sailing directions over the deep water courses, it is assumed that the blank spaces between soundings are also deep.

There are no artificial aids to navigation in these waters, but I am confident that the soundings shown on this sheet, together with the shoreline, will be sufficient guide for the navigation of Knight Island Passage.

Respectfully submitted,

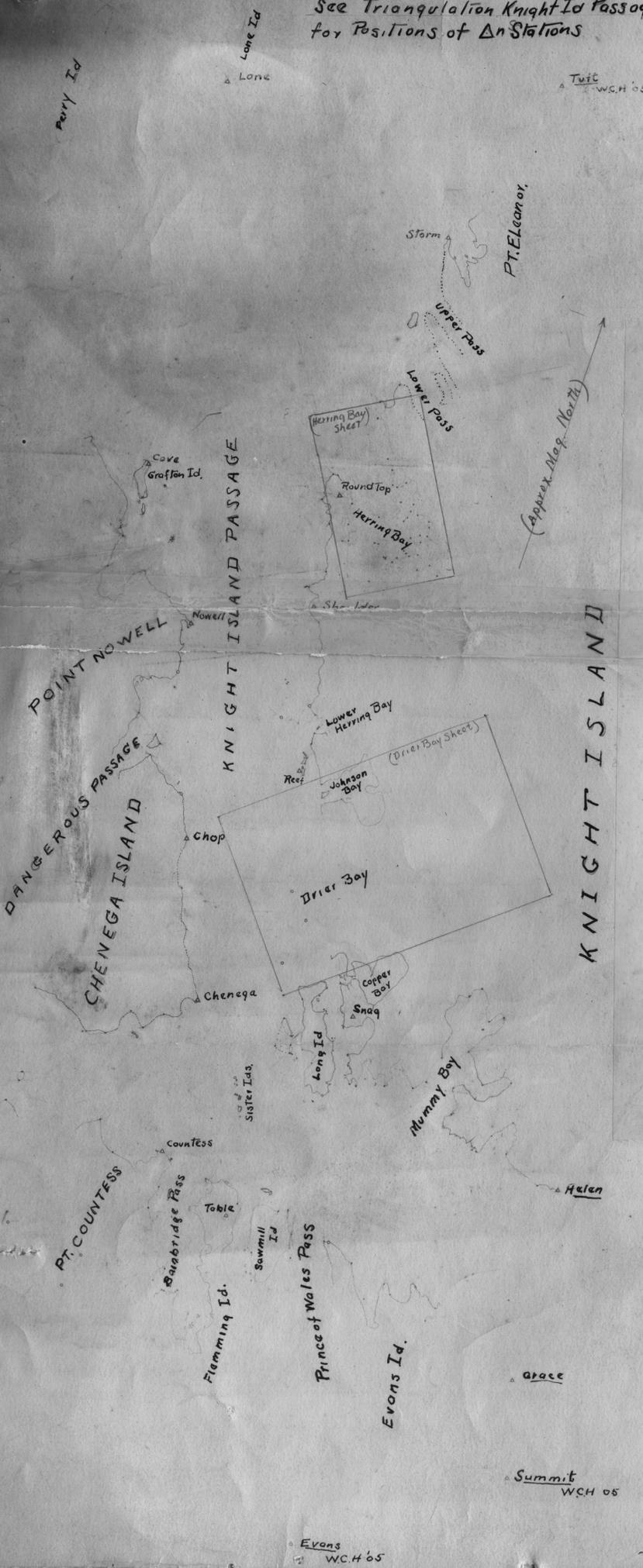


Asst. C. & G. Survey,

Commanding Str. TAKU.

Photograph of
 Plane Table Reconnaissance Sheet of
 Shoreline Knight Id. Passage
 Scale of Sheet 1:40000

See Triangulation Knight Id. Passage
 for Positions of Δ Stations



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HYDROGRAPHIC SHEET
SHOWING SOUNDINGS
IN
PASSAGE WEST AND SOUTH OF KNIGHT ISLAND
PRINCE WILLIAM SOUND
ALASKA

1907

U.S.C. & G.S. STR. TAKU

R.B. Derickson
Asst. C. & G. Survey
Commanding

Scale 1:40000

NOTE.

The positions of the stations shown on this sheet were plotted with intersecting distances, from the Triangle Side Computation, and positions transferred from Plane Table Sheets. Sheet constructed and soundings plotted by J.B. Bingham, Asst. C. & G. Survey. For Geographical Positions of Triangulation Stations, see Computation of Triangulation of Knight Island Passage.

Lone 