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U. S. DEPARTMENT OF COMMERCE
CHARLES SAWYER, SECRETARY
COAST AND GEODETIC SURVEY
ROBERT F. A. STURDS, *Director*

AUGUST 30, 1952 SERIAL NO. 760

UNITED STATES COAST PILOT

Southeast Alaska

Formerly Alaska, Part I

Dixon Entrance to Yakutat Bay

TENTH (1952) EDITION

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National Oceanic and Atmospheric Administration

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Preface

THIS is the tenth edition of the United States Coast Pilot, Southeast Alaska (formerly Alaska, Part I), Dixon Entrance to Yakutat Bay. It is based on examinations by the United States Coast and Geodetic Survey and includes the results of a special field inspection made in 1951 by Commander Curtis LeFever, USC&GS. Alaska units of the United States Forest Service, Fish and Wildlife Service, National Park Service, and Coast Guard made every effort to assist and further the Coast Pilot work. The book was reviewed for weather information by the Climatological Services Division of the United States Weather Bureau.

This tenth edition of the Coast Pilot is corrected through Notice to Mariners 35 of August 30, 1952. It cancels the ninth edition published in 1943.

Supplements to the Coast Pilot, containing corrections and additions from various sources, are issued each year. Each supplement is complete in itself and cancels all previous issues. The latest supplement, together with Notices to Mariners subsequent to it, will correct the book to date. Supplements may be obtained free upon application to the United States Coast and Geodetic Survey.

Mariners are requested to forward to the Director, United States Coast and Geodetic Survey, Washington 25, D. C., any information affecting this Coast Pilot.

ROBERT F. A. STUDDS, *Director*

August 30, 1952

SERVICE FLAG
U. S. COAST AND GEODETIC SURVEY

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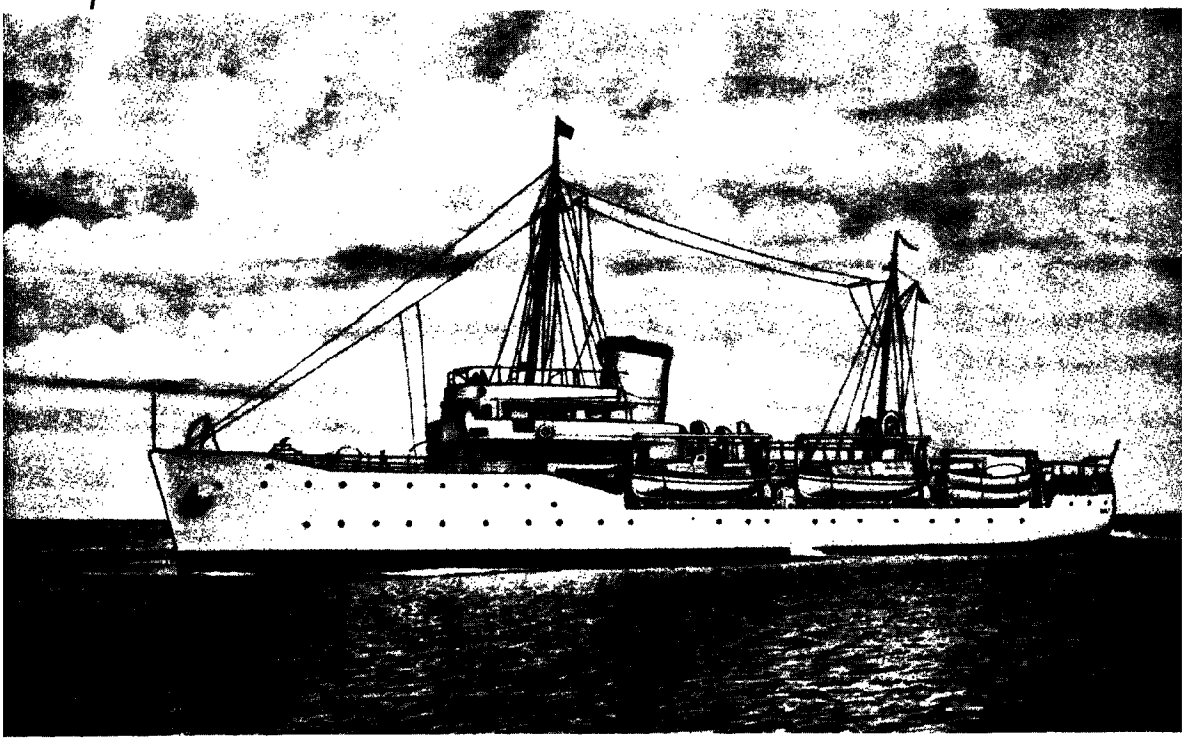
U. S. Coast and Geodetic Survey Charts

Alaska, Part I



Coast and Geodetic Survey Ship *EXPLORER;* length 198 feet, draft 15 feet, displacement 1850 tons.

NUMERICAL LIST OF NAUTICAL CHARTS

July 1, 1951

No.	Price	Scale
5002	$1.00	1:1,412,349
5020	1.00	1:868,003
5021	1.00	1:811,980
5022	1.00	1:736,560
5052	1.00	1:1,200,000
5101	1.00	1:234,270
5202	1.00	1:232,188
5302	1.00	1:216,116
5402	1.00	1:210,668
5502	1.00	1:207,840
5602	1.00	1:200,000
5702	1.00	1:196,948
5802	1.00	1:191,730
5902	1.00	1:185,238
5952	.50	1:40,000
5971	.50	1:10,000
5984	.75	1:20,000
6002	1.00	1:180,789
6004	.50	1:20,000
6023	.25	1:20,000
6058	.50	1:20,000
6102	1.00	1:176,253
6112	.50	1:20,000
6122	.25	1:20,000
6151	.75	1:40,000
6152	.75	1:40,000
6153	.75	1:40,000
6154	.50	1:40,000
6155	.75	1:20,000
6156	.75	1:40,000
6157	.75	1:40,000
6171	.75	1:15,000
6185	1.00	1:40,000
6195	.75	1:40,000
6265	.75	1:40,000
6266	.50	1:10,000
6300	1.00	1:200,000
6382	1.00	1:80,000
6401	.75	1:150,000
8002	.75	1:969,756
8053	1.00	1:80,000
8054	.25	1:80,000
8074	.75	various
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8076	.25	1:20,000
8078	.75	1:80,000
8079	.75	1:79,334
8085	.25	1:5,000
8094	.75	1:30,000
8095	.75	1:10,000
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8281	.75	1:40,000
8283	1.00	1:40,000
8285	.50	1:10,000
8299	.25	1:40,000
8302	.75	1:80,000
8303	.75	1:80,000
8304	.75	1:80,000
8306	.50	1:160,000
8402	.75	1:300,000
8410	.75	1:40,000
8455	.75	1:80,000
8457	.75	1:40,000
8502	1.00	1:969,761
8505	.50	1:20,000
8513	.75	1:100,000
8520	1.00	1:80,000
8551	1.00	1:200,000
8552	.75	1:200,000
8553	1.00	1:194,154
8554	1.00	1:200,000
8556	1.00	1:350,000
8802	1.00	1:1,023,188
8859	1.00	1:300,000
8860	1.00	1:300,000
8861	1.00	1:300,000
8862	1.00	1:300,000
8863	1.00	1:300,000
8864	1.00	1:300,000
8865	1.00	1:300,000
8995	.75	1:200,000
9000	1.00	1:4,860,700
9102	1.00	1:1,126,303
9103	.50	1:200,000
9193	1.00	1:120,000
9198	1.00	1:160,000
9302	.75	1:1,584,076
9370	.75	1:300,000
9380	1.00	1:400,000
9400	.75	1:1,587,870
9495	1.00	1:125,000

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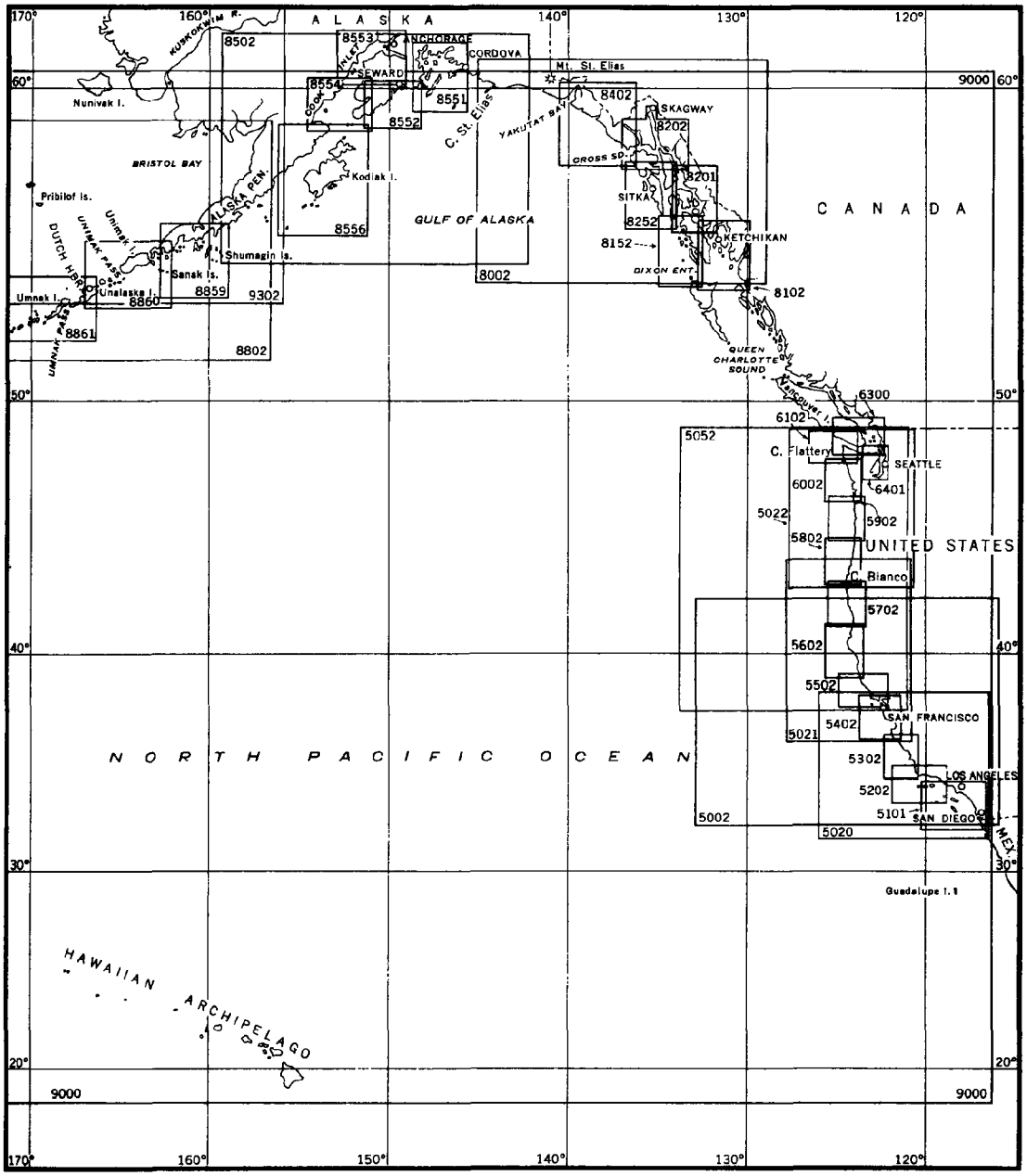
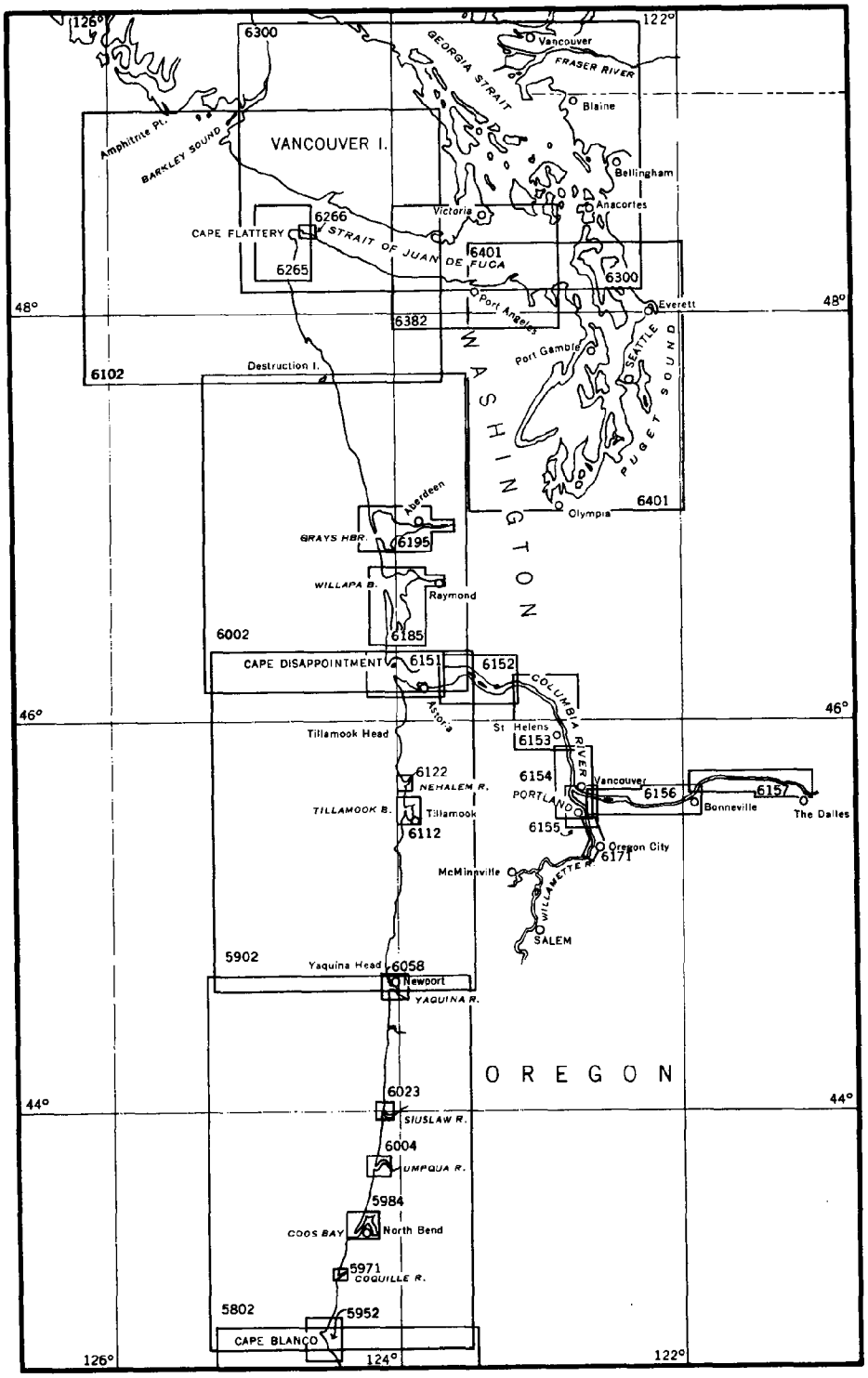
SAILING AND GENERAL CHARTS - PACIFIC COAST



GENERAL, COAST AND HARBOR CHARTS - PACIFIC COAST

CAPE BLANCO, OREGON TO CAPE FLATTERY, WASH.



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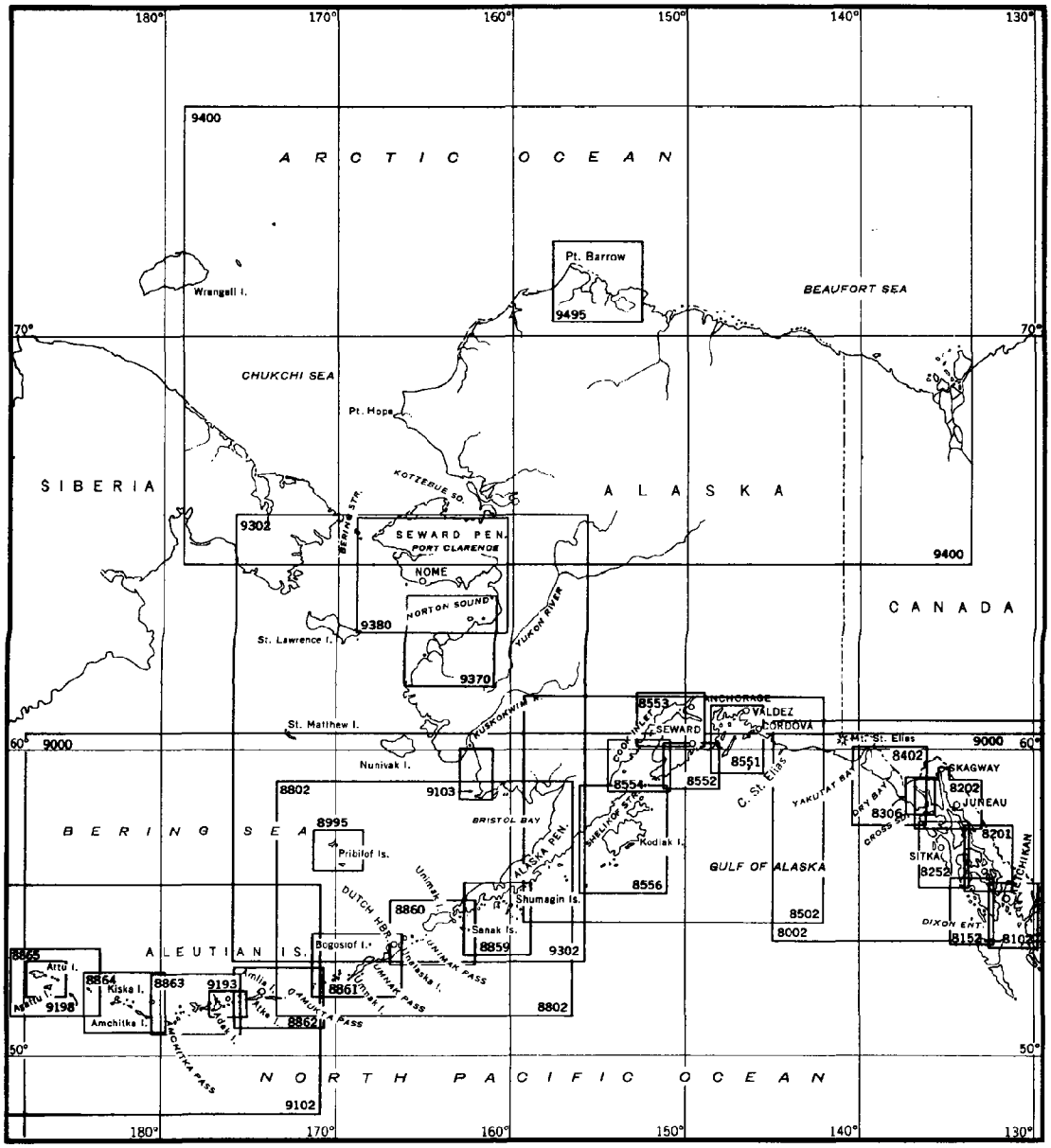

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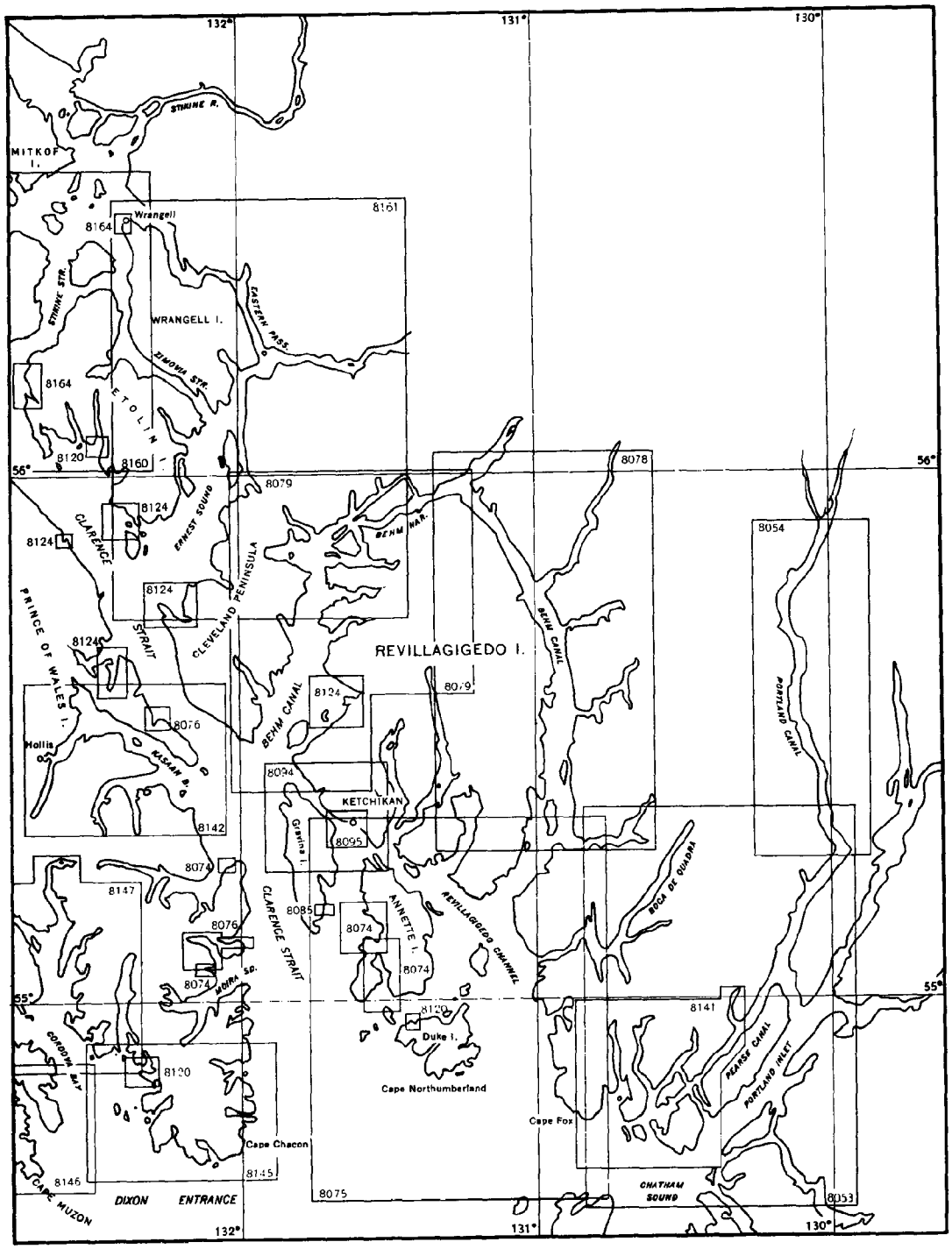
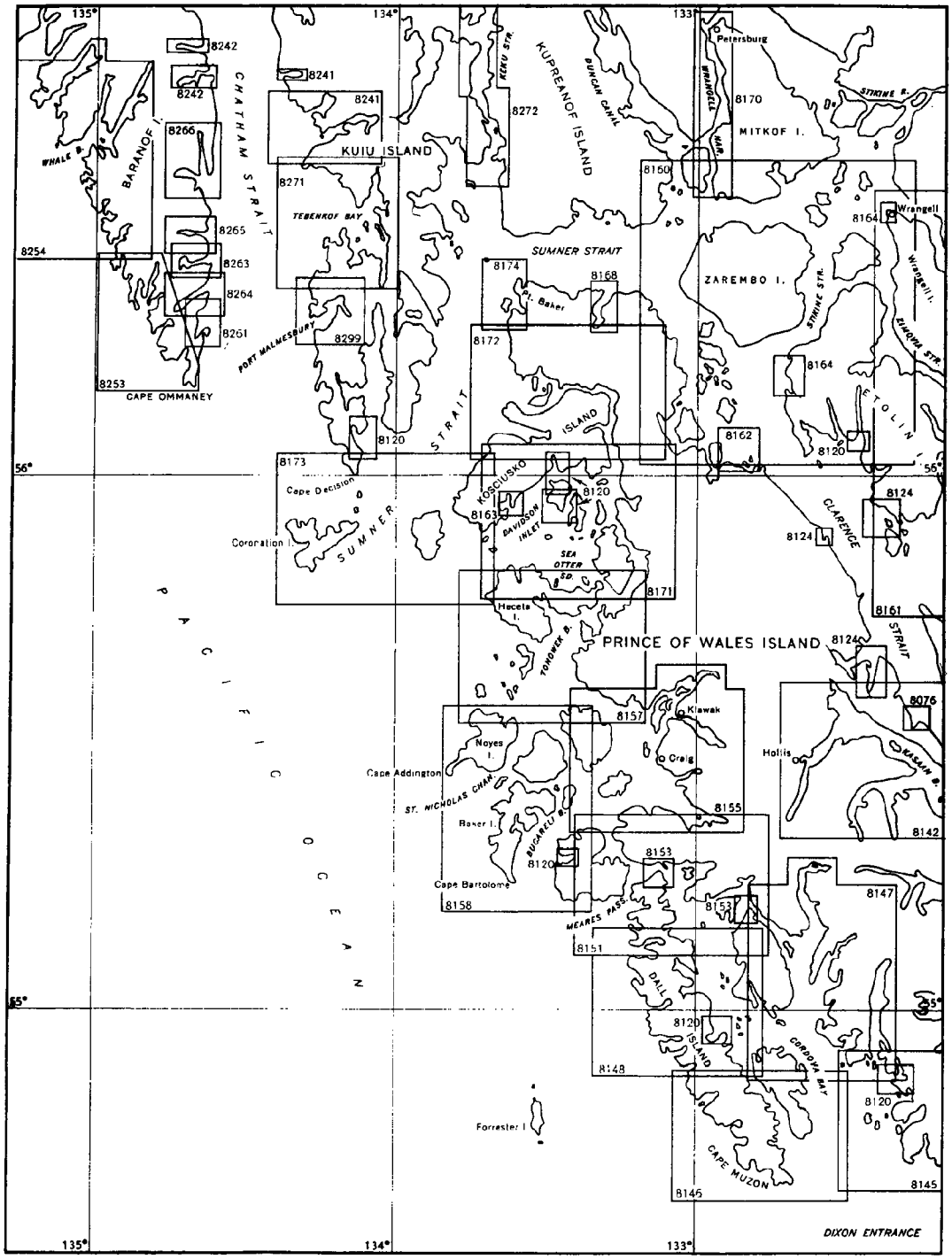
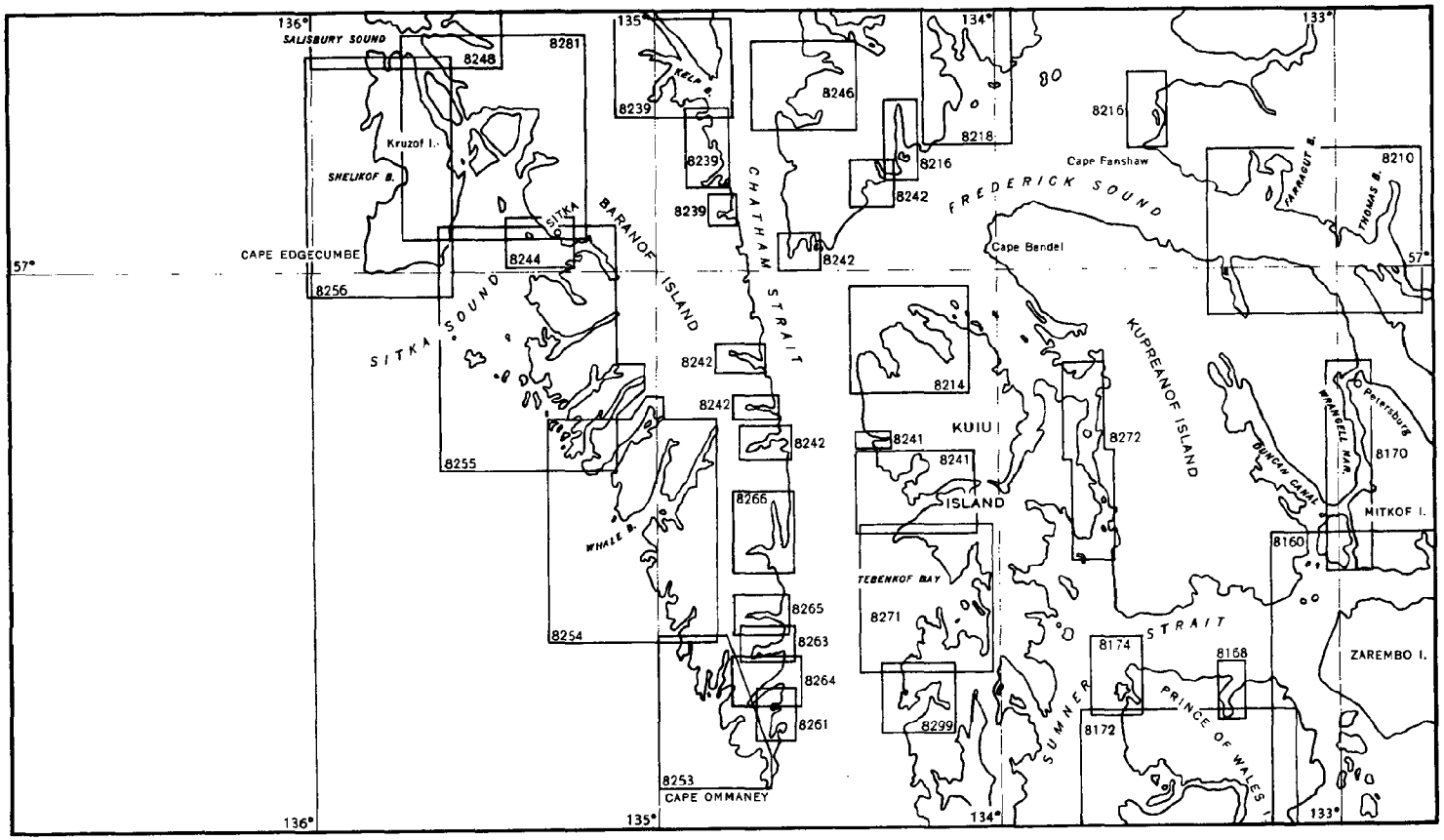


DIXON ENTRANCE TO SUMNER STRAIT

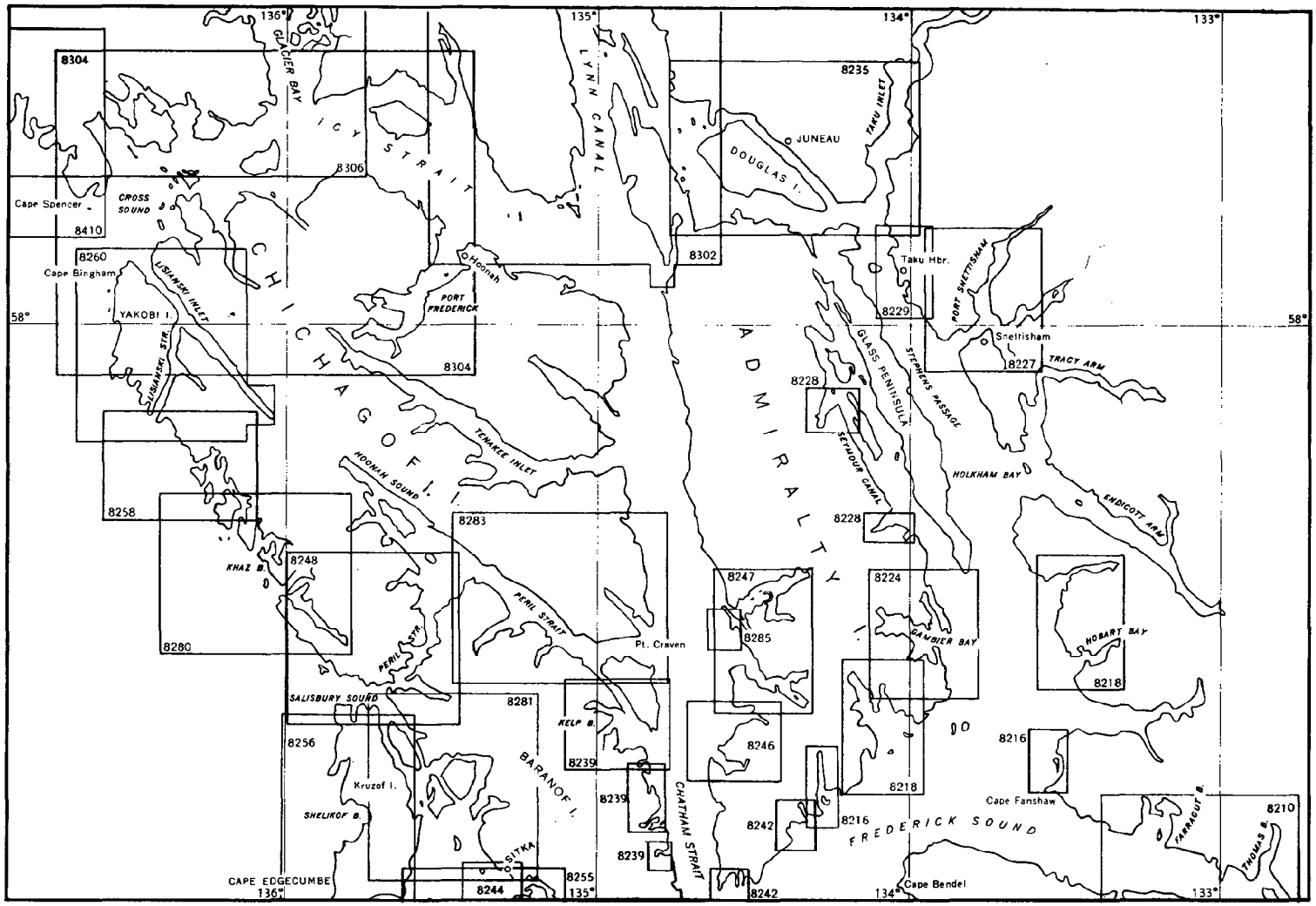


COAST AND HARBOR CHARTS - ALASKA

SUMNER STRAIT TO FREDERICK SOUND

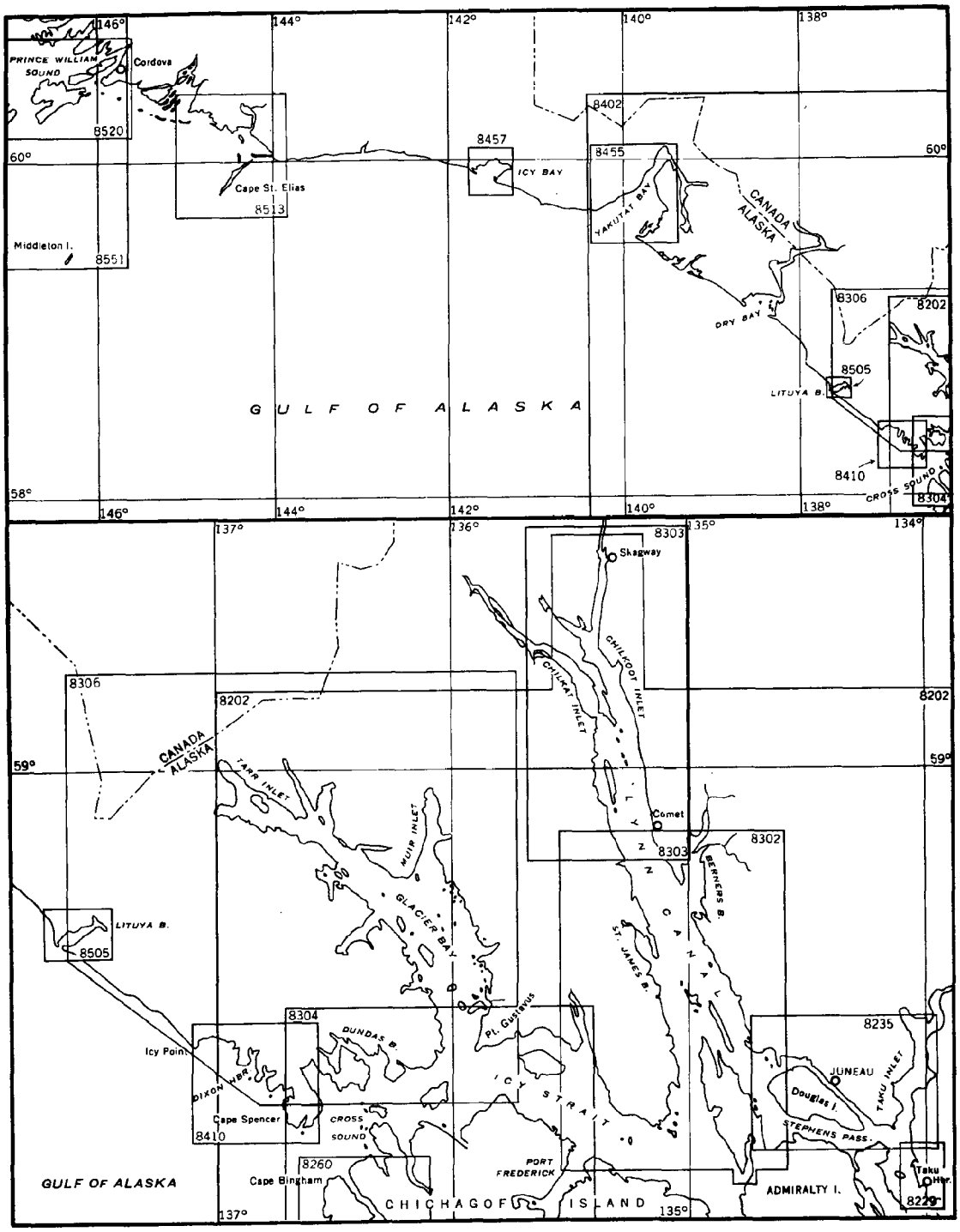


FREDERICK SOUND TO ICY STRAIT

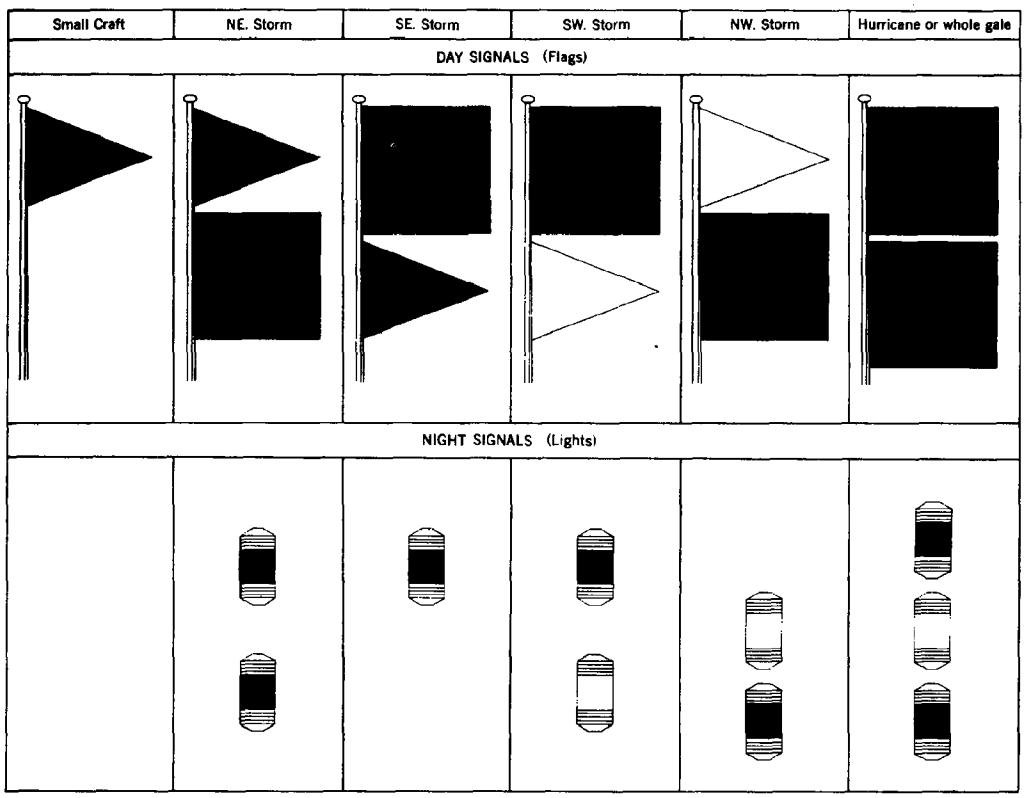


GENERAL, COAST AND HARBOR CHARTS - ALASKA

LYNN CANAL TO PRINCE WILLIAM SOUND



STORM WARNING SIGNALS



EXPLANATION OF SMALL CRAFT, STORM, AND HURRICANE WARNINGS

The small craft warning.—A red pennant indicates that moderately strong winds that will interfere with the safe operation of small craft are expected. No night display of small craft warnings is made.

The northeast storm warning.—A red pennant *above* a square red flag with black center displayed by day, or two red lanterns, one above the other, displayed by night, indicates the approach of a storm of marked violence with winds beginning from the *northeast.*

The southeast storm warning.—A red pennant *below* a square red flag with black center displayed by day, or one red lantern displayed by night, indicates the approach of a storm of marked violence with winds beginning from the *southeast.*

The southwest storm warning.—A white pennant *below* a square red flag with black center displayed by day, or a white lantern *below* a red lantern displayed by night, indicates the approach of a storm of marked violence with winds beginning from the *southwest.*

The northwest storm warning.—A white pennant *above* a square red flag with black center displayed by day, or a white lantern *above* a red lantern displayed by night, indicates the approach of a storm of marked violence with winds beginning from the *northwest.*

Hurricane, or whole gale warning.—Two square flags, red with black centers, one above the other, displayed by day, or two red lanterns, with a white lantern between, displayed by night, indicate the approach of a tropical hurricane or of one of the extremely severe and dangerous storms which occasionally move across the Great Lakes.

Code Flags and Single Meanings

** General Signal*

Able (Affirm*) *Speed Trial*	King *Stop Instantly*	Uncle *Standing into danger*	1
Baker *Explosives*	Love *Stop, Something to communicate*	Victor *Require Assistance*	2
Charlie *Yes*	Mike *Doctor on Board*	William *Require Medical Assistance*	3
Dog *Keep Clear*	Nan (Negative*) *No*	Xray *Stop your Intentions*	4
Easy *Altering Course to Starboard*	Oboe (Option*) *Man Overboard*	Yoke *Carrying Mails*	5
Fox *Disabled*	Peter (Prep*) *About to Sail (Lights out)*	Zebra *Shore Stations*	6
George *Want a Pilot*	Queen *Request Pratique*	1st Repeat	7
How *A Pilot is on Board*	Roger *Way is off my ship*	2nd Repeat	8
Item (Interrogatory*) *Altering Course to Port*	Sugar *Going full speed astern*	3rd Repeat	9
Jig *Semaphore*	Tare *Do not pass ahead of me*	*(Decimal Point)* *Code and Answering Pennant:*	0

CHAPTER 1

General Information

THE COAST AND GEODETIC SURVEY is charged with (1) the survey of the coasts of the United States and its possessions to insure the safe navigation of coastal and intracoastal waters; (2) the compilation and publication of **nautical charts, Coast Pilots, tables of predicted tides and currents, and tidal current charts** to meet the needs of the mariner; (3) the determination of geographical positions and elevations in the interior of the country to coordinate the coastal surveys and provide a framework for mapping and other engineering work; (4) the compilation and publication of aeronautical charts for use in air navigation; (5) observations of the earth's magnetism in all parts of the country to furnish magnetic information essential to the mariner, aviator, land surveyor, radio engineer, and others; and (6) seismological observations and investigations to supply earthquake data required in designing structures.

District Offices of the Coast and Geodetic Survey are located at some of the principal ports in the United States; see Appendix. Files of charts, Coast Pilots, and other publications are maintained at these offices for the use of mariners, who are invited to avail themselves of the facilities afforded.

Sales agents for Charts, Coast Pilots, Tide Tables, Current Tables, and Tidal Current Charts of the Coast and Geodetic Survey are located in many ports of the United States and in some foreign ports; see Appendix for agents located within the area covered by this Coast Pilot. The charts and publications can also be purchased from the Washington Office and from most of the District Offices. Orders mailed to Washington, D. C., should be accompanied by check or money order, made payable to the Treasurer of the United States. Postage stamps or Superintendent of Documents coupons cannot be accepted. The catalog of nautical charts and related publications can be obtained free of charge from the Coast and Geodetic Survey or any of its agencies.

Important.—Mariners and others using this Coast Pilot are urgently requested to forward to the Director, United States Coast and Geodetic Survey, Washington 25, D. C., directly or through a District Office, any information affecting it or the charts that may come to their attention, as well as any suggestions they may have for increasing the value of these publications. Reports of an urgent character should be sent by radio or telegraph.

Special signals for surveying vessels.—The following signals have been prescribed for vessels of the United States engaged in hydrographic surveying:

By day a surveying vessel of the Coast and Geodetic Survey, under way and employed in hydrographic surveying, may carry in a vertical line, one over the other not less than 6 feet apart where they can best

be seen, three shapes not less than 2 feet in diameter of which the highest and lowest shall be globular in shape and green in color and the middle one diamond in shape and white.

Vessels of the Coast and Geodetic Survey shall carry the above-described marks while actually engaged in hydrographic surveying and under way, including drag work. Launches and other boats shall carry the prescribed marks when necessary.

By night a surveying vessel of the Coast and Geodetic Survey, under way and employed in hydrographic surveying, shall carry the regular lights prescribed by *The Rules of the Road.*

A vessel of the Coast and Geodetic Survey, when at anchor in a fairway on surveying operations, shall display from the mast during the daytime two black balls in a vertical line and 6 feet apart. At night two red lights shall be displayed in the same manner. In the case of a small vessel the distance between the balls and between the lights may be reduced to 3 feet if necessary.

Such vessels, when at anchor in a fairway on surveying operations, shall have at hand and show if necessary in order to attract attention a flare-up light in addition to the lights which are, by this regulation, required to be carried.

In addition to the signals described, vessels of the Coast and Geodetic Survey when engaged in survey work often hoist one of the following International Code signals:

HD signifying "I am engaged in submarine survey work, you should keep clear of me."

HF signifying "I have a sweep out, you should keep clear of it."

The **wire drags** used by the Coast and Geodetic Survey in sweeping for dangers to navigation may be crossed by vessels without danger of fouling at any point except between the towing launches and the large buoys near them, where the towline approaches the surface of the water. Steamers passing over the drag are requested to change course so as to cross it approximately at right angles, as a diagonal course may cause the propeller to foul the supporting buoys and attached wires.

No attempt should be made to pass between the wire drag launches while the wire is being set out or taken in, unless it would endanger a vessel to do otherwise. In setting out or taking up the wire drag, the tension on the bottom wire is released and the floats at each 100-foot section may cause the wire to be held near the surface. At this time the launches are usually headed either directly toward or away from each other and the operation of taking up or setting out may usually be clearly seen.

Nautical charts are published primarily for the use of the mariner, although they serve the public interest in many other ways. They are compiled principally from the basic field surveys of the Coast and Geodetic Survey, supplemented by data from other Government organizations. They include all available information necessary for safe navigation.

Projections.—Nautical charts, with few exceptions, are constructed on the Mercator projection. On this projection meridians and parallels are straight lines intersecting at right angles. On any particular chart the distances between meridians are equal throughout, but distances between parallels increase progressively from the equator toward the poles, so that a straight line between any two points is a rhumb line. This unique property of the Mercator projection is one of the main reasons why it is preferred by the mariner.

Notes, symbols, and abbreviations.—Charts contain various types of notes placed in association with the title or in the proximity of the detail to which they refer. They may include such matters as scale, projection, date to which chart has been corrected, source of charted data, and explanation of the more important symbols and abbreviations, and index or notation of adjoining charts, controlling depths, caution notes, and the like. These notes are essential for the complete interpretation of the chart and should be thoroughly understood by the chart user.

Accuracy of charts.—Each sounding represents an actual measure of depth and location at the time the survey was made. Shores and shoals where sand and mud prevail, and especially bar harbors and the entrances of bays and rivers, are exposed to strong tidal current and a heavy sea, are subject to continual change of a greater or less extent, and important ones may have taken place since the date of the last survey. In localities which are noted for frequent and radical changes, such as the entrances to a number of estuaries on the Atlantic, Gulf, and Pacific coasts, notes are printed on the charts calling attention to the fact.

It should also be remembered that in coral regions and where rocks and boulders abound it is always possible that soundings, however detailed, may have failed to find every small obstruction. For these reasons, when navigating such waters, the customary sailing lines and channels should be followed and those areas avoided where the irregular and sudden changes in depth indicate conditions which are associated with pinnacle rocks, coral heads, or boulders.

Dredged channels.—These are generally shown on the chart by two broken lines to represent the side limits of the improvement together with the depth and date. The depth is the controlling depth through the channel on the date charted and does not mean that this depth obtains over the full width of the channel, nor that the depth has not subsequently changed due to either shoaling or dredging. The Coast Pilot generally gives the project dimensions of an improved channel.

Buoys.—Too much reliance should not be placed on buoys always maintaining their exact station, especially when in exposed localities. It is safer, when possible, to navigate by bearings or angles referred to fixed objects on shore and by the use of soundings.

Plane of reference for soundings on charts.—For the Atlantic coast of the United States and the West Indies, the plane of reference for soundings is the mean of all low waters; for the Pacific coast of the United States, Alaska, and the Hawaiian Islands, it is the mean of the lower low waters. For foreign charts many different planes of reference are in use, but that most frequently adopted is mean low water springs.

The date of a chart is of vital importance to the navigator. When charted information becomes obsolete, further use of the chart for navigation may be dangerous. Natural and artificial changes, many of them critical, are occurring constantly, and it is important that navigators obtain up-to-date charts at regular intervals, or hand-correct their copies for changes listed in *Notice to Mariners*.

Nautical charts bear three dates, which are important to persons using them: (1) The **edition date** (month and year) of the publication note, *printed* on most charts, centrally in the lower margin; (2) the **print date** (year, month, and day), the latest date *printed* in the lower left-hand corner below the border, which is the date of correction to the printing plate; (3) the **date of issue,** *stamped* in the right lower margin and just to the left of the subtitle. Charts are hand-corrected to show all essential changes for lights, buoys, daybeacons, recently reported dangers, and other critical information as of date of issue from the Washington, D. C., office. All important corrections subsequent to the date of issue are published in the *Notice to Mariners*, and should be immediately applied by the mariner to charts on hand or purchased from agents.

Scales of charts.—The scales of nautical charts range from 1:2,500 to about 1:5,000,000. Graphic scales are generally shown on charts with scale 1:80,000 or larger and numerical scales are given in the upper right border for smaller scale charts. For convenience of reference, Coast and Geodetic Survey charts are classified according to scale as follows:

Sailing charts.—Scales 1:600,000 and smaller. These are for use in fixing the mariner's position as he approaches the coast from the open ocean, or for sailing between distant coastwise ports. On such charts the shoreline and topography are generalized and only offshore soundings, the principal lights, outer buoys, and landmarks visible at considerable distances are shown.

General charts.—Scale 1:100,000 to 1:600,000. These are for coastwise navigation outside of outlying reefs and shoals.

Coast charts.—Scale 1:50,000 to 1:100,000. These are for inshore navigation leading to bays and harbors of considerable width, and for navigating large inland waterways.

Harbor charts.—Scales larger than 1:50,000. These are for harbors, anchorage areas, and the smaller waterways.

Intracoastal Waterway (inside route) charts.—Scale 1:40,000. This is a special series of charts embracing the inside route in New Jersey, the route from Norfolk, Va., to Key West, Fla., on the Atlantic coast, and from Key West, Fla., to the Mexican boundary on the Gulf coast.

Caution in using small-scale charts.—It is obvious that dangers to navigation cannot be shown with the same amount of detail on small-scale charts as on those of larger scale; therefore, in approaching the land or dangerous banks, the largest scale chart available should be used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile. For the same reason, near objects should be used for bearings in preference to objects farther off, although the latter may be more prominent, as a small error in a bearing or in laying it down on the chart has greater effect in misplacing the position, the longer the line to be drawn.

Depth curves.—Since the installation of echo-sounding apparatus on most modern ships, the Coast and Geodetic Survey has been giving special prominence to depth curves on nautical charts of areas where modern hydrographic surveys have been made. Deep-water submarine relief has become important to the navigator, and the more faithfully the chart depicts this relief, the closer the navigator can relate his depth readings to the chart and the more certain will be his position. Previously, the charts were distinguished by many soundings and few depth curves; the newer charts are characterized by many depth curves and fewer soundings.

Echo soundings.—Personnel of vessels equipped with echo sounders should understand the limitations of their instruments. Most of the various types of echo sounder are calibrated for a velocity of sound in water of 800 fathoms per second, whereas the actual velocity may differ from the calibrated value by as much as 5 percent, depending upon the temperature and salinity of the waters in which the vessel is operating; the highest velocities are found in warm, highly saline water, and the lowest in icy, fresh water. Variation in line voltage can also cause errors of 10 percent or more in readings of the echo sounder. It is also possible to obtain echoes from schools of fish.

The largest and commonest error in reading echo sounders is caused by the ability of most installations to record, visually or graphically, echoes from the second, third, or fourth preceding outgoing impulse; such a reading is in error by one or more times the scale range of the instrument. This should be kept in mind when shallow readings are noted where the charts show fairly deep water. Where possible, wide variations from charted depths should be checked by wire soundings.

Compass roses on charts.—The annual change in variation gradually introduces an error in magnetic compass roses on charts, and in some cases, the displacement of

position from neglect of this change may be of importance. The compass roses are replotted for every new edition of the chart if the error is appreciable; and the amount and date of the variation and the amount of annual change are stated for each compass rose. On certain of the sailing and general charts the magnetic variation is shown by isogonic lines in addition to the compass roses.

Magnetic disturbance of the compass.—The charts show areas where local magnetic disturbance of the compass, or *local attraction*, is caused by magnetic masses external to the ship. Such disturbances are fairly common in shallow waters; they are never encountered over oceanic depths. Magnetic force diminishes so rapidly with distance that a magnetic center in the visible land would have to be of unprecedented intensity to be capable of affecting the compass of a vessel 0.5 mile from shore.

It is unlikely that all the areas of magnetic disturbance have been located. When such an area is discovered, the position should be fixed and the facts reported as far as they can be ascertained. It is particularly important to note the time at which the disturbance was encountered, so as to rule out the possibility that the effects were caused by a magnetic storm rather than by local irregularity.

Deviation of the compass.—The magnetic effect of the ship itself combines with any instrumental error of the compass to cause the deviation, which varies with the heading of the ship and with the magnetic latitude. It is customary to counteract the deviation as far as is conveniently possible by soft iron and permanent magnets, suitably placed in or on the binnacle. See U. S. Coast and Geodetic Survey Special Publication No. 96, *Instructions for compensation of the magnetic compass.*

Determination of compass error by the use of navigational ranges.—The azimuths of channel ranges which have been determined with sufficient accuracy for compass error determination are indicated in degrees and minutes in the *Light Lists* and in the *Notice to Mariners*. Azimuths given only in degrees should not be used for this purpose.

Use of electrical equipment affecting magnetic compasses.—Experiments with portable electric megaphones show that such instruments have a definite effect on magnetic compasses, so that when such instruments are within 6 feet of a compass an error of 2° to 4° will result. Closer proximity increases this greatly. Other equipment, such as emergency lights and portable telephones, will have similar effects. So as not to affect magnetic compasses, such electric equipment should not be stowed within 10 feet of magnetic compasses and care should be taken to see that such instruments are not used in proximity of magnetic compasses for a time greater than necessary. Serious deflection of a ship's compass has been caused by the helmsman wearing an electric suit of the type used by airmen. Masters are advised to prohibit the wearing of such garments in the vicinity of the compass.

Tides and Currents.—Tide Tables are published in advance annually by the Coast and Geodetic Survey. See *Publications* at the end of this chapter. Each volume includes full daily predictions of the times and heights of high and low waters for certain reference stations along the coasts. The use of Table 2 of the Tide Tables should be known to every navigator. By means of this table the predictions given for the reference ports are extended so as to enable one to obtain the predictions for each day for a large number of other stations. Table 3 provides a means for computing the height of tide at any time.

The effect of strong winds, in combination with the regular tidal action, may at times cause the water to fall considerably below the plane of reference of the chart. The water may also rise considerably above mean high water due to similar causes.

Caution.—In using the Tide Tables, slack water should not be confused with high or low water. For ocean stations there is usually little difference between the time of high or low water and the beginning of ebb or flood currents; but for places in narrow channels, land-locked harbors, or on tidal rivers, the time of slack current may differ by several hours from the time of high or low water. The relation of the times of high or low water to the turning of the current depends upon a number of factors, so that no simple general rule can be given. To obtain the times of slack water, reference should be made to information given in the Coast Pilot for various places, or to the Current Tables.

Current Tables for the Atlantic coast and for the Pacific coast of the United States are published in advance annually by the Coast and Geodetic Survey. Each volume includes the daily predicted times of slack water and the times and velocities of strength of flood and ebb for certain reference stations and a table of current differences and constants by means of which corresponding daily predictions may be readily obtained for numerous other places. Tables for the velocity of current at any time, duration of slack, and rotary tidal currents at certain offshore locations, together with data on the Gulf Stream and wind currents are included. There are also current diagrams for a number of sounds, bays, and harbors which show in a graphical form the velocities of the flood and ebb currents and the times of slack and strength over a considerable stretch of the channel of these waterways. See *Publications* at the end of this chapter.

Tidal Current Charts are published by the Coast and Geodetic Survey for various localities; see *Publications* at the end of this chapter. These current charts are good for any year and show the direction and velocity of the tidal current for each hour of its cycle. They present a comprehensive view of the tidal current movement of the area as a whole and also supply a means of readily determining the direction and velocity of the current at various localities throughout the area. The Tidal Current Charts are designed for use with the daily current or tide predictions contained in the annual tables.

Destructive and Other Waves.—Wind waves.—The most common type of wave is caused by the wind. The size of ocean waves depends on the strength of the wind, its duration, and the extent of open water over which it blows. As they travel across the ocean, their height continually decreases, their length increases, and several days later they roll toward the coast as a long, low **swell** or **ground swell.** This swell may be all but hidden by short irregular wind waves until it enters shallow water. Offshore the swell is almost uniform in character until it is deflected by outlying islands and scattered up and down the coast so that a number of systems of swell approach the shore.

Waves from deep water are modified when they get into shoal water. Where the swell approaches a shoreline at an angle it tends to turn parallel to the shore. It bends into bays and around outlying points. When the depth is reduced to less than one-half the wave length, the waves become higher and shorter, the crest arches forward and finding itself unsupported by sufficient water in front, dashes downward breaking into **surf.** Transformations occur everywhere, and therefore, the character of the surf varies considerably on adjacent beaches although caused by a uniform swell offshore. An individual breaking wave either on a beach, an isolated rock, or a shoal is a **breaker.**

When viewed from a vessel, especially a small boat, the surf or breaker never appears as dangerous as it is, and often when comparatively smooth at sea a dangerous surf is running which is not perceptible 400 yards offshore. Many lives have been lost unnecessarily by the crews of stranded vessels being thus deceived and attempting to land in the ship's boats.

When large swells encounter the seaward margin of a submarine terrace they break and form smaller waves of translation or rollers. These **rollers** differ from the usual waves found in deep water in that they are entirely above the still-water level. They may cross the shallow water to the shore without change until they break as surf on the beach. Rollers often transport shingle and other material shoreward along the bottom. They do not break and form surf until the depth of water equals the height of the wave.

Seiche and surge.—Seiche is a stationary vertical wave oscillation with a period varying from a few minutes to an hour or more, but somewhat less than the tidal periods. It is usually attributed to an external force such as strong winds, changes in barometric pressure, swells, or seismic sea waves disturbing the equilibrium of the water surface. It is found both in enclosed bodies of water and superimposed upon the tidal waves of the open ocean. When these external forces cause a short-period horizontal oscillation of water, it is called surge.

The combined effect of seiche and surge sometimes makes it difficult to maintain a ship in its position alongside a pier even though the water may appear to the eye to be completely undisturbed; heavy mooring lines have repeatedly been parted under such conditions. Pilots advise taut lines to reduce the effect of the surge.

Destructive waves.—Unusual sudden changes in height of water level can be caused by seismic sea waves or violent storms. Seismic sea waves sometimes spread out in all directions from places at which severe seismic disturbances occur. They travel long distances and can cause tremendous damage by wrecking ships in harbors or close to shore and inundating coastal regions. Violent storms can produce extreme heights of tide which reflect the piling up of water to high levels or the withdrawal of water with consequent low levels. These two types of destructive waves have become commonly known as **tidal waves,** a name which is technically incorrect as they are not the result of tide-producing forces.

Seismic sea waves.—The destructive effect of great seismic sea waves which occur from time to time should not be minimized. The loss of life and property can be lessened if shipmasters and others acquaint themselves with the behavior of these waves so that intelligent action can be taken when they become imminent.

Tide gage records of the waves of April 1, 1946, in the Pacific and of many others that have occurred in the past show that the recession of the water is usually, though not always, preceded by a smaller but distinct rise of water level. Except for the possible grounding of floating equipment, the rise following the first fall is generally the first destructive part of the series of waves. The waves are so long that they are not visually recognizable as such, but manifest themselves as a rapid rising and falling of the water surface with a period of 12 to 20 minutes.

At Honolulu, which is reasonably well protected from the direct onslaught of the waves, there was on April 1, 1946, first a rise of about ½ foot in 6 minutes followed by a fall of 2¼ feet in the next 7½ minutes. In the three succeeding 7½-minute periods there was a rise of 2¾ feet, a fall of about 3½ feet, and then a rise of 4 feet to the third and highest crest of the series. The oscillations continued for many hours. The Honolulu record is probably representative of the pattern, though not the magnitude, of the wave in other parts of the islands where heights of 40 feet or more have been reported. The larger heights occurred on the shores facing the approaching wave, which in this case were the northern shores.

In some harbors there is normally a seiche whose period is determined by the size and depth of the harbor. If seismic sea waves, even though small, should have a period

about equal to that of the seiche, a resonance may be set up which would considerably magnify the usual oscillation and make it difficult to hold a ship to her moorings.

Waves travel outward from the epicenter at speeds which depend on depth. Though their speed may exceed 400 knots in the open ocean, they are relatively low, extremely long, and harmless and hence will pass a ship unnoticed. Upon reaching shoaler water the waves decrease in velocity and length, and increase in height. They become dangerous on either nearby or distant coasts where depths and shape of coastline conspire to augment them.

Improvements have been and are being made in the quick determination and reporting of earthquake epicenters, but no method has as yet been perfected for determining whether a sea wave will result from a given earthquake. The problem of detecting and reporting the existence of sea waves when they do occur is being studied.

The times required for a seismic sea wave to reach Honolulu from various potential epicentral areas have been computed and are as follows: 7½ to 9 hours from the main islands of Japan, 6 to 6½ hours from Kamchatka, 4¼ to 5½ hours from the Aleutian Islands and Alaska Peninsula, 6 to 12 hours from Mexico and Central America, and 12½ to 15½ hours from South America.

After the receipt of a seaquake warning, safety requires that ships put to sea and that people on shore retreat to high ground away from the water front. If lack of time or other reason makes it necessary for a ship to remain in a harbor, the following account of the experience of a United States naval vessel while lying in the port of Kahului, Maui, on April 1, 1946, may be helpful.

"At or about 0650 this date, the water in this harbor was observed to be receding seaward and the level dropped from 10 to 12 feet in a matter of 15 to 20 minutes. Later the tide surged back into the entrance of the harbor through the jetties with waves washing over the breakwater and, shortly thereafter, over the docks and land on the northeast side. There were officially recorded on the log 20 separate waves from 0650 until 0920. These waves started with great magnitude from 10 to 15 feet in height and lessened as time progressed. Due to the suddenness of the first tidal wave approaching it was impossible to get the vessel safely under way. Later the terrific currents around the harbor entrance made navigation extremely hazardous. In view of these facts, a decision was made to remain alongside the dock and maintain the safety of the ship by the use of mooring lines and wire.

"The vessel was moored starboard side to dock No. 2 and the strong currents within the harbor moved virtually in all directions, causing the ship to alternately move forward, aft, away from the dock, and then toward the dock. During this emergency, the manila lines and two 1⅝ towing hawsers were parted but were replaced immediately. Approximately 30 lines were parted, and all hands were made available at all times to cope with the situation. During the time our lines were being rapidly depleted through breakage, new ones were furnished by the Navy Supply Office and the Marine Corps. In the meantime, the harbor began filling with debris to such an extent that the main generators were shut down, due to the congestion of the sea chest. As a result, the handling of all lines was accomplished by hand, as all our winches and windlasses are operated electrically. It was feared at one time that in low water the vessel might rest on the bottom with a possibility of capsizing. . . . The damge caused is not sufficiently severe to prevent continued operation of the vessel."

Extreme tides.—A considerable rise or fall in the level of the sea along a particular coast may result from strong winds and a sharp change in barometric pressure. In cases

where the water level is raised, higher waves can form with greater depth and the combination can be destructive to low regions, particularly at high stages of tide. Extreme low tides can result in depths which are considerably less than those shown on nautical charts. This storm type of tidal wave occurs especially in coastal regions bordering on shallow waters which are subject to tropical storms.

Use of Oil for Modifying the Effects of Breaking Waves.—Experience has proved the usefulness of oil in modifying the effect of breaking waves and has developed simple and effective methods of using it. The principal facts developed are:

1. The heaviest and thickest oils, notably animal and vegetable oils, are the most effective. Crude petroleum is serviceable and should be used when no better oil is available; it may be improved by mixing with other oils. Refined kerosene is of little value.
2. In cold weather oils thicken and do not spread freely. This tendency to thicken may be reduced by thinning a heavy, sticky oil with petroleum.
3. A small quantity of oil suffices if it can be made to spread to windward.
4. Oil spreads very slowly so a vessel with engines stopped or running slowly before a sea can make a slick to windward but not to leeward, except perhaps close alongside, for the vessel's drift or speed will exceed the rate of spread of the oil.
5. The effect of oil on free waves—that is, on waves in deep water—is greatest.
6. The effect of oil on a surf or waves breaking on a bar where a mass of shallow water is in actual motion is less than on free waves, but oil is of some service under these conditions.
7. A vessel at sea will get the best results by drifting or running slowly before the sea and distributing oil either from canvas bags filled with oakum saturated with oil and slung over the side into the sea or from the waste pipes.
8. In crossing a bar in heavy weather oil in considerable quantities is needed on both sides of the vessel for a short time. A convenient method in this situation is to trail a hose over the bow and pour oil freely through it.
9. In crossing a bar with flood current pour oil overboard and allow the oil to float in ahead of the vessel. To an entering vessel crossing a bar with an ebb current oil is of little use.
10. Oil is useful to vessels and boats when running, lying to, or wearing.
11. A vessel riding to a sea anchor can fasten an oil bag to an endless line rove through a block on the sea anchor. This method distributes the oil ahead and provides a means to haul the bag aboard for refilling.
12. Before boarding a wreck have the wreck use oil freely on both sides, if able to do so. If the wreck cannot use oil, the rescuing vessel should first pass to leeward of the wreck, using oil freely to form a slick into which the wreck will drift. If the wreck is aground, the attending circumstances will indicate the methods to be used.
13. In lowering or hoisting boats in heavy weather, in port or at sea, oil will greatly assist the operation.
14. In towing another vessel in a heavy sea, oil should be distributed from the towing vessel forward and on both sides; if it is only distributed from the after part of the towing vessel, only the tow is benefited.

CORPS OF ENGINEERS.—The improvement of the rivers and harbors of the United States and miscellaneous other civil works are under the charge of the **Corps of Engineers, Department of the Army.** The miscellaneous civil works include the administration of the Federal laws enacted for the protection and preservation of navigable waters of the United States, the establishment of regulations for the use, administration, and navigation of navigable waters, the approval of plans of bridges, the alteration of obstructive bridges, the establishment of anchorage grounds and harbor lines, the removal of sunken vessels obstructing or endangering navigation, and the granting of permits for structures or operations in navigable waters.

Information concerning the various ports, improvements, channel depths, navigable waters, and the condition of the Intracoastal Waterways in the areas under their jurisdiction may be obtained direct from the District Engineer offices; see Appendix.

Anchorage areas and restricted areas in some places are defined and limited by the Corps of Engineers. They also publish regulations controlling the use of these areas. These are enforced by the United States Coast Guard. The areas are shown on the large-scale charts of the Coast and Geodetic Survey. Copies of the regulations may be obtained at the offices of the Corps of Engineers. The regulations are quoted at length, where applicable, in the Coast Pilots.

The **Port Series**, prepared jointly by the Corps of Engineers and the Maritime Administration and sold by the Superintendent of Documents, are complete reports covering the principal seaports of the United States. They are primarily of interest to commercial and industrial concerns. The volumes of the series are wide in their scope and treat the subjects of particular interest to the shipping world, such as the physical features of each port (includes list of piers, wharves, and docks, with data), its organization and practices, regulations regarding the movement of ships and goods, port dues and charges, fuel and supplies, water and rail connections, and character and commerce of the hinterlands.

Port and Terminal Charges, a series of four volumes prepared by the Corps of Engineers and sold by the Superintendent of Documents, give detailed information regarding all port services and charges, including dockage, wharfage, storage, and handling charges, at practically all ports of the United States. These publications include the more important governmental regulations affecting the movements of vessels, freight, and passengers. This information includes a digest of the more important regulations of the United States Public Health Service (quarantine and hospital services), the Customs Service, and the Immigration and Naturalization Service.

Protection of navigable waters.—Given below are extracts from the laws of the United States for the protection and preservation of the navigable waters of the United States.

That it shall not be lawful to throw, discharge, or deposit, or cause, suffer, or procure to be thrown, discharged, or deposited either from or out of any ship, barge, or other floating craft of any kind, or from the shore, wharf, manufacturing establishment, or mill of any kind, any refuse matter of any kind or description whatever, other than that flowing from streets and sewers and passing therefrom in a liquid state, into any navigable water of the United States, or into any tributary of any navigable water from which the same shall float or be washed into such navigable waters; and it shall not be lawful to deposit, or cause, suffer or procure to be deposited material of any kind in any place on the bank of any navigable water, or on the bank of any tributary of any navigable water, where the same shall be liable to be washed into such navigable water, either by ordinary or high tides, or by storms or floods, or otherwise, whereby navigation shall or may be impeded or obstructed.

That it shall not be lawful to tie up or anchor vessels or other craft in navigable channels in such a manner as to prevent or obstruct the passage of other vessels or craft; or to voluntarily or carelessly sink, or permit or cause to be sunk, vessels or other craft in navigable channels; or to float loose timber and logs, or to float what is known as sack rafts of timber and logs in streams or channels actually navigated by steamboats in such a manner as to obstruct, impede, or endanger navigation. And whenever a vessel, raft, or other craft is wrecked and sunk in a navigable channel, accidentally or otherwise, it shall be the duty of the owner of such sunken craft to immediately mark it with a buoy or beacon during the day and a lighted lantern at night, and to maintain such marks until the sunken craft is removed or abandoned, and the neglect or failure of said owner so to do shall be unlawful; and it shall be the duty of the owner of such sunken craft to commence the immediate removal of the same and prosecute such removal diligently, and failure to do so shall be considered as an abandonment of such craft, and subject the same to removal by the United States as hereinafter provided for.

That, except in case of emergency imperiling life or property, or unavoidable accident, collision, or stranding, and except as otherwise permitted by regulations prescribed by the Secretary as hereinafter authorized, it shall be unlawful for any person to discharge, or suffer, or permit the discharge of oil by any method, means, or manner into or upon the coastal navigable waters of the United States from any vessel using oil as fuel for the generation of propulsion power, or any vessel carrying or having oil thereon in excess of that necessary for its lubricating requirements and such as may be required under the laws of the United

States and the rules and regulations prescribed thereunder. The Secretary is authorized and empowered to prescribe regulations permitting the discharge of oil from vessels in such quantities, under such conditions, and at such times and places as in his opinion will not be deleterious to health or sea food, or a menace to navigation, or dangerous to persons or property engaged in commerce on such waters, and for the loading, handling, and unloading of oil.

The **HYDROGRAPHIC OFFICE** of the United States Navy exists for the improvement of the means of navigating safely the vessels of the United States Navy and the mercantile marine by providing accurate nautical charts, light lists, and sailing directions (pilots) of foreign navigable waters, navigator's tables and manuals of instruction for the use of all vessels of the United States, and for the benefit and use of navigators generally.

Publications issued by Hydrographic Office for the use of mariners are Charts of the high seas and all foreign waters, Sailing Directions for the same areas, Light Lists, Table of Distances Between Ports, Radio Navigational Aids, Radio Weather Aids to Navigation, International Code of Signals, American Practical Navigator (Bowditch), and several books of navigational tables that are described in the American Practical Navigator and in the General Catalog of Hydrographic Office Publications. Periodic publications of the Hydrographic Office are: The Notice to Mariners (weekly), the Hydrographic Bulletin (weekly), the Daily Memorandum, and the Pilot Charts for various oceans (monthly or quarterly); see *Publications* at the end of this chapter.

Notice to Mariners, containing corrections to the charts, Coast Pilots, Sailing Directions, Light Lists, and other publications, is issued weekly and mailed free on application to the Hydrographic Office, Washington 25, D. C., or through any Branch Hydrographic Office, District office of the Coast and Geodetic Survey, or District office of the Coast Guard. The notice is published in two parts. Part I, Western Hemisphere, covers North and South America, Greenland, Aleutian Islands, and Hawaiian Islands. Part II, Eastern Hemisphere, covers the remainder of the world. Each part contains appropriate tables of chart corrections and corrections to Light Lists. Part I carries corrections to H. O. Pub. 205, *Radio Aids to Navigation,* corrections to the *H. O. Chart Catalog,* and other items of world coverage. Part II is needed only by those vessels sailing to ports outside the Western Hemisphere.

WEATHER BUREAU.—Weather forecasts and warnings of the approach of storms over land and ocean areas are among services of the **Weather Bureau** to navigation, commerce, agriculture, and the general public. Other warnings cover a variety of hazards, such as cold waves, frost, forest-fire hazard, floods, and many types of weather conditions affecting the nation's economy.

Meteorological information is collected and transmitted at hourly, 3-hourly and 6-hourly intervals from land stations, ships at sea, and aircraft. These reports form a basis for the forecasting service, for summarization and publication of climatological data having general value and applicability, and for research basic to improvement of the national weather service.

Weather Bureau offices are located in many ports and other places throughout the continental United States and possessions. Stations in the area of concern to this Coast Pilot, at which the public may compare barometers against Weather Bureau barometers and discuss matters of weather service with Weather Bureau officials, are listed in the

Appendix. By international agreement, the Weather Bureau also bears a share in the maintenance and operation of certain weather ships on the free oceans.

Marine meteorological service.—The collection of observations from ships at sea is conducted on a purely voluntary and cooperative basis. The Weather Bureau supplies shipmasters with blank forms, printed instructions, and such other material as is essential to the making and recording of observations. In the course of an average peace-time year, more than 100,000 observations are received from vessels representing every maritime nation and reaching every quarter of the globe. Reports based on this cooperative service by seamen are included in various publications. Among these are the *United States Coast Pilots*, which contain sections on weather and climate, storm charts, and meteorological tables. The *Pilot Charts* issued by the Hydrographic Office contain ocean meteorological data prepared in the Weather Bureau. *Sailing Directions*, *Naval Air Pilots*, and other publications of the Hydrographic Office also contain summaries of weather information prepared by the Weather Bureau for various parts of the world from reports rendered chiefly by officers of merchant ships.

The hurricane and storm warning service.—This service was established primarily to aid marine interests. Storm warnings are prepared at regular district forecast centers and at special hurricane forecast centers. The warnings are distributed to the public through all neighboring Weather Bureau offices by radio, the press, and every other available means. During the West Indian hurricane season, June to November, inclusive, special teletype circuits expedite the exchange of special reports from the Atlantic and Gulf coasts. Special ship reports are described under the heading *Reports from Ships*. Special aircraft reports are obtained during the hurricane season from weather reconnaissance planes which fly near the storms and sometimes into the storm centers. Hurricane warnings, as well as gale and storm warnings, are disseminated also by flag and lantern displays from about 400 storm-warning towers or flagstaffs on the Atlantic, Gulf, and Pacific coasts and on the shores of the Great Lakes.

Weather information service for overseas air transport.—The Weather Bureau provides forecasts for trans-Atlantic flights, and has helped develop weather service required for regularly scheduled air transport operations over the oceans.

Under agreements with foreign governments, the Weather Bureau now provides weather information service for domestic and foreign aircraft. A detailed forecast, based on all available weather information for the ocean and adjacent land areas, is supplied to the aircraft captain just before departure, and any necessary amendments are transmitted by radio to the aircraft during flight. Forecasts cover wind conditions, icing, turbulence, cloud extent and heights, temperatures, and storms or other severe conditions to be expected en route and at the destination airport and alternates at estimated time of arrival.

General public service.—Weather Bureau publications may be obtained on request from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., upon payment of list price. The current *Price List of Weather Bureau Publications* may be requested from the Weather Bureau, Washington 25, D. C. Certain publications, such as *Annual Meteorological Summaries*, may be obtained free of charge, ordinarily from the individual Weather Bureau offices which prepare them.

Other means by which weather information of public concern is disseminated are described under the headings of *Storm Signals*, *Weather Broadcasts*, and *Reports from Ships* (*Weather reports, United States*) in this chapter. A table of commercial radio stations which broadcast directly from Weather Bureau microphones is contained in the Appendix.

Additional information pertaining to weather radio or teletype services may be requested from the Weather Bureau, Washington 25, D. C.

Storm Signals are displayed by the United States Weather Bureau at numerous places on the coasts of the United States and the shores of the Great Lakes. No visual displays of storm warnings are made at coastal stations in Alaska since distribution of the messages is effected by local radio broadcasts, as a rule. Day and night displays are illustrated in the front of this volume.

These storm signals are used to warn of the approach of a storm of marked violence with the wind beginning to blow from the indicated direction.

The mariner must bear in mind that the storm signals do not necessarily mean that a storm will occur at the place where the signal is displayed, but that one is expected either there or within such a distance that vessels leaving port would be liable to be caught in it.

The **COAST GUARD** has among its duties (1) enforcement of the laws of the United States on the high seas, in harbors, bays, sounds, roadsteads, and other like bodies of water along the coasts of the United States, its territories and possessions; (2) enforcement of navigation laws, of neutrality laws and regulations, of rules and regulations in relation to anchorage grounds, and of the Oil Pollution Act; (3) inspection of all vessels to insure safety to passengers and crews; (4) aid to distressed mariners and saving of life and property from shipwreck; (5) issuance of marine licenses and certificates; (6) investigation of circumstances connected with shipwreck or collision at sea; (7) destruction of derelicts; (8) construction, operation, maintenance, and inspection of aids to navigation; and (9) publication of Light Lists and Radiobeacon Charts.

Light Lists.—All aids to navigation, such as lights, radiobeacons, fog signals, buoys, and daymarks, are described in these publications which are for sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C., and by the various sales agencies. Mariners are referred to the above publications for detailed information regarding the characteristics, power, and visibility of lights, as well as descriptions of light structures and daymarks, buoys, and fog signals. Such detailed information is not given in this Coast Pilot; see *Publications* at the end of this chapter.

The Light List is corrected to the date of publication printed on the title page. The mariner is cautioned that the latest list must be used; he should keep his Light Lists as well as his charts corrected from changes announced in the weekly *Notice to Mariners.*

Aids to Navigation.—Lights.—The distances at which lights may be seen in clear weather, given in Light Lists and on charts, are the geographic ranges computed in nautical miles for a height of the observer's eye of 15 feet above sea level; the luminous range is given when the light is not of sufficient power to be seen to the limit of its geographic range. These distances may at times be increased by abnormal atmospheric refraction and, of course, may be greatly lessened by unfavorable weather conditions, such as fog, rain, haze, or smoke. All except the most powerful lights are easily obscured by such conditions.

The navigator who expects to make a light of considerable power should find the geographic range corresponding to his own height of eye by reference to the Visibility Table in the *Light Lists.* For lights of small luminous power it is obvious that the increased geographic range is of no interest.

If, when first sighted, a light can be made to dip below the horizon by at once lowering the eye several feet, it is evident that the vessel is at the limit of the geographic range and that the light is of considerable luminous power. If, under the same circumstances, the light cannot be made to dip, it is evident that the vessel is well within the geographic range and may, in fact, be very close to the light, and that the light is of relatively small power. This same maneuver will also aid in distinguishing the lights of another vessel from the more powerful navigational lights, as a vessel's lights are usually so limited in intensity that they do not carry far enough to be intercepted by the horizon. The distance of a light cannot be estimated by its dimness or brilliance. See inside back cover for *Distance of Visibility of Objects at Sea* table.

Buoys.—For the system of buoyage of the United States—color, shape, numbering, and light characteristics—the mariner is referred to the preface of the *Light Lists*.

Buoys are liable to be carried away, shifted, or capsized; lighted buoys may be extinguished; or audible buoys may not sound as the result of storm, ice conditions, collision, or other accidents. The navigator should, if possible check his position by bearings on fixed objects on shore and by soundings.

Fog signals that depend upon the transmission of sound through the air have, as aids to navigation, certain inherent defects that should be considered. Sound travels through the air in a variable manner, even in the absence of wind, and its behavior cannot be predicted or guarded against. The distance at which a fog signal can be heard may vary with the bearing of the signal and may be different on different occasions. The intensity of the sound may be greater at a distance than close-to. There are sometimes areas, perhaps close to the signal, where the sound is entirely inaudible. Mariners must not judge their distance from a fog signal by the intensity of the sound and must not assume that a signal is not sounding because they do not hear it.

All these considerations point to the necessity for the utmost caution when navigating near land in a fog. Audible signals are useful, but the navigator's principal reliance should be on the sounding equipment and on radio bearings, if such are available.

Echoes.—When a vessel is in the vicinity of a high rocky shore the navigator may find it advantageous to time the echo of his own signal and thus obtain a rough estimate of the distance offshore. The velocity of sound in air can be taken as 1,100 feet per second. In some localities **echo boards** have been erected to facilitate this operation. Two general types are in use. The first is specially constructed so that the echo will be heard at a specified distance off. The second is a flat surface which will reflect any sound striking it. See the *Light List* for the construction details of each echo board before using it.

Radiobeacons are operated continuously during fog and low visibility and also at scheduled intervals during clear weather, night and day. The more powerful stations have an effective range far greater than is possible with light and fog signals, and bearings of them will furnish the navigator with a valuable indication of his position long before the land is in sight.

A list and descriptive details of all marine radiobeacons are given in the *Light List* and H. O. Publication No. 205, *Radio Navigational Aids*. Radio aircraft ranges and standard broadcast stations that may be received on marine radio compasses are listed in the Appendix. The correction to be applied to convert a great circle direction to the rhumb line direction for plotting on a Mercator chart can be obtained from *Radio Bearings* in this chapter.

A vessel steering a course for a radiobeacon should observe the same precautions that apply when steering for a light or any other mark. If the radiobeacon is aboard a

lightship, particular care should be exercised to avoid the possibility of collision, and sole reliance should never be placed on sighting the lightship or hearing her fog signal. If there are no dependable means by which the vessel's position may be fixed and the course changed well before reaching the lightship, a course should be selected that will insure passing the lightship at a distance, rather than close aboard, and repeated bearings of the radiobeacon should show an increasing change in the same direction.

During a period of radio propagation disturbance, radiobeacon observations may be unreliable. See later discussion under *Time Signals*.

Special operation of radiobeacon stations for calibration of direction finders.—Certain United States radiobeacons will broadcast for the purpose of enabling vessels to calibrate their radio direction finders upon request. Special calibration operation will be made only upon request in advance to the district commander in whose district the calibration station is located, the address and district limits of which are listed in the Appendix. The day, time, and frequency on which special calibration service is desired must be stated. If service is desired on both frequencies listed, the time that transmission on each frequency is desired must be specified. Upon the arrival at the station on the date and hour specified, station personnel may be contacted by means of the usual whistle signal or flag hoist. At stations that also have radiobeacons, when previous arrangements have not been made, the regular radiobeacon transmitter will be operated for calibration purposes in answer to the usual whistle signal or flag hoist for calibration as given below. If it is not practicable to determine the time of calibration sufficiently in advance to contact the district commander, or if the calibration is desired from a remote station where communication is difficult, request may be made directly to the station by means of telephone, telegraph, or a whistle signal consisting of three long blasts followed by three short blasts, this whistle signal to be repeated until same is acknowledged by the station through the starting of the transmitter. The same group of signals will be sounded at the termination of calibration.

If attention of station or lightship is not attracted by the whistle signals, hoist the International Code signal, **J** over **K**, to indicate request for radio direction finder calibration.

The work of the station personnel is not confined to standing watch and there may be times when the whistle request for calibration is not immediately heard, due to the noise of the operating station, etc. Usually, a repeated signal not too far from the station will attract attention.

Transmission for calibration purposes will be continuous without the 2-minute silent interval unless another station in the same frequency group is in operation at the time, in which case calibration operation will be "1 minute on, 2 minutes off." No continuous transmission for calibration will be undertaken during regular schedule periods of operation.

In addition to the special operation of regular radiobeacon transmitters for calibration of direction finders, special radio direction finder calibration transmitters of short range are also operated at certain localities to provide continuous service. These stations with information as to position, frequency, and characteristic are given in the *Light Lists*.

Radio bearings.—*Accuracy.*—No exact data can be given as to the accuracy to be expected in radio bearings taken by a ship, since the accuracy depends to a large extent upon the skill of the ship's operator, the condition of the ship's equipment, and the accuracy of the ship's calibration curve. Mariners are urged to obtain this information for themselves by taking frequent radio bearings when their ship's position is accurately

known, and by recording the results. United States radiobeacons are operated on hourly schedules regardless of weather conditions and at other times upon request (see special operation of radiobeacon stations given in *Light Lists*), giving mariners opportunity to make such frequent observations, and often to check the results directly with visual bearings.

Skill in the operation of the radio direction finder can be obtained only by practice and by observing the technical instructions for the set in question. For these reasons the operator should study carefully the instructions issued with the set and should practice taking bearings frequently so that when bearings are needed he can obtain them rapidly and accurately.

As the operator obtains bearings by revolving the direction finder coil until the signal disappears or becomes a minimum, the operator can tell by the size of the arc of silence or of minimum strength approximately how accurately he has taken the bearing. For instance, if the minimum is broad and the residual signal covers about 10° with equal strength, it is doubtful if the bearing can be accurately estimated within 3° or 4°. Where direction finder bearings are not taken by the navigating officer, it will frequently be advantageous for the mariner to have his ship's operator report the probable operator's error of the bearing taken.

Radio bearings from other vessels.—Any vessel with a radio direction finder can give a bearing to a vessel equipped with a radio transmitter. Such service will generally be furnished when requested, particularly by Government vessels. These bearings, however, should be used only as a check, as comparatively large errors may be introduced by local conditions surrounding the radio direction finder unless known and accounted for. Any radio station, the position of the transmitter of which is definitely known, may service as a radiobeacon for vessels equipped with a radio direction finder. However, mariners are cautioned that stations established especially for maritime service are more reliable and safer for use by the mariner, for numerous reasons.

Caution, when taking radio bearings from a ship one should be careful to take the bearing when the vessel is on an even keel. Large errors may be introduced if the vessel is listed when the bearing is taken.

Conversion of radio bearings to Mercator bearings.—The increasing use of radio directional bearings for locations of ships' positions at sea, especially during foggy weather, has made it particularly desirable to be able to apply these radio bearings directly to the nautical chart. These radio bearings are the bearings of the great circles passing through the radio stations and the ship, and, unless in the plane of the Equator or of a meridian, would be represented on a Mercator chart as curved lines. Obviously it is impracticable for a navigator to plot such lines on a Mercator chart, so it is necessary to apply a correction to a radio bearing to convert it into a Mercator bearing, that is, the bearing of a straight line on a Mercator chart laid off from the sending station and passing through the receiving station.

A table of corrections is given for the conversion of a radio bearing into a Mercator bearing. It is sufficiently accurate for practical purposes for distances up to 1,000 miles.

The only data required are the latitudes and longitudes of the radiobeacons and of the ship by dead reckoning. The latter is scaled from the chart, and the former either scaled from the chart or taken from the list of radiobeacons in the *Light List* or H. O. Publication No. 205 *Radio Navigational Aids.*

The table is entered with the differences of longitude in degrees between the ship and station (the nearest tabulated value being used), and opposite the middle latitude between the ship and station, the correction to be applied is read.

The sign of the correction (bearings read clockwise from the north) will be as follows: In north latitude, the minus sign is used when the ship is east of the radiobeacon and the plus sign used when the ship is west of the radiobeacon. In south latitude, the plus sign is used when the ship is east of the radiobeacon, and the minus sign is used when the ship is west of the radiobeacon.

To facilitate plotting, 180 degrees should be added to the corrected bearing, and the result plotted from the radiobeacon.

Should the position by dead reckoning differ greatly from the true position of the ship as determined by plotting the corrected bearings, a retrial should be made, using the new value as the position of the ship.

Example.—A ship in latitude 39°51′ N., longitude 67°35′ W., by dead reckoning, obtains a radio bearing of 299° true on the radiobeacon located in latitude 40°37′ N., and longitude 69°37′ W.

Radiobeacon station	Latitude	40°37′ N.
Dead reckoning position of ship	Latitude	39°51′
Middle latitude		40°14′
Radio station	Longitude	69°37′ W.
Dead reckoning position of ship	Longitude	67°35′
Longitude difference		2°02′

Entering the table with difference of longitude equals 2°, which is the nearest tabulated value, and opposite 40° middle latitude, the correction of 39′ is read.

The ship being east of the radiobeacon, the correction is minus. The Mercator bearing will then be 299° — 0°39′=298°21′. To facilitate plotting, add 180° and plot from the position of the radiobeacon, the bearing 298°21′+180° or 478°21′ or 118°21′ (Mercator bearing reckoned clockwise from north true).

In cases of collision with aids to navigation it frequently happens that such accidents are not reported as promptly as desirable to the District Coast Guard Officer, and consequently repair or replacement is delayed to the detriment of marine traffic. Vessel operators should give notice of such collisions to the nearest local or district office of the U. S. Coast Guard or to Coast Guard Headquarters, as required by law and regulation.

Numbering and recording of undocumented vessels.—Under the act of June 7, 1918, as amended, and the regulations issued thereunder, every undocumented vessel operated in whole or in part by machinery, owned in the United States and found on the navigable waters thereof, except public vessels and vessels not exceeding 16 feet in length, measured from end to end over the deck excluding sheer, temporarily equipped with detachable motors, shall be numbered. The requirements contemplate that machinery-propelled undocumented vessels of less than 5 net tons used for commercial purposes, which are owned in the United States and found on such waters, be numbered under the provisions of the act as such vessels, by reason of tonnage, are exempt from documentation. The Numbering Act, however, is for the purpose of identification only and the certificate of award of number which is issued to any such vessel is solely for such purpose. It is not an authorization, license, or permit for any such vessel to engage in trade.

Table of corrections, in minutes

[DIFFERENCE OF LONGITUDE IN DEGREES]

Mid. L.	½°	1°	1½°	2°	2½°	3°	3½°	4°	4½°	5°	5½°	6°	6½°	7°	7½°	8°	8½°	9°	9½°	10°
15°	4	8	12	16	19	23	27	31	35	40	43	47	50	54	58	62	66	70	74	78
16°	4	8	12	17	21	25	29	33	37	41	45	50	54	58	62	66	70	74	79	83
17°	4	9	13	18	22	26	31	35	39	44	48	53	57	61	66	70	75	79	83	88
18°	5	9	13	19	23	28	32	37	42	46	51	56	60	65	70	74	79	83	88	93
19°	5	10	15	20	24	29	34	39	44	49	54	59	63	68	73	78	83	88	93	98
20°	5	10	15	21	26	31	36	41	46	51	56	62	67	72	77	82	87	92	98	103
21°	5	11	16	21	27	32	38	43	48	54	59	64	70	75	81	86	91	97	102	108
22°	6	11	17	22	28	34	39	45	51	56	62	67	73	79	84	90	96	101	107	112
23°	6	12	18	23	29	35	41	47	53	59	64	70	76	82	88	94	100	105	111	117
24°	6	12	18	24	31	37	43	49	55	61	67	73	79	85	92	98	104	110	116	122
25°	6	13	19	25	32	38	44	51	57	63	70	76	82	89	95	101	108	114	120	127
26°	7	13	20	26	33	39	46	53	59	66	72	79	85	92	99	105	112	118	125	131
27°	7	14	20	27	34	41	48	54	61	68	75	82	89	95	102	109	116	123	129	136
28°	7	14	21	28	35	42	49	56	63	70	77	84	92	99	106	113	120	127	134	141
29°	7	15	21	29	36	44	51	58	65	73	80	87	95	102	109	116	124	131	138	145
30°	7	15	22	30	38	45	53	60	68	75	83	90	98	105	113	120	127	135	143	150
31°	8	15	23	31	39	46	54	62	70	77	85	93	100	108	116	124	131	139	146	155
32°	8	16	24	32	40	48	56	64	72	79	87	95	103	111	119	127	135	143	151	159
33°	8	16	25	33	41	49	57	65	74	82	90	98	106	114	123	131	139	147	155	163
34°	8	17	25	34	42	50	59	67	75	84	92	101	109	117	126	134	143	151	159	168
35°	9	17	26	34	43	52	60	69	77	86	95	103	112	120	129	138	146	155	163	172
36°	9	18	26	35	44	53	62	71	79	88	97	106	115	123	132	141	150	159	168	176
37°	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	163	172	181
38°	9	18	28	37	46	55	65	74	83	92	102	111	120	129	139	148	157	166	175	185
39°	9	19	28	38	47	57	66	75	85	94	104	113	123	132	142	151	160	170	179	189
40°	10	19	29	39	48	58	68	77	87	96	106	116	125	135	145	154	164	174	183	193
41°	10	20	30	39	49	59	69	79	89	98	108	118	128	138	148	157	167	177	187	197
42°	10	20	30	40	50	60	70	80	90	100	110	120	130	140	151	161	171	181	191	201
43°	10	20	31	41	51	61	72	82	92	102	113	123	133	143	153	164	174	184	194	205
44°	10	21	31	42	52	63	73	83	94	104	115	125	135	146	156	167	177	188	198	208
45°	11	21	32	42	53	64	74	85	95	106	117	127	138	149	159	170	180	191	201	212
46°	11	22	32	43	54	65	76	86	97	108	119	129	140	151	162	173	183	194	205	216
47°	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	186	197	208	219
48°	11	22	33	45	56	67	78	89	100	111	123	134	145	156	167	178	190	201	212	223
49°	11	23	34	45	57	68	79	91	102	113	125	136	147	158	170	181	192	204	215	226
50°	11	23	34	46	57	69	80	92	103	115	126	138	149	161	172	184	195	207	218	230
51°	12	23	35	47	58	70	82	93	105	117	128	140	152	163	175	186	198	210	221	233
52°	12	24	35	47	59	71	83	95	106	118	130	142	154	165	177	189	201	213	225	236
53°	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
54°	12	24	36	49	61	73	85	97	109	121	133	146	158	170	182	194	206	218	231	243
55°	12	25	37	49	61	74	86	98	111	123	135	147	160	172	184	197	209	221	233	246
56°	12	25	37	50	62	75	87	100	112	124	137	149	162	174	187	199	211	224	236	249
57°	13	25	38	50	63	75	88	101	113	126	138	151	164	176	189	201	214	226	239	252
58°	13	25	38	51	64	76	89	102	115	127	140	153	165	178	191	204	216	229	242	254
59°	13	26	39	51	64	77	90	103	116	129	141	154	167	180	193	206	219	231	244	257
60°	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260

Vessels of 16 gross tons and over used exclusively for pleasure purposes are entitled to be documented as yachts by the Bureau of Customs. The documentation of such vessels as yachts is not a mandatory requirement, however, and where such vessels are machinery-propelled and found on United States waters, if not documented, they must be numbered under the provisions of the act. There is no restriction as to length, tonnage, or size of such vessels and the provisions of the Numbering Act should not be confused with those of the Motorboat Act of 1940 providing for the equipment of motorboats not exceeding 65 feet in length and with other machinery-propelled vessels. The regulations issued by the Commandant of the Coast Guard under authority of the Numbering Act clarify the language of the statute requiring the following undocumented vessels to be numbered:

(*a*) All boats equipped with permanently installed motors.

(*b*) All boats over 16 feet in length equipped with detachable motors.

The following undocumented vessels are not required to be numbered:

(*a*) Public vessels.

(*b*) All boats not exceeding 16 feet in length temporarily equipped with detachable motors.

(*c*) Motor lifeboats carried as lifesaving equipment on inspected vessels.

The words *temporarily equipped with detachable motors* shall be construed to mean outboard motors which are clamped or otherwise temporarily fastened as distinguished from outboard motors bolted or otherwise permanently secured. The controlling principle shall be whether or not the vessel has permanently installed motors rather than the design or construction of the vessel. A boat designed specifically for the use of an outboard motor as the ordinary means of propulsion, if not exceeding 16 feet in length, is nevertheless exempt from the requirements of the act if temporarily equipped with an outboard motor.

Applications and issuance of numbers.—Upon the purchase of an undocumented vessel which has been issued a certificate of award of number under the provisions of the act of June 7, 1918, as amended, and after completion of the bill of sale on the reverse side of the certificate by the vendor or the former owner, the purchaser should execute the application for number for undocumented motor vessel, which is incorporated on the reverse side of the certificate of award of number (CG 1513) and surrender the certificate, bill of sale, and application for a new number to the Officer in Charge, Marine Inspection, U. S. Coast Guard, having jurisdiction over the area in which the vessel is owned, within the statutory period of 10 days. That officer upon receipt of the certificate with the bill of sale and application properly executed, and upon being satisfied with the evidence of ownership, will assign a number to the vessel and forward the certificate and accompanying papers to the District Commander for processing. He will at the same time issue to the new owner a letter authorizing the operation of the vessel for a limited period, without the certificate of award of number on board, pending the issuance of such papers by the District Commander.

In the case of such vessels which are new or which have never been numbered under the provisions of the act of June 7, 1918, as amended, or which are operating under the old form of certificate of award of number, application should be made to the Officer in Charge, Marine Inspection, U. S. Coast Guard, having jurisdiction over the area in which the vessel is owned, for a certificate of award of number by presenting proper evidence of ownership such as a bill of sale, or builder's certificate, and by the execution of Form CG 1512, application for number for undocumented motor vessel. Upon the execution of these cards in duplicate and the presentation of evidence of ownership, the Officer in Charge, Marine Inspection, U. S. Coast Guard, will accept the application and accompanying papers, transmitting same to the District Commander for processing and will thereupon assign a number to the vessel, at the same time issuing a letter authorizing the operation of the vessel for a temporary period under the numbers assigned and pending the issuance of a certificate of award of number by the District Commander.

Number required on bows of vessels.—Upon assignment of a number by the Officer in Charge, Marine Inspection, U. S. Coast Guard, or upon receipt of the certificate of award of number, the number awarded shall be painted or attached to each bow of the vessel and shall be in block characters of good proportion and not less than 3 inches in height, reading from left to right and parallel with the waterline, as near the forward end of the bow as legibility of the entire number for surface and aerial identification permits. The number shall also be of a color in contrast with the color of the hull so as to be distinctly visible and legible.

Carrying certificate of award of number.—The certificate of award of number must be kept on board at all times (unless in the custody of the Coast Guard), except in the case

of vessels not exceeding 17 feet in length, or vessels whose design or fittings are such that the carrying of such certificate on board would render it imperfect, illegible, or would otherwise tend to destroy its usefulness as a means of ready identification.

Search and rescue operations for surface vessels or aircraft in distress or overdue are coordinated by the Coast Guard. Air-Sea Rescue planes have special markings of chrome yellow on the wing tips and wing-tip floats. The cooperation of vessel operators with the Air-Sea Rescue planes may mean the difference between life and death of some seaman or aviator.

Operators of disabled wooden craft that are, or may consider themselves to be, the object of a search should hoist on a halyard or otherwise place aloft any metallic object that would assist their detection by radar. All Coast Guard patrol vessels, planes, and some buoy tenders utilize this equipment and thus can continue searches in darkness and during other periods of low visibility if it can be assumed that the object of the search can be detected through the use of this aid.

Actual observations have shown that wooden hulls or other non-metallic objects are suited as radar targets according to the size, orientation, shape, and other radar-reflecting qualities of the object. Their value as radar targets may be enhanced by the use of special radar-reflecting devices properly oriented and placed as high above the waterline as possible. The largest metallic object available should be used.

Distress Signals.—Submarine emergency identification signals.—The following smoke bomb or flare signals are made by submarines of the United States in cases of necessity:

Black or green.—Indicates torpedo has been fired. Will be used to simulate torpedo firing on special exercises such as convoy exercises.

Yellow.—Indicates that submarine is about to come to periscope depth from below periscope depth. Surface craft terminate antisubmarine counterattacks and clear vicinity of submarine. Do not stop propellers!

Red.—Indicates an emergency condition within the submarine and she will surface immediately if possible. Surface vessels clear the area and stand by to give assistance after the submarine has surfaced. In case of repeated red signals, or if the submarine fails to surface within a reasonable time, she may be assumed to be disabled. Buoy the location, look for submarine marker buoy, and attempt to establish sonar communications. Advise naval authorities.

The foregoing, all of which mark the submarine's position, are fired from a submerged signal ejector into the air to a height of about 300 feet, then float downward slowly, suspended from a small parachute, and give colored illumination for about 30 seconds.

Submarines are also equipped with marker buoys which are about 3 feet in diameter, painted yellow, and equipped with telephones for communication with the interior of the submarine. A submarine on the bottom in distress and unable to surface, will, if possible, release this buoy. An object of this description which is sighted on the surface of the water should be investigated and naval authorities advised.

Signals for aid of aircraft in distress.—The information below is quoted from Annex 12 to International Civil Aviation Organization (S.A.R.) (Annex), Search and Rescue signals.

6.1—Signals with surface craft.

6.1.1—When it is necessary for an aircraft to direct a surface craft to the place where an aircraft or a surface craft is in distress, the aircraft shall do so by transmitting precise instructions by any means at its disposal. If such precise instructions cannot be transmitted or when necessary for any other reason, the instructions shall be given by using the procedure prescribed in 6.1.2.

NOTE.—Normally a change of heading will be made by a surface craft as an acknowledgement that the direction has been received and will be compiled with. If the surface craft is unable to comply it will so indicate by hoisting the International flag N, or by other visual or radio means.

6.1.2.—The following procedures performed in sequence by an aircraft shall mean that an aircraft is directing a surface craft toward an aircraft or a surface craft in distress:

(a) Circling the surface craft at least once.

(b) Crossing the projected course of the vessel close ahead at a low altitude, opening and closing the throttle, or changing the propeller pitch.

(c) Heading in the direction in which the surface craft is to be directed. Repetition of such procedures shall have the same meaning.

6.1.3—The following procedure performed by an aircraft shall mean that the assistance of the surface craft to which the signal is directed is no longer required:

Crossing the wake of the vessel close astern at a low altitude, opening and closing the throttle, or changing the propeller pitch.

Mariners are advised that while U. S. Government vessels or planes in distress may exhibit the recognized International Distress signals, as set forth under the International Rules of the Road, they may be equipped with an additional distress signalling device intended to supplement the regular distress signals. This apparatus emits an orange smoke visible by day and red flames which can be seen at night.

Rescue operations for ditching and disabled aircraft.—Mariners may at any time be called upon to assist aircraft, which have become disabled, in the process of ditching these craft in the ocean and completing the rescue of personnel aboard.

The following procedure and suggestions are set forth by the Commander, Eastern Area, U. S. Coast Guard:

Establish good means of communication with aircraft if possible and attempt to get as close together as time permits before actual ditching takes place. Describe the force and direction of the surface wind and condition of the sea as accurately as possible. This factor will greatly affect the pilot's decision in how to ditch his plane and is often the deciding factor in a successful ditching operation. If the operation is to be attempted at night, use of the searchlight and all other ship's lighting has been found very beneficial, but care should be taken that the pilot of the aircraft is not blinded by the lights.

After the ditching has been completed, care must be taken not to maneuver the ship too close to the aircraft, as they might drift together.

Station several lookouts if possible in high places and assign each one a separate boat, life raft, or survivor so that if the survivors become separated they can be readily picked up.

In addition to the regular lifeboat equipment in the ship's boat, it has been proved that the following items are also useful:

Blankets, several flashlights, 2 pairs of heavy gloves, pliers, bolt cutters, metal shears, 2 fire axes, extra life jackets, an inflatable rubber or cork life raft, and several 10-fathom lengths of nine thread.

The rubber or cork life raft can be used to lay alongside the ditched aircraft in cases where the metal lifeboat might become damaged.

After rescue operations are completed, the mariner should make every effort to recover or destroy all equipment or wreckage to preclude future sightings and reporting.

Danger signal information.—During the war it came to the attention of the Coast Guard that many American masters and officers, when on the high seas and danger of collision appeared imminent, used the danger signal of four or more short blasts of the whistle as provided by Article 18, Rule 3 of the Inland Pilot Rules. The International Rules for the Prevention of Collision provide no danger signal, and the use of four or more short blasts of the whistle is neither appropriate nor applicable. The International Code of Signals provides a special signal, the letter **U** which may be transmitted visually or by means of Morse Code (• • —), using a flashing light or a whistle or siren, which signifies *you are standing into danger*. The International Code Signal **D** which may be transmitted visually or by means of Morse Code (— • •), using a whistle or siren, signifies *keep clear of me—I am maneuvering with difficulty*, and can be used as a warning.

Mine sweeping operations.—United States vessels engaged in mine sweeping operations or exercises are hampered to a considerable extent in their maneuvering powers.

Vessels must keep clear of mine sweepers.—With a view to indicating the nature of the work on which they are engaged, these vessels will show the signals hereinafter mentioned. For the public safety, all other vessels, whether steamers or sailing craft, should endeavor to keep out of the way of vessels displaying these signals and not approach them inside the distances mentioned herein, especially remembering that it is dangerous to pass between the vessels of a pair or group sweeping together.

All vessels towing sweeps are to show:

BY DAY.—A black ball at the foremasthead and a black ball at each yardarm.

BY NIGHT.—All around green lights instead of the black balls, and in a similar manner. (These lights may only be exhibited when necessary to warn approaching friendly vessels.)

Vessels or formations showing these signals are not to be approached nearer than 500 yards on either beam and vessels are not to cross astern closer than 1,000 yards. Under no circumstances is a vessel to pass through a formation of mine sweepers.

Mine sweepers should be prepared to warn merchant vessels who persist in approaching too close by means of any of the appropriate signals from the International Code of Signals.

Ship fire signal.—In many ports a standard signal of five prolonged blasts of the whistle or siren has been adopted for use as an alarm in the event of a fire occurring on board the vessel, except vessels underway, or at the dock to which the vessel is moored. Such signal may be used in addition to other means of reporting a fire. The words *prolonged blast* shall mean a blast of from four to six seconds' duration. The signal is not to be used for other purposes. On hearing the 5-blast whistle signal persons on shore should pull a fire alarm box or turn in an alarm to the Fire Department by the most convenient means.

Reports of accidents.—The licensed officer in command of any vessel shall report in writing and in person to the Coast Guard officer nearest the port of first arrival any accident to said vessel involving loss of life, or damage to property, and shall also report in like manner any casualty or loss of life from whatever cause of any person on board such vessel and any stranding or grounding, whether or not any damage has been sustained by the vessel.

CUSTOMS.—The functions of the **Bureau of Customs** include the following: Enter and clear vessels; supervise the discharge of cargo; ascertain the quantities of imported merchandise, appraise and classify such merchandise, and assess and collect the duties thereon; control the custom warehousing of imported merchandise; enforce customs and other laws by inspecting international traffic by vessels.

The Bureau of Customs administers the navigation laws pertaining to registry, enrollment, and licensing of vessels, including the issuing of commissions to yachts and the assignment of signal letters; the measurement of vessels, administration of tonnage duties, and the collection of tolls; the regulation of vessels in the coasting and fishing trade and limitation of the use of foreign vessels in waters under the jurisdiction of the United States; the recording of sales, conveyances, and mortgages of vessels; the protection of steerage passengers; and the remission of fines, penalties, and forfeitures incurred under the laws governing these matters.

Collection districts and ports of entry located within the area covered by this volume are tabulated in the Appendix.

The **IMMIGRATION AND NATURALIZATION SERVICE** is under the jurisdiction of the Department of Justice. The functions of the Service are the administration of the laws relating to the admission, exclusion, and deportation of aliens, the registration and fingerprinting of aliens, and the naturalization of aliens lawfully resident in the United States.

The primary function of the Immigration Border Patrol, which operates as a part of the immigration force, is to detect and prevent the smuggling and surreptitious entry of aliens into the United States in violation of the immigration laws, and to apprehend smugglers of aliens and aliens who have effected unlawful entry.

The immigration laws provide that there shall be paid to the collector of the customs by the master, agent, owner or consignee of a vessel arriving at an American port from a foreign port or place a head tax of $8 for, with certain exceptions, every alien passenger thereon entering the United States.

The designated ports of entry for aliens are divided into three classes. Class A is a designated port of entry for all aliens. Class B is a designated port of entry only for aliens who at the time of applying for admission are lawfully in possession of valid and unexpired resident aliens' border-crossing identification cards or valid nonresident aliens' border-crossing identification cards. Class C is a designated port of entry only for aliens who are arriving in the United States as seamen as that term is defined in the last sentence of section 1 of the Immigration Act of 1917 (39 Stat. 874; 8 U. S. C. 173) [That the term *seaman* as used in this Act shall include every person signed on the ship's articles and employed in any capacity on board any vessel arriving in the United States from any foreign port or place.] No alien may enter the United States at a designated port of entry until and unless he has been inspected by an immigration officer or officers and found to be entitled under the provisions of the immigration laws and regulations to enter the United States. A list of the ports of entry for aliens is given in the Appendix.

QUARANTINE AND HEALTH.—The **United States Public Health Service** is the governmental guardian of the public health, working to prevent the spread of human contagious and infectious diseases.

In addition to its other duties, this bureau administers hospitalization and outpatient treatment at marine hospitals and many other relief stations to legal beneficiaries of the Government; it administers the foreign and domestic quarantine laws, supervising the medical examination of immigrants and enforcing interstate quarantine laws.

Radio report of disease aboard.—The master of the vessel shall report promptly by radio, to the medical officer in charge at the port of entry, the occurrence or suspected occurrence on board of any of the following communicable diseases: Anthrax, chancroid, chickenpox, cholera, dengue, diphtheria, favus, gonorrhea, granuloma, inguinale, impetigo contagiosa, infectious encephalitis, leprosy, lymphogranuloma venereum, measles, meningococcus meningitis, plague, poliomyelitis, psittacosis, ringworm of the scalp, scarlet fever, smallpox, streptococcic sore throat, syphilis, trachoma, tuberculosis, typhoid fever, typhus, yellow fever, or other diseases characterized by fever or skin rash.

Quarantine.—Vessels subject to quarantine inspection include (*a*) all vessels from a port not under the control of the United States, except a vessel which in its current voyage has not touched at any port other than ports under the control of the United States or ports in Canada, Newfoundland, the Islands of St. Pierre and Miquelon, Iceland, Greenland, the west coast of Lower California, Cuba, the Bahama Islands, the Canal Zone, or the Bermuda Islands; or a vessel which having received pratique at a Canadian port located in the international waters of the Juan de Fuca, Haro, Georgia, and Rosario Straits, and Puget Sound and tributaries and connecting waters on the Pacific coast, travels on the same international waters to a United States port and presents a duplicate copy of the Canadian pratique to the quarantine officer.

(*b*) A vessel arriving from any port whether or not under the control of the United States, which has aboard a person infected or suspected of being infected with anthrax, chickenpox, cholera, dengue, diphtheria, infectious encephalitis, measles, meningococcus, meningitis, plague, poliomyelitis, psittacosis, scarlet fever, smallpox, streptococcic sore throat, typhoid fever, typhus, or yellow fever, or arrives from a port where at the time of departure there was present or suspected of being present cholera, plague, or yellow fever, or where there was significant increase in the prevalence of smallpox or typhus at the time the vessel touched there.

A vessel shall fly a yellow flag, International Code Flag **Q**—Queen; anchor in the quarantine anchorage; and await inspection.

Only the quarantine officer, quarantine employees, or pilots, shall be permitted to board any vessel subject to quarantine inspection until after it has been inspected by the quarantine officer and granted pratique, except with the permission of the quarantine officer. A person boarding such vessel shall be subject to the same restrictions as those imposed on the persons on the vessel.

Sanitary inspection.—Vessels arriving at a port under the control of the United States from a foreign port shall be subject to sanitary inspection to ascertain whether there exists rodent, vermin, or insect infestation or other unsanitary condition requiring measures for the prevention of the introduction, transmissions, or spread of communicable disease.

Quarantine regulations are given in the text under the names of the ports.

In general, where State quarantine is in force, the minimum requirements of quarantine are in accordance with the regulations of the Public Health Service. National quarantine regulations will be found at the stations of the service and at United States consulates, and will be furnished to vessels upon application, either by officers of the service or by the Bureau in Washington, D. C.

Medical service.—United States merchant seamen are entitled to medical relief obtainable through the Public Health Service at its established hospitals and relief stations.

A United States seaman is one engaged on board in care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States, or in the service, on board, of those engaged in such care, preservation, or navigation.

Outpatient offices of the Public Health Service are located at the addresses given in the Appendix.

Free medical advice is furnished to seamen by radio. See H. O. Publication 205, *Radio Navigational Aids.*

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE.—To prevent the entry or spread within the United States and its territories of injurious insects and plant diseases, the **Bureau of Entomology and Plant Quarantine** enforces quarantines and restrictive orders, issued under authority provided in various acts of Congress, which prohibit or regulate the importation or interstate movement of injurious insects and of plants and products that may introduce or spread insect pests or plant diseases new to or not widely prevalent within the United States or its territories. In compliance with plant-quarantine regulations it inspects at ports of entry plants and plant products that may be brought into the United States or its territories. A list of the ports within the area covered by this volume at which inspectors of the Bureau are located, is given in the Appendix.

The Bureau inspects plants and plant products offered for export and certifies to shippers and interested parties such products in accordance with the sanitary requirements of the country to which they may be exported.

RADIO.—Radio supervision.—The radio communications in the United States and its possessions, except the Panama Canal Zone, are controlled by the **Federal Communications Commission,** Washington 25, D. C.

Responsibility of shipmasters.—Shipmasters have the responsibility of seeing that the general radio regulations are carried out by the radio operators.

Radio inspectors.—Inspectors of the Federal Communications Commission have authority to board ships at United States ports for the inspection of the radio station to determine whether it complies with international treaties, Federal laws, and such rules and regulations of the Federal Communications Commission which may apply. In general, these inspectors operate at the following ports where field officers of the Commission are located and where information concerning radio regulations and communications may be obtained:

Boston, Mass.	San Juan, P. R.	Los Angeles, Calif.
New York, N. Y.	Tampa, Fla.	San Francisco, Calif.
Philadelphia, Pa.	New Orleans, La.	Portland, Oreg.
Baltimore, Md.	Beaumont, Tex.	Seattle, Wash.
Norfolk, Va.	Galveston, Tex.	Juneau, Alaska
Savannah, Ga.	Houston, Tex.	Honolulu, T. H.
Miami, Fla.	San Diego, Calif.	

Service documents.—The rules and regulations of the International Telecommunication Convention require that when a radio-transmitting installation is compulsory equipment on board a ship, the latter must be provided with the following service documents:

1. The radio license.
2. The operators' certificates.
3. Register (radio service log) in which shall be noted, at the time they occur, service incidents of all kinds, as well as the communications exchanged with land stations or mobile stations and relating to reports of disaster. If the regulations on board permit, the position of the ship shall be indicated once a day in the said register.
4. Alphabetical list of call letters.
5. List of coast and ship stations.
6. List of stations performing special services.
7. The general radio regulations and the additional radio regulations as well as the provisions of the convention necessary for the operations of radio-communication service on board ships.
8. The telegraph rates of the countries for which the station (ship) most frequently accepts radiotelegrams.

The rules and regulations of the United States Federal Communications Commission require certain vessels to have additional service documents, a complete list of which may be obtained from the Federal Communications Commission, Washington 25, D. C., or from its suboffices. For further details concerning the above rules and regulations consult the following publications: Ship Radiotelegraph Safety Rules, The Communications Act of 1934, with amendments, and Radio Navigational Aids, H. O. 205.

Weather Broadcasts.—Marine Weather Bulletins covering North Atlantic and North Pacific waters are issued by the Weather Bureau for broadcast by commercial and Government radio stations. Bulletins for Western North Atlantic waters are broadcast by U. S. Navy Radio Station NSS, Washington, D. C., while those applicable to Eastern North Pacific waters are transmitted by Stations KPH, Bolinas, and KTK, San Francisco, Calif. A separate Marine Bulletin for Central Pacific waters is broadcast by KHK, Kahuku, T. H. The marine bulletins contain Storm Advisories, Weather Summary and Forecasts for the next 24 hours, beginning from the time of broadcast. A selection of ship and coast station reports in abbreviated codes is included in the NSS, KTK, and KHK transmissions for use in preparing shipboard weather maps.

For those ships desiring additional surface and upper air data for preparation of weather maps at sea, Synoptic Weather Bulletins are broadcast by the Civil Aeronautics Administration Stations WSY, New York, N. Y. and WEK, New Orleans, La. Similar transmissions which also include ocean area warnings and forecasts are made by U. S. Navy Stations NBA, Balboa, C. Z.; NPG, San Francisco, Calif., and NPM, Honolulu, T. H.

Areas covered by warnings and forecasts in the marine bulletins, together with time schedules of the broadcasts, are as follows:

NSS, Washington, D. C.: North Atlantic north of Latitude 3° N. and West of Longitude 35° W., including Gulf of Mexico and Caribbean Sea—0200, 0800, 1400 and 2000 G. M. T.

NBA, Balboa, C. Z.: North Atlantic south of Latitude 25° N. and west of Longitude 60° W.; Pacific waters between Latitudes 10° S. and 30° N. and east of Longitude 110° W.—0530, 1030, 1700 and 2230 G. M. T.

NPG, San Francisco, Calif.: North Pacific south of Latitude 60° N. and from Longitude 150° W. to 105° W.—0100, 0700, 1300 and 1900 G. M. T.

KTK, San Francisco, Calif.: North Pacific waters east of the 180th meridian—0420 and 1620 G. M. T.

KPH, Bolinas, Calif.: North Pacific waters east of the 180th meridian—0500 and 1700 G. M. T.

NPM, Honolulu, T. H.: North Pacific waters from the Equator to Latitude 45° N. and from Longitude 140° W. to 160° E.—0330, 0930, 1530, and 2130 G. M. T.

KHK, Kahuku, T. H.: North Pacific from the Equator to Latitude 50° N. and from Longitude 140° W. to 160° E.—0830 and 2030 G. M. T.

Local weather bulletins containing coastal area forecasts, storm warnings when issued, and weather summaries for specified areas are broadcast on schedule twice daily by many government and commercial marine shore radio stations.

Storm warnings, whenever they are issued by the United States Weather Bureau, are the subject of special broadcasts by many Government and commercial radio stations of the mobile service. These special broadcasts are generally preceded by transmission of the Safety Signal (TTT) and the preliminary announcement on 500 kc.

Emergency broadcasts by U. S. Naval Radio Stations.—Storm warnings and notices concerning the safety of navigation at sea of an urgent nature are broadcast by United States Naval Radio stations in accordance with the urgency, as follows:

A. Notices of an urgent nature, such as tidal waves, hurricanes, typhoons, cyclones, etc., so imminent as to warrant immediate broadcasting:

1. One transmission immediately on receipt.
2. One transmission at the end of the first ensuing silent period.
3. One transmission during the first ensuing on-watch period for ships with one operator, in case both previous transmissions were made during the off-watch period.

B. Storm warnings and notices of less urgency than those specified in (A) above and other than those normally included in scheduled hydrographic broadcasts:

1. One transmission at the end of the first ensuing silent period.
2. One transmission during the on-watch period for ships with one operator in case the previous transmission was made during an off-watch period.

These broadcasts are preceded by transmission of the Urgent Signal (XXX) or Safety Signal (TTT) and a preliminary announcement on 500 kc. with subsequent shift to indicated station working frequency for transmission of the message.

Emergency broadcasts by U. S. Coast Guard radio stations.—Storm and hurricane warnings, advisories, and other urgent marine information are broadcast by Coast Guard radio stations:

A. By radiotelegraph:

(1) At the end of the first silent period (HH:18 or HH:48) following receipt of the message at the radio station.

(2) At the end of the first ensuing silent period falling within the watch hours for single-radio-operator ships in case the previous transmission occurred during an off-watch period.

(3) In the station's next scheduled weather or hydrographic broadcast.

B. By radiotelephone:

(1) Immediately upon receipt of the message at the radio station.

(2) In the station's next scheduled weather or hydrographic broadcast.

The radiotelegraph broadcasts are preceeded by transmission of the safety signal and announcement on 500 kcs., as described above for Naval stations. The broadcasts by radiotelephone are preceeded by transmission of the safety signal for voice (Sécurité) on 2670 kcs., with announcement of the broadcast to follow on the station's working frequency.

Radiotelephonic broadcasts of weather information (United States).—Transmission by voice of weather information from the Weather Bureau is made through certain radio stations of the Coast Guard and of the commercial coastal harbor radiotelephone service.

These broadcasts are followed immediately by reports of dangerous obstructions and changes in aids to navigation.

This service gives to yachts, fishing craft, tugboats and other vessels equipped with a radio receiving set having a band covering the frequency range of 2 to 3 megacycles, official weather information from the Weather Bureau in plain language and on regular schedules.

These radiotelephone broadcasts are made twice and, in some cases, four times daily at definite times, and include marine forecasts (and storm warnings whenever they are issued) for coastal waters in or adjacent to the areas served by the radio stations.

Small craft warnings of winds likely to interfere with the safe operation of small craft are included in these broadcasts.

Certain local radio stations in the standard broadcast band have microphones installed in nearby Weather Bureau offices. From these stations forecasts, weather summaries, and warnings are broadcast on regular schedule. For stations and schedules in the area covered by this volume, see the Appendix.

West Indies.—Coast Guard station NMR, San Juan, P. R. broadcasts twice daily by radiotelephone and radiotelegraph a weather bulletin consisting of marine forecasts and weather summary for the Caribbean Sea area and small craft, storm and hurricane warnings when applicable.

Mexico and Canada.—Scheduled broadcasts of weather information affecting the coasts of Mexico and Canada are made by designated stations of those countries on marine frequencies by both radiotelegraph and radiotelephone.

Alaska.—Weather broadcasts are made by radiotelegraph and radiotelephone by Naval station NHB, Kodiak, and Coast Guard station NMJ, Ketchikan. Radiotelephone broadcasts are made also by various stations of the Alaska Communication System operating in the 2-megacycle band.

Circulars giving complete details relating to the broadcasting of weather information, including times and frequencies, are available on request to the Weather Bureau. Similar information is also given in H. O. Publication 206, *Radio Weather Aids*, including decoding tables and station index numbers.

Reports from ships.—The master of every ship of the United States equipped with radio transmitting apparatus, on meeting with a tropical storm, dangerous ice, derelict, or any other direct danger to navigation, is required to cause to be transmitted a report of these dangers to ships in the vicinity and to the appropriate Government agencies.

Weather reports (United States.)—Weather reports should not be sent regularly except from ships with which specific arrangements have been made by the United States Weather Bureau, but masters of all ships encountering tropical or other severe storms should send special observations by radio.

These reports should be sent in the International Meteorological Code, unsigned and checked PREPAID, UNITED STATES GOVERNMENT. They should be given Safety Message priority and addressed OBSERVER WASHINGTON from Atlantic waters and OBSERVER SAN FRANCISCO from Pacific waters.

If a copy of the code is not available on shipboard, the message may be sent in plain language. Copies of the *International Meteorological Code for Ships* may be obtained free on application to the United States Weather Bureau, Washington 25, D. C. It may also be found in H. O. Publication 206, *Radio Weather Aids*.

During the West Indies hurricane season, June 1 to November 30, ships in the Gulf of Mexico, Caribbean Sea area, Southern North Atlantic Ocean and the Pacific waters west of Central America and Mexico are urged to cooperate with the Weather Bureau in furnishing these special reports in order that warnings to shipping and coastal areas may be issued.

Time Signals.—The United States system of broadcasting time signals begins at 55 minutes 0 seconds of some hour and continues for 5 minutes. Signals are transmitted on every second during that time, except that there is no signal on the twenty-ninth second of any minute, nor on certain seconds at the ends of the minutes, as shown in the following diagram:

Minute	Second										
	50	51	52	53	54	55	56	57	58	59	60
55	—		—	—	—	—					—
56	—	—		—	—	—					—
57	—	—	—		—	—					—
58	—	—	—	—		—					—
59	—										—

The dashes in the above diagram indicate seconds on which signals are transmitted. The seconds marked "60" are the zero seconds of the following minutes. All seconds from 0 to 50, inclusive, are transmitted except the twenty-ninth second. The dash on the beginning of the hour (shown as 59 minutes 60 seconds) is much longer than the others, i. e., 1.3 seconds. In all cases the beginnings of the dashes indicate the beginnings of the seconds, and the ends of the dashes are without significance. It will be noted that the number of dashes sounded in the group at the end of any minute indicates the number of minutes of the signal yet to be sent. In the event of a failure or an error occurring in any of the time signals another time signal will be transmitted 1 hour later on the same frequency.

Standard Frequency Broadcast Service of National Bureau of Standards.—The technical radio services broadcast continuously by the National Bureau of Standards, Central Radio Propagation Laboratory, from its radio station WWV near Washington, D. C., include a total of eight radio frequencies, 2.5, 5, 10, 15, 20, 25, 30, and 35 megacycles, which are on the air at all times, day and night. This insures reliable coverage of the United States and extensive coverage of other parts of the world.

Station WWVH on the island of Maui, Hawaii, broadcasts on three frequencies, 5, 10, and 15 megacycles. Further information about WWVH is given later in this section.

The services are: (1) Standard radio frequencies, (2) time announcements, (3) standard time intervals, (4) standard audio frequencies, (5) standard musical pitch, 440 cycles per second, corresponding to A above middle C, (6) radio propagation disturbance warning notices.

Time announcements.—The audio frequencies are interrupted at precisely 1 minute before each hour and each 5 minutes thereafter. They are resumed precisely on the hour and each 5 minutes thereafter.

The beginnings of the periods, when the audio frequencies are resumed, are in agreement with the basic service of the United States Naval Observatory so that they mark accurately the hour and successive 5-minute periods.

Megacycles	Power, kw.	Modulation	Audio frequencies cycles per second
2.5	0.7	1	400 or 600
5	8.0	1	440 or 600
10	9.0	1	440 or 600
15	9.0	1	440 or 600
20	*8.5	1	440 or 600
25	0.1	1	440 or 600
30	0.1	1	
35	0.1	1	

* 0.1 kw., for first 4 work days after first Sunday of each month.

Greenwich Mean Time is announced in telegraphic code each 5 minutes. This provides a quick reference to correct time where a timepiece may be in error by a few minutes. The 0- to 24-hour system is used starting with 0000 at midnight. The first two figures give the hour and the last two figures the number of minutes past the hour when the tone returns. For example, at 1655 GMT, or 11:55 a.m., Eastern Standard Time, four figures (1, 6, 5, and 5) are broadcast in code. The code used, International Morse, is given below. The time announcement refers to the end of the announcement interval, i. e., when the audio frequencies are resumed.

Numerals in International Morse Code

0 — — — — —	2 • • — — —	4 • • • • —	6 — • • • •	8 — — — • •
1 • — — — —	3 • • • — —	5 • • • • •	7 — — • • •	9 — — — — •

A voice announcement of Eastern Standard Time is given following each telegraphic code announcement. For example, at 9:10 EST the voice announcement in English is: "This is radio station WWV; when the tone returns it will be 9:10 a.m. Eastern Standard Time; 9:10 a. m."

Two standard audio frequencies, 440 cycles per second and 600 cycles per second, are broadcast on all radio carrier frequencies except 30 and 35 mc. The audio frequencies are given alternately, starting with 600 cycles every hour on the hour for four minutes, interrupted one minute, followed by 440 cycles for four minutes, and interrupted one minute. Each ten-minute period is the same.

Standard time intervals.—On each carrier frequency is a pulse of 0.005-second duration which occurs at intervals of precisely 1 second. The pulse consists of five cycles, each of 0.001-second duration, and is heard as a faint tick when listening to the broadcast. It may be used as an accurate time signal. On the fifty-ninth second of every minute the pulse is omitted. The 1-minute, 4-minute, and 5-minute intervals, synchronized with the seconds pulses, are marked by the beginning or ending of the periods when the audio frequencies are off.

Radio propagation disturbance warning notice.—A warning of radio propagation conditions is broadcast in code on each of the standard radio carrier frequencies at 19 and 49 minutes past the hour. If a warning is in effect, the letter "W" (in International Morse Code • — —) is repeated 6 times following the time announcement; if unstable conditions are expected, the letter "U" (in International Morse Code • • —) is repeated 6 times; if there is no warning, the letter "N" (in International Morse Code — •) is repeated 8 times.

A warning (W) means that radio propagation disturbance of the ionosphere-storm type in the North Atlantic region is anticipated within 12 hours, or is in progress, with its most severe effects on radio transmission paths for which the control points of transmission lie in or near the northern auroral one. This type of radio propagation disturbance is characterized by low intensities, accompanied by utter or rapid fading on the normal frequencies used at the different times of the day, or by complete blackouts of signals. By shifting to lower than normal frequencies for that time of day it may be possible to obtain communication, although with lower than normal intensity. Owing to increased auroral-zone absorption during the disturbance, however, usable transmission may be impossible on any high frequency. Also, *during a period of radio propagation disturbance, direction-finder observations may be unreliable.* Sudden ionosphere disturbances (SID) characterized by simultaneous fadeouts in the entire high-frequency spectrum, on paths in the daylight side of the world, are not covered by this warning.

The usual daily time for changing the announced warning is 2119 GMT (4:19 p.m., EST). The notice is, however, changed at any hour when disturbance becomes noticeable or anticipated. After a warning (W), the announcement is returned to "U" and later to "N" as conditions return to normal. Thus any time a radio operator questions reception of North Atlantic paths, it would be advisable to check with the WWV announcement to see whether conditions are considered disturbed by the Bureau's Warning Service.

Distance range of reception.—Of the radio frequencies of WWV, the lowest provides service to short distances, and the highest to great distances. Reliable reception is in general possible at all times throughout the United States and North Atlantic Ocean, and at some times throughout the world. One should select the frequency that gives the best reception at any particular place and time. This can usually be done by two methods:

A. By tuning to the different frequencies and selecting the one most suitable at that time. For nighttime conditions over the propagation path, lower frequencies than those used during the day are usually necessary because of the skip. Received intensities on usable frequencies are much greater for nighttime than for daytime conditions.

B. By making use of techniques of prediction of usable frequencies.

Additional information on how to receive and utilize the service is given in the Bureau's Letter Circular, LC974, *Technical Radio Broadcast Services, Radio Station WWV*, obtainable on request. The Bureau welcomes reports on reception, methods of use, or special applications of the service. Correspondence should be addressed to Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

Radio Station WWVH.—Radio Station WWVH, recently established by the National Bureau of Standards on the island of Maui, Territory of Hawaii, broadcasts on an experimental basis, on 5, 10, and 15 megacycles. Station WWVH extends to the Pacific area the following technical services: Standard radio frequencies, time announcements, standard time intervals, standard audio frequencies and standard musical pitch. Omnidirectional antennas radiate approximately 400 watts of power at each carrier frequency.

The program of broadcasts of WWVH, on its three frequencies, 5, 10, and 15 mc., is the same as that of station WWV for standard time intervals, time announcements in code, standard audio frequencies, and accuracy. Reports received indicate that station WWVH may be usefully received at many locations not served by station WWV and that simultaneous reception of WWV and WWVH does not interfere with ordinary use of the standard frequencies and time signals.

The entire broadcast (modulation and carrier) is interrupted for periods of approximately four minutes immediately after each hour and half hour, and for periods of approximately forty minutes beginning at 0700 and 1900 GMT. These interruptions are made to permit operation of automatic ionospheric sounding equipment at the Hawaiian field station and to compare the local standards at WWVH with broadcasts by station WWV.

NAVIGATIONAL WARNINGS.—Radiotelegraphic navigational warnings affecting the waters of the United States and possessions are compiled by the United States Hydrographic Office; the United States Coast Guard; and the North Atlantic International Ice Patrol, United States Coast Guard vessel. These warnings contain information of importance to the safety of navigation, such as the position of ice and derelicts, and defects and changes in aids to navigation, mine fields, and the like which are later published in the *Notice to Mariners.*

Radiotelephone transmission by voice of navigational warnings is made immediately after the regular radiotelephonic broadcast of weather information by the same stations, following the same schedule and method of procedure.

These radiotelephone warnings contain the latest reports of local changes in aids to navigation such as are later published in the *Notice to Mariners* and the late and more important reports of obstructions to navigation in nearby waters as received from the Hydrographic Office and local sources.

Complete details relative to radiotelephonic or radiotelegraphic navigational warnings are given in H. O. Publication 205, *Radio Navigational Aids.*

Ships in distress.—Radio-equipped vessels requiring assistance may obtain the services of the Coast Guard by transmitting a request on the international distress and calling frequency 500 kc. to "Any Coast Guard Unit" (radio call NCU), or to any shore radio station addressed to "COGUARD." Shore radio stations will forward to the Coast Guard all information regarding vessels requiring assistance unless such information is contained in a message specifically addressed elsewhere.

If the following information is included in the original request for assistance it will place the responsible Coast Guard officer in a position to determine immediately the types and number of vessels required to render adequate aid; thus greatly facilitating the work of the Coast Guard and avoiding any unnecessary delay in the dispatching of assistance.

1. Name, type, and nationality of vessel: color, size, and shape.
2. Position, course, and speed (including drift).
3. Nature of trouble and condition of vessel, sea, and wind. Action taken, if any.
4. Number of persons on board.
5. State whether or not Coast Guard assistance is required.

Small craft in distress.—Under the provision of the international regulations, which permit the use of any means available to a vessel or aircraft in distress to draw attention and obtain help, small commercial and private craft equipped with radiotelegraph or radiotelephone apparatus that cannot be operated on the international distress frequency of 500 kc. (600 m.) may usually obtain United States Coast Guard assistance by transmitting the distress signal or call and the message on the 2670 kc. (112 m.) frequency. Practically all Coast Guard units maintain a continuous watch on 2670 kc. and will answer emergency calls thereon, if heard.

Medical advice by radio.—Arrangements are made in various countries whereby mariners of all nationalities may obtain medical advice by radio. In the United States and its possessions free medical advice is obtainable through Government and commercial radio stations of its mobile service. This advice is given in language intelligible to the layman. For further details see H. O. Publication 205, *Radio Navigational Aids.*

LORAN is a system of position finding by reception of radio signals from specially designed transmitting stations of known position. The name is derived by combining the first two letters of "long," the first two letters of "range," and the first letter of "navigation." It is designed to furnish reliable positions to navigators at greater distances from the transmitting stations than is possible by other methods of radio navigation.

The principle of the Loran system is the determination of the difference of the distances of two radio transmitting stations from the observer, though not the actual distance of either station. This is accomplished by determining how much more time a signal or pulse from one station takes to reach him than a signal or pulse from the other. Upon a chart a curve is drawn through all points whose distances from these stations differ by the amount found from the observation. The vessel must be somewhere on this curve, which is the Loran line of position with reference to these stations. Similarly, another line of position is obtained by comparing the signals received from another pair of stations. Since the vessel must be on both lines, the point of their intersection is its position.

Because of the velocity of propagation of radio waves, 162,000 nautical miles per second, the time differences are extremely small, being measured in millionths of a second. These small time intervals are determined visually by measuring on the luminous time scale of the receiver aboard ship or aircraft the separation between reference marks made by the reception of the pulses from the transmitting stations. This time scale is formed by the motion of a point of light, which is the tip of a ray of electrons, controlled by electrical circuits in the receiver. The components of this motion take place in a few millionths of a second and are not visually perceptible, but the complete cycle in the formation of the time scale is repeated over and over at the rate of approximately 25 times per second. Due to persistence of vision, the eye sees a continuous pattern as in motion pictures. It is on this microsecond time scale that the time difference is measured.

The position of the vessel is found from the time difference by the use of Loran charts or tables. For the service area of each pair of transmitting stations the time differences which a vessel would observe are laid down in a pattern of lines. Each line is labeled with the time difference which is common to all points on it. The navigator has only to select the line of position indicated by the reading of the Loran receiver. Loran tables are used to determine positions of greater accuracy than is possible with the average small-scale Loran chart. The tables furnish the data necessary to plot, on any chart, the required segment of the line of position.

Caution.—Loran Position determinations on or near the base-line extensions are subject to considerable error and therefore should be avoided whenever possible. For accurate position determinations in the base-line extension area, the use of a radio bearing (or other means) along with Loran lines from another rate is recommended.

Loran charts and tables are compiled and distributed by the Hydrographic Office. They are available for all effective Loran service areas, which include the more frequented portions of the North Atlantic, North Pacific, South Pacific, and Indian Oceans.

The Coast and Geodetic Survey is printing Loran lines of positions on various sailing and inshore navigational charts.

The Hydrographic Office distributes H. O. Misc. 15308, *Loran Accuracy Diagram.* The diagram shows, for the regions of the world where Loran is available, the limits of areas within which Loran ground wave lines of position have average errors of 1 mile or less, and areas within which sky wave lines of position have average errors of 2 miles or less. In addition, there are outlined all areas where two or more Loran lines of position intersect at angles greater than 15 degrees.

Mariners and aviators are requested to notify the Commandant (OAN), Coast Guard Headquarters, Washington 25, D. C., or the nearest Coast Guard District Commander, of any defect observed in the operation of the Loran System (blinking is *not* a defect). The notification should include information as to the Loran rate involved, whether signals observed are ground waves or sky waves, the nature of the defect, the approximate position of the craft, and the date and time (GMT) of observation of the defective operation.

Suggestions for improvement of Loran service are also requested, addressed to Commandant (OAN), Coast Guard Headquarters, Washington 25, D. C.

RADAR (Radio Detection and Ranging) is one of the most important of recent developments affecting the techniques of navigation. It is an anticollision and piloting device that may be used during darkness and low visibility to detect most objects and to furnish an accurate measurement of range under all conditions. However, it has many limitations as well as advantages. Radar is merely a supplement and a highly valuable adjunct to other navigational methods.

Radar works on the principle of echoes. Instead of sound, a radar transmits a radio signal. The radar equipment is basically an instrument for measuring the distance from the transmitter of an object which will reflect electromagnetic energy of radio frequencies.

The accuracy of a position obtained by radar varies considerably with different types of radar and the skill of the operator. In general, the accuracy of radar fixes compares favorably with, and sometimes exceeds, those obtained by other methods.

Advantages.—For navigational purposes, radar has several advantages over other navigational aids; namely:

1. Radar can be used at night and during periods of low visibility, when most other methods are not available.

2. Radar navigation is often more accurate than other methods of piloting. The limitations of accuracy of each set should be determined.

3. Radar fixes can be obtained rapidly. With the PPI (Plan Position Indicator) scope a continuous position is available.

4. A fix can be obtained from a single object, since both range and bearing are provided.

5. Radar may be available at greater distances from land than most methods of piloting.

6. Radar is a reliable anticollision device, permitting higher speeds (with relative safety) during periods of low visibility.

Failure on the part of a Government vessel to make use of radar while under way in low visibility has been held by a court to be directly contributory to a collision in which the vessel was involved. Article 29 of both International Rules of the Road and Inland

Rules of the Road are applicable. This decision places an additional burden on vessels which are equipped and manned to use radar to do so while under way during periods of reduced visibility without in any way relieving commanding officers of the responsibility of carrying out normal precautionary measures.

7. Radar can be used to locate and track violent tropical storms.

8. Radar reception is not affected by the same factors that cause interference and poor reception in radio communication. Consequently, radar's use is insured when normal radio communication is impossible.

Limitations.—As a navigational aid, radar is subject to certain limitations and disadvantages, as follows:

1. Radar is subject to mechanical failure. Also, as radar sets are sensitive instruments requiring accurate and precise adjustment, any error in the adjustment or synchronization will cause an error in the result.

2. There are both minimum and maximum range limitations. The minimum range is dependent on several factors. Inasmuch as the receiver is disconnected while a pulse is being sent out, any echo returning during transmission of the pulse will not be indicated. Excessive sea return, or echo from nearby water, and other obstructions nearby also affect the minimum effective range. Sea return becomes less with increased range because of the change in the angle of incidence, more of the signal is reflected away from the ship and less is returned in the form of echo. A good practical minimum range is 100 yards.

Maximum range is usually limited by the curvature of the earth to the line-of-sight, or slightly more (about 15 percent), because high frequency radio waves travel in a straight line and do not follow the earth's curvature except under the abnormal atmospheric conditions heretofore mentioned. The approximate maximum range at which any given target will return an echo can be determined by means of the table of *Distance of Visibility of Objects at Sea* in the same manner used for determining the distance at which a light can be expected to be seen at sea. This assumes, of course, that the radar is of sufficient power to extend to such a distance, that the scope is graduated for range to this distance, and that the target is of a nature that it will return a good echo.

3. Interpretation of the information presented on the scope is not always easy, even after considerable training.

4. Radar may be less accurate than other methods of piloting. A visual bearing, for instance, is usually more accurate than the radar bearing.

5. Radar may be unreliable or unavailable during certain atmospheric conditions.

6. Radar requires transmission from the ship.

7. Charts do not always give information necessary for identification of radar echoes.

8. Small boats and buoys may not be detected, especially if a light sea is running, if they are near the shore, or lack sufficient elevation to produce an echo. Most icebergs can be detected at distances equal to that at which a similar land mass could be seen, but *radar is not wholly reliable in the detection of growlers and floe ice large enough to damage or sink ships.*

9. Radar cannot distinguish the *nature* of small targets. One small object capable of returning an echo looks to radar just about the same as another.

The limitation of each radar set should be thoroughly understood by those who are depending upon the information it presents.

PUBLICATIONS.—The following résumé of the United States Government publications of navigational value is included for the ready reference of the mariner.

Certain libraries have been designated by the Congress of the United States to receive prints, as issued, of all publications printed by the Government for public distribution. These publications may be consulted by anyone during business hours.

Sales agencies have been established in various ports by the Coast and Geodetic Survey, Hydrographic Office, and Superintendent of Documents. District Offices of the Coast and Geodetic Survey sell all publications of that Bureau. Branch Hydrographic Offices do not sell any of the publications of that Bureau.

The mailing address of the Coast and Geodetic Survey, Hydrographic Office, Superintendent of Documents, Weather Bureau, Coast Guard, and Federal Communications Commission is Washington 25, D. C.

The Catalog of the United States Coast and Geodetic Survey Nautical Charts, Coast Pilots, Tide Tables, Current Tables, and Tidal Current Charts is distributed free by the United States Coast and Geodetic Survey and its agents.

Nautical Charts.—Coast of the United States, Territories, and Possessions:
Issued by the United States Coast and Geodetic Survey.
For sale by the Coast and Geodetic Survey and its sales agents.
Mississippi River from the Head of Passes to Cairo:
Issued and for sale by the Mississippi River Commission, Vicksburg, Miss.
Illinois Waterway System:
Issued and for sale by the United States Corps of Engineers, Chicago, Ill.
Ohio River:
Issued and for sale by the United States Corps of Engineers, Cincinnati, Ohio.
Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River, St. Regis to Cornwall, Canada:
Issued and for sale by the United States Lake Survey, Detroit, Mich.
New York State Canal System:
Issued and for sale by the Superintendent of Public Works, Albany, N. Y.
Foreign Countries:
Issued by the United States Hydrographic Office.
For sale by the Hydrographic Office and its sales agents.

Coast Pilots.—Coasts of the United States, Territories, and Possessions:
Published by the United States Coast and Geodetic Survey.
For sale by the Coast and Geodetic Survey and its sales agents.
Foreign Countries:
Published by the United States Hydrographic Office.
For sale by the Hydrographic Office and its sales agents.

Tide and Current Tables.—Tide Tables, East Coast, North and South America, including Greenland:
Tide Tables, West Coast, North and South America, including Hawaiian Islands:
Tide Tables, Europe and West Coast of Africa, including Mediterranean Sea:
Tide Tables, Central and Western Pacific Ocean and Indian Ocean:
Current Tables, Atlantic Coast, North America:
Current Tables, Pacific Coast, North America:
Tide and Current Tables, Philippine Islands:
Tide and Current Tables, Japan and China:
Published by the United States Coast and Geodetic Survey.
For sale by the Coast and Geodetic Survey and its sales agents.

Tidal Current Charts.—Boston Harbor, Narragansett Bay to Nantucket Sound, Long Island and Block Island Sounds, New York Harbor, Delaware Bay and River, Tampa Bay, San Francisco Bay, Puget Sound Northern Part, Puget Sound Southern Part—Nine Volumes:
Published by the United States Coast and Geodetic Survey.
For sale by the Coast and Geodetic Survey and its sales agents.

Water Temperatures and Densities.—Surface Water Temperatures, Atlantic Coast North and South America (Sp. Pub. 278).
Surface Water Temperatures, Pacific Coast North and South America and Pacific Ocean Islands (Sp. Pu. 280).
Density of Sea Water, Atlantic and Gulf Coasts (Sp. Pub. 279).
Density of Sea Water, Pacific Ocean (Sp. Pub. 281).
Published by the United States Coast and Geodetic Survey.
For sale by the Superintendent of Documents.
Notice to Mariners.—Notices to Mariners are published weekly and may be secured free of charge from the United States Hydrographic Office.
Light Lists.—Atlantic and Gulf Coasts, Intracoastal Waterway, Pacific Coast:
Published by the United States Coast Guard.
For sale by the Superintendent of Documents and his sales agents.
Foreign Countries:
Published by the United States Hydrographic Office.
For sale by the Hydrographic Office and its sales agents.
Radio.—Charts of Radiobeacon System, Atlantic and Gulf Coasts, Pacific Coast, and Great Lakes:
Free on application to the United States Coast Guard.
Radio Circulars giving schedules, frequencies, and data included in weather broadcasts.
Free on application to the Chief, United States Weather Bureau.
Radio Navigational Aids (H. O. Pub. No. 205).
Radio Weather Aids to Navigation (H. O. Pub. No. 206).
Published by the United States Hydrographic Office.
For sale by the Hydrographic Office and its sales agents.
List of radiobeacons:
See Light Lists published by the United States Coast Guard.
Hydrographic Bulletin:
Issued weekly by the United States Hydrographic Office.
International Code of Signals [American Edition] Vol. II—Radio (H. O. Pub. No. 88):
Published by the United States Hydrographic Office.
For sale by the Hydrographic Office and its sales agents.
International Convention for the Safety of Life at Sea, London, 1929 (affecting radio), Extracts From:
May be obtained from United States Federal Communications Commission.
Communications Act of 1934:
For sale by Superintendent of Documents.
Ship Radio Telegraph Safety Rules:
From the United States Federal Communications Commission or the Superintendent of Documents.
The International Bureau of Telecommunication Union, Berne, Switzerland, publishes and sells the following:
1. List of Frequencies.
2. List of Coast Stations and Ship Stations.
3. List of Aircraft and Aeronautical Stations.
4. List of Broadcasting Stations.
5. List of Stations Performing Special Services.
6. List of Call Letters of Fixed Land and Mobile Stations.
7. List of Fixed Stations.
8. The Telegraph Rates.
Radio Service Bulletin:
Issued by United States Federal Communications Commission.
Weather.—Manual of Marine Meteorological Observations (W. B. Circular M):
Preparation and Use of Weather Maps at Sea (W. B. Circular R):
Manual of Cloud Forms and Codes for States of the Sky (W. B. Circular S):
International Code for Radio Weather Reports from Ships (W. B. 1046, Revised):
Published by the United States Weather Bureau.
For sale by Superintendent of Documents. These publications will also be furnished free of charge on request of ships' officers cooperating with the Weather Bureau.

Weather Message for Shipping, IMO Publication No. 9, Volume IV:
Published and sold by World Meteorological Organization, Geneva, Switzerland.
Miscellaneous.—American Practical Navigator [Bowditch] (H. O. Pub. No. 9):
Published by the United States Hydrographic Office.
For sale by the Hydrographic Office, the Superintendent of Documents, and their agents.
The American Nautical Almanac:
The American Ephemeris and Nautical Almanac:
Published by the United States Naval Observatory.
For sale by the Superintendent of Documents and his sales agents.
International Code of Signals [American Edition] Vol. I—Visual (H. O. Pub. No. 87):
Published by the United States Hydrographic Office.
For sale by the Hydrographic Office and its sales agents.
Pilot Rules for Certain Inland Waters of Atlantic and Pacific Coasts and Coast of Gulf of Mexico:
Published by and free on application to the United States Coast Guard.
Pilot Rules for Rivers whose Waters Flow into the Gulf of Mexico and Their Tributaries and Red River of the North:
Published by and free on application to the United States Coast Guard.
Pilot Rules for Great Lakes and Their Connecting and Tributary Waters:
Published by and free on application to the United States Coast Guard.
Navigation Laws of the United States:
Published by the United States Coast Guard.
For sale by the Superintendent of Documents.
General Rules and Regulations Prescribed by the Board of Supervising Inspectors—four volumes.
Published by and issued free on application to the United States Coast Guard.
Laws Governing Steamboat Inspection:
Published by and issued free on application to the United States Coast Guard.
Annual Report of the Chief of Engineers, United States Army:
Part 1.—Report upon river and harbor improvement work, including flood-control operations.
Part 2.—Commercial Statistics, Water-borne Commerce of the United States.
These volumes may be consulted at the libraries which are public depositories.
Port Series—of the United States:
Prepared by the Corps of Engineers, United States Department of the Army, in cooperation with the Maritime Administration, United States Department of Commerce.
For sale by the Superintendent of Documents.
Port and Terminal Charges:
Prepared by the Corps of Engineers, United States Department of the Army.
For sale by the Superintendent of Documents.

CHAPTER 2

Regional Information

ALASKA is an irregularly shaped northwestward extension of the continent that is essentially a compact land mass. In total area, 586,405 square statute miles of land and inland waterways, the Territory is one-fifth of the size of the United States, and larger than all Atlantic Coast States combined. Alaska is located between 51° and 72° north latitude and 130° west and 173° east longitude. Except for bordering the Dominion of Canada on its eastern frontiers, Alaska is surrounded by water. It is bounded on the north by the Arctic Ocean; on the west by the Chukchi and Bering Seas; and on the south by the Pacific Ocean. The total shoreline including islands, bays, and inlets is 33,904 statute miles.

Alaska's island areas are composed of two principal groups: The Aleutian chain with its hundreds of small islands, and the Alexander Archipelago with more than 1,100 islands adjacent to the southeastern portion of the Territory. Smaller island groups include the Kodiak group south of the Alaska Peninsula, and the Pribilof, Nunivak, St. Mathews, and St. Lawrence groups in the Bering Sea.

History and Government.—The official date of Alaska's discovery is July 16, 1741. On that day Vitus Bering, a Danish captain in the service of the Russian Navy, sighted Mount St. Elias. Bering's ship, the *St. Peter*, was wrecked on Bering Island in the Komandorski Islands where he died on December 8, 1741. Captain Alexie Ilich Chirikof, Bering's lieutenant in command of the ship *St. Paul*, made land at Bucareli Bay, Alexander Archipelago. Bering's expedition returned to Siberia with about $100,000 in furs, which signalized an immediate rush to exploit, and only incidently to explore, the new land. In their search for furs, the Russians first explored the Aleutian Islands and the Bering Sea, subsequently reaching east and south to Cook Inlet, Prince William Sound, and the Alexander Archipelago.

During the latter part of the eighteenth century other European nations ventured along the northwest coast of Alaska. Spanish expeditions under Maurelle, Quadra, Malaspina, and Caamaño left bases in California to sail north and west as far as Unalaska in the Aleutians. Captain James Cook, England's famous explorer, reached Alaska in 1778 and sailed northward to Icy Cape before being turned back by the Arctic ice pack. A French expedition under La Perouse veered from South Pacific exploration to the North Pacific, and was later followed by French traders who had heard the stories of rich furs. Between 1791 and 1794, Captain George Vancouver contributed an outstanding advancement to

Alaska exploration by charting Southwestern and Southern Alaska with such accuracy that it was not improved upon for more than a century.

American traders sailing around Cape Horn arrived soon after the Russians established their trading posts. American whaleships first entered the Arctic Ocean through Bering Strait in 1848. The North Pacific Exploring Expedition of the United States Navy explored and made surveys in the North Pacific, Aleutian Islands, Bering Sea, and on the Siberian coast in 1854 and 1855.

From 1799 to 1863, Alaska was under the administration of the Russian-American Company. The head of the Russian-American Company, Alexander Baranof, moved the capital of Russian America from Kodiak to Sitka in 1802.

Between 1803 and 1843 the Russians, Von Krusenstern, Golovin, Etolin, Nasilof, and Zagoskin contributed to coastal and interior exploration. A one-man trading post was established in 1836 on the lower Kuskokwim. Two years later the Russians penetrated the interior, establishing a post at Nulato and exploring nearby portions of the Koyukuk and Yukon Rivers. The Copper and Susitna River valleys were explored during 1842. Traders of the Hudson Bay Company descended the Yukon River in 1847 and established Fort Yukon.

First hint of the sale of Russian America to the United States is found in the Russian archives of 1854. It appears that America was interested in the region much earlier, as President Andrew Jackson expressed an interest in the northern territory in 1836. It was not until 1867 that the United States purchased Alaska from Russia for $7,200,000.

In the years between its acquisition from Russia and the gold discoveries in 1898 the Territory lay dormant, almost entirely unexplored and with virtually no utilization of its natural resources by any except an occasional whaler and a few fishermen who penetrated northward to the waters of Southeastern Alaska.

In 1884 Congress created the District of Alaska. Prior to this time the Territory had been administered by the United States Army and United States Navy. In 1912 the District of Alaska was abolished in favor of a territorial form of government and the capital was moved to Juneau.

The Governor and Secretary of Alaska are appointed for 4 years by the President with the advice and consent of the Senate of the United States. The legislature of the Territory consists of a Senate and a House of Representatives, consisting respectively of 16 and 24 members who are elected by the qualified voters of the Territory. The Territory is represented in the Congress of the United States by a Delegate who is elected by the qualified voters for a term of 2 years. There are four Judiciary Divisions in Alaska, with headquarters at Juneau, Nome, Anchorage, and Fairbanks. A Federal District Judge, United States Attorney, and United States Marshal—all presidentially appointed—preside over each. United States Commissioners, appointed by the Judges, act as local court magistrates, probate judges, and coroners in the larger communities.

The original **natives** of Alaska consist of Eskimos, Aleuts, and Indians. Eskimos inhabit the north and western regions of the Alaska mainland, the major concentration located along the coasts of the Bering Sea and Arctic Ocean. Aleuts are found principally in the Aleutian Islands. The Athapascan Indians are native to the interior regions. Other Indian groups are found in southeastern Alaska, the principal tribe being the Tlingits, with smaller numbers of Tsimshians and Haidas.

Language.—The language of Alaska is English. Schools were first established in the Territory in 1884. Today, there is an excellent school system. Most of the non-native

white population are from the western part of the United States. The small foreign-born population is mostly from northern Europe and Canada.

Names in Alaska are derived almost exclusively from the following six sources: The Russians, 1725-1867; the Spaniards, 1774-1800; the English, 1778-1854; the French 1786; the Americans, 1848 to date; and the natives. Last in order, but first in importance, are the native names. Explorers visiting new lands and people are always prone to ascertain and use the native names of places, mountains, rivers, lakes, and other features. However, in dealing with tribes whose language is strange, the sounds are imperfectly understood and the application of the name is uncertain. Hence, a name is generally not the preservation of the native one but some faint imitation or corruption of it. Practically all aqueous horizontal features of the landscape have been designated by native names, and vertical features have been named by explorers and surveyors, with the exception of volcanoes. Native names applied to vertical features have been found generally to be terms of position. A large part of the Alaskan native names along the coasts were gathered by the Russians. These names in Russian characters have been transliterated into Roman characters by persons unskilled in Russian, and this has served to produce some extraordinary and unpronounceable forms.

Agriculture in Alaska is still in its infancy. Agricultural lands now are developed chiefly in Matanuska Valley near Anchorage and Palmer, and Tanana Valley near Fairbanks. Only about 12,000 acres in the entire country are being cultivated. Existing farms produce wheat, barley, oats, peas, potatoes, clover, alfalfa, carrots, rutabagas, cabbage, and other hardy vegetables and bush fruits. Livestock consists of beef and dairy cattle, horses, sheep, hogs, goats, and chickens.

Forestry.—Alaska's coastal and interior forest lands are estimated to cover more than 375,000 square miles. The most productive forest region is the Tongass National Forest in Southeastern Alaska. The Chugach National Forest in the Prince William Sound region contains almost the entire balance of Alaska's coastal forests. Although the present timber use is substantial, today the National Forests are used to only a small fraction of their possible sustained output of good production.

Fisheries.—Established late in the nineteenth century, the fishing industry is Alaska's largest industrial activity. In 1949 an estimated 28,400 persons were engaged in the industry. The same year the following fish plants were operated: 117 salmon canneries, including 12 floating plants; 17 herring plants; 20 crab plants; 17 clam canneries; and 6 shrimp plants. In addition are many cold storage plants, mostly located at the ports, for the care of halibut, oysters, and other non-canned fish products.

Mining.—Although Alaska is commonly thought of as a mining country, the industry has developed little. Discovery of placer gold by the early adventurers led to intensive searches which yielded numerous placer and lode gold and other mineral deposits, such as silver, lead, copper, tin, platinum, mercury, antimony, graphite, limestone, marble, barite, and clay.

Commerce.—Alaska's trade is principally with the United States. The main exports to the States are fish, minerals, furs, and forest products. Her principal imports from the States are foodstuffs, clothing, machinery, and other manufactures.

Topography.—The mountains, plateaus, and lowlands are arranged somewhat similar to those in the United States. Although the mountains of the United States roughly follow north-south trends, the mountains of Alaska occur in broad arcs with prevalent east-west trends.

Mount McKinley, 20,220 feet, in the Alaska Range, is the highest peak on the continent and its height above its own base is greater than that of any other mountain in the world. Other high peaks include Mount St. Elias, 18,008 feet; Mount Foraker, 17,000 feet; Mount Sanford, 16,208 feet; and Mount Blackburn, 16,140 feet. More than 50 mountains are over 10,000 feet high. Equally impressive are the rugged mountain chains and islands of Southeast Alaska that rise abruptly from sea level to more than 5,000 feet.

Paralleling the coastline at the southern and southeastern coasts of Alaska is the Pacific Mountain System. In southeastern Alaska, the Coast Range, extending south through British Columbia, continues northwestward into the Yukon Territory, where it almost merges with the St. Elias Range. The latter contains the Chugach, Nutzotin, and Wrangell Mountains as subsidiary ranges with peaks as high as 19,850 feet. In an echelon relationship with the St. Elias Range is the Alaska Range, extending from a point east of Mt. McKinley southwestward to join the Aleutian Range in the Alaska Peninsula.

Southeastern Alaska consists of a narrow strip of continental land, together with **Alexander Archipelago,** a vast chain of islands lying near the mainland and which shields it from the sea. The archipelago, as a whole, extends in a generally northwest and southeast direction more than 250 miles; the inland waters, which may be said to belong to its system, extend at least a hundred miles farther. The greatest breadth from the mainland to the ocean, northeast and southwest, is about 80 miles.

These islands are situated in a series of natural groups formed by the intersecting channels. These groups are again separated into two great groups by Sumner Strait extending from the Hazy Islands to the mouth of the Stikine River. This passage, having but one important curve, is the only direct northeasterly channel from the Pacific to the mainland, included in the region between Cross Sound and Dixon Entrance.

The groups of islands included in the southern portion are as follows: Islands at the eastern end of Dixon Entrance; Revillagigedo and associated islands; Etolin, Zarembo, and associated islands; and Prince of Wales and associated islands.

The groups to the northward of Sumner Strait are Mitkof and associated islands, Kupreanof and associated islands, Kuiu and associated islands, Baranof and associated islands, Admiralty and associated islands, and Chichagof and associated islands.

The islands to the northward of Sumner Strait have a general trend of northwest and southeast, while those to the southward of the strait trend more nearly northwest by west and southeast by east.

The topographical features of the archipelago are similar to those of the mainland to the eastward, but less elevated. Its hydrographic characteristics are such as would be developed by a submergence of the lateral ridges of a sharply broken and much elevated system of coast ranges, such as exists from Puget Sound to the Alaska Peninsula, without important topographical modifications of any kind. Most of the islands are high, the peaks and ridges showing a remarkable uniformity in general altitude. A few peaks rise conspicuously above the rest, but these are marked exceptions. The country is exceedingly rough and broken; the sharper inclinations, on the whole, facing toward the mainland. The higher summits are sharp, notched, irregular, and showing little if any modification by erosion. The lower summits are more frequently somewhat rounded, but, together with the flanks of the former, are so masked in a dense growth of timber as to conceal most of their characteristic features. Deep and narrow gorges; precipitous cliffs; steep mountain sides, scored by avalanches and land-slips; small level plateaus of accumulated washings from

the highlands; occasional districts of moderately low but rolling country—these are prominent features in the topography.

The snow line in mid-summer reaches an altitude varying, according to local conditions, from 2,000 to 5,000 feet. **Glaciers** are formed in favorable localities, such as are abundantly afforded by narrow gorges of the coast ranges whose walls perennially ward off the sun. Toward the northern part of the archipelago, on the continental shore, where lofty ridges above the snow line supply the necessary feeders, these ice rivers often attain great size and even reach the water side. In most cases, for several thousand feet in elevation, they force their way between densely wooded hillsides. Others fail at a considerable altitude, and manifest themselves in glacial torrents, frequently forming cascades of great beauty. The proximity of such streams is invariably indicated by the milky stratum which covers the denser sea water, sometimes for miles from the embouchure. This condition of a stream of fresh water may be taken as unfailing evidence that it somewhere receives the discharge from a glacier.

In the islands of the archipelago, however, the land does not usually reach a sufficient altitude to retain snow throughout the year, and, except on the higher peaks, the entire absence of snow forms a remarkable feature of the summer landscape. From the great amount of rainfall at certain seasons fresh water is readily obtainable in all parts of the archipelago. There is no difficulty in procuring wood for fuel and timber for most purposes of construction and repair.

Ice forms at the heads of the inlets where the water is comparatively fresh and in the rivers, but seldom in the main channels. Floating patches of slush ice, formed in fresh-water streams and lagoons, are sometimes found in the channels, but never form an obstruction to navigation.

Icebergs and *growlers* occur locally in all months of the year from the discharging glaciers. Glacial ice is usually present in the eastern part of Frederick Sound, in Stephens passage between Point Hugh and the western end of Douglas Island, in Icy Strait, and in Cross Sound between the Sisters and Cape Spencer. This ice may be encountered at any time throughout the year, and the size of pieces is sufficient to make them dangerous to navigation. Much of this glacial ice is covered with mud and stones and resembles, when still, reefs or rocks awash.

Neither the inlet ice nor the glacial ice moves far from its source and is rarely encountered in the open sea, even near the coast. An exception is the glacial ice from Glacier Bay, which, emerging from Cross Sound, has been reported as having been seen from 10 to 15 miles seaward of Cape Spencer.

The hydrographical characteristics form a parallel to the topographic features above mentioned. The continuation of the steep inclines and narrow gorges below sea level has resulted in a system of narrow straits and deep soundings which characterizes the northwest coast of America from Puget Sound to Cape Spencer. To many of these contracted passages the term *canal*, employed by Vancouver, is eminently applicable. Again, the rugged nature of the ridges and peaks, and the singular absence of plains or extensive plateaus, is paralleled by the numerous rocks and reefs surrounded by deep water, and the general absence of extensive shoals except at the mouths of streams or rivers fed by glaciers.

Anchorages are numerous throughout the inland passages. Many of them are suitable for temporary purposes in the summer; during the fall and winter care should be taken to select an anchorage affording good shelter and holding ground whenever practicable.

Harbors and ports.—The principal towns within the limits of this volume are Craig, Douglas, Haines, Juneau, Ketchikan, Pelican, Petersburg, Sitka, Skagway, and Wrangell. In addition to these there are numerous small settlements that have grown up around canneries and mines.

Rules of the Road.—*Rules to prevent collisions of vessels and pilot rules for certain inland waters of the Atlantic and Pacific Coasts and the Coast of the Gulf of Mexico* apply to the inland waters of Southeastern Alaska included by the boundaries as follows:

§82.275. *Bays, sounds, straits and inlets on the coast of southeastern Alaska between Cape Spencer Light Station and Sitklan Island.* A line drawn from Cape Spencer Light Station due south to a point of intersection which is due west of the southernmost extremity of Cape Cross; thence to Cape Edgecumbe Lighthouse; thence through Cape Bartolome Lighthouse and extended to a point of intersection which is due west of Cape Muzon Lighthouse; thence due east to Cape Muzon Lighthouse; thence to a point which is one mile, 180° true from Cape Chacon Lighthouse; thence to Barren Island Lighthouse; thence to Lord Rock Lighthouse; thence to the southernmost extremity of Garnet Point, Kanagunut Island; thence to the southeasternmost extremity of Island Point, Sitklan Island. A line drawn from the northeasternmost extremity of Point Mansfield, Sitklan Island, 040° true, to where it intersects the mainland.

General Rule for inland waters.—At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specific lines are not described in this part, the waters inshore of a line approximately parallel with the general trend of the shore, drawn through the outermost buoys or other aid to navigation of any system of aids, are inland waters, and upon them the Inland Rules and pilot rules made in pursuance thereof apply.

The International Rules govern in Canadian waters.

Echoes.—In many inland passages, where the channels are narrow, or along certain coasts which are hilly and mountainous, such as occur in British Columbia and Alaska, it may prove useful in a fog to sound a whistle or siren and to estimate the distance offshore from the time it takes for the echo to return from the sides of the hills or mountains, the average velocity of sound in air being about 1,114 feet per second. One-tenth of the elapsed time in seconds between the sounding of the whistle and the return of the echo is approximately equal to the distance off the hill or mountain in nautical miles. In narrow channels with steep shores the vessel can be kept in mid-channel by keeping in such a position that the echoes from both shores return at the same instant.

Kelp grows on nearly every danger having a rocky bottom, and will be seen on the surface of the water during the summer and autumn months; during the winter and spring it is not always to be seen, especially where it is exposed to a heavy sea. Kelp should always be considered a sign of danger, and no vessel should pass through it unless it is known that extensive sounding or a wire drag survey have definitely determined that no dangers exist. However, many rocks are not marked by it. Boulder patches are generally not marked by kelp. A heavy sea will occasionally tear the kelp away from rocks, and a moderate current will ride it under water so that it will not be seen. It is well to note that dead, detached kelp floats on the water in masses, while live kelp attached to rocks streams away level with the surface.

Floating logs are frequently found in sufficient numbers in certain localities as to constitute a danger to navigation, particularly of small craft. Extreme caution should be exercised when running at night. In the inside passages areas of particular danger lie in

the vicinity of tidal rapids and fast water and in the eddies off points of land. The greatest concentrations of floating logs and debris will be found for several days after unusually high waters near those places where the tides meet in narrow channels with steep sides, particularly if logging, milling, or extensive towing are done in the locality. A severe storm occurring during the period of unusually high waters will cause about the worst condition of this kind. Free floating logs lying in the trough of the short waves and perpendicular to the usual course followed are particularly difficult of observation.

Another source of danger difficult to see are *deadheads* or *sinkers* which have become adrift from rafts or booms. One end of a sinker settles to the bottom while the other floats just awash, rising and falling with the tide.

Fish traps are numerous along the outside coast and among the inside passages. The piles often become broken off and form a danger to navigation, especially at night. Regulations limiting the areas within which fish weirs may be established have been prescribed by the Secretary of the Army and the supervision of the fishing structures is controlled by the Chief of Engineers, United States Army. Strangers should proceed with caution when crossing areas of possible fish weirs, and should avoid crossing such areas at night whenever possible.

Regulations prescribe that fishing structures and appliances in navigable waters of the United States shall be lighted for the safety of navigation as follows:

Lighting fishing structures. (1) Fishing structures and appliances in navigable waters of the United States will be lighted for the safety of navigation as follows:

The lights will be displayed between sunset and sunrise. They will be placed at each end of the structure, excepting where the inner end terminates in such situation that there is no practicable navigation between it and the high-water line of the adjacent coast, in which case no inner light will be displayed. The outer light will be white, and the inner light will be red. The size, capacity, and manner of maintenance of the light will be such as may be specified in the Department of the Army permit authorizing the erection of the structure or appliance. When several structures or appliances are placed on one line with no navigable passage between them, they will be considered for lighting purposes as one structure.

(2) By authority of the Secretary of the Army conditions in form as follows will be included in all permits for fishing structures and appliances in navigable waters of the United States, issued by the Chief of Engineers or by District Engineers specially authorized by him to issue such permits:

That the weir, trap, or pound will be lighted between sunset and sunrise, by and at the expense of the permittee, for the safety of navigation. The lights will be displayed at each end, the outer end of the structure, and at an elevation of not less than..... feet above high water. The outer light will be white, the inner light will be red, and both will be equal to..... with a capacity to burn..... days untended. They will be subject to the inspection of the aforesaid District Engineer before use. (Additions may be made to this condition and superfluous words deleted as may be necessary to provide for lighting the particular structure.)

That there will be installed and maintained on the weir, trap, or pound, by and at the expense of the permittee, such additional lights and signals, if any, as may be prescribed by the U. S. Coast Guard, and that provision will be made for proper attendance by watchman or otherwise of all lights and signals, so that they will at all times be in effective condition.

TIDES.—Throughout the southeastern part of Alaska the tide is nearly simultaneous. Off the outer coast high water occurs near the time of the transit of the moon, and in the various straits and passages it occurs on an average from 15 to 30 minutes later than on the outer coast.

There is considerable inequality in the heights of the two high waters and of the two low waters of each day. The average difference in the height of the high waters is about 2 feet and the differences in the low waters about 3 feet. This inequality changes with the

declination of the moon. When the moon is near the equator it is relatively small, but when the moon is near its greatest north or south declination the inequality reaches a maximum. The tides at this time are called *tropic tides*.

Off the outer coast the average rise of high water above the plane of reference, which is the mean of the lower low waters, is about 10 feet. Extreme variations from 4 feet below to 15 feet above the datum may be expected.

In the various straits, canals, and other passages which are characteristic of this region, the range of tide is somewhat larger than on the outer coast, the average rise being from 14 to 15 feet above the datum of mean lower low water and the extreme variations from 5 feet below to 22 feet above the same datum.

Tide Tables for the West Coast of North and South America include full tidal data for Alaskan and British Columbian waters. They are published annually in advance by the Coast and Geodetic Survey. See *Publications* in Chapter 1.

Caution.—In using the Tide Tables, slack water should not be confused with high or low water. For ocean stations there is usually but little difference between the time of high or low water and the beginning of ebb or flood currents; but for places in narrow channels, land-locked harbors, or on tidal rivers, the time of slack current may differ by several hours from the time of high or low water stand. The relation of the times of high and low water and the turning of the current depends upon a number of factors, hence no simple rule can be given. To obtain the times of slack water or strength of current, reference should be made either to figures given for various places in this volume of the Coast Pilot or to the *Current Tables, Pacific Coast, North America and Asia.*

CURRENTS.—A prevailing current sets northwestward along the outer coast of British Columbia and southeastern Alaska, with an estimated velocity of 0 to 1½ knots. Strong southerly winds increase and northwesterly winds decrease its velocity. The distance it extends offshore is not known, but it is believed to be strongest near the coast and inside the 100-fathom curve. That it extends into the inland waterways of Southeastern Alaska is indicated by the results of current observations at a number of locations in the inside passages between Dixon Entrance and Cross Sound, which show a general northwestward non-tidal flow through those passages. A southerly set, varying from 0.2 to 0.8 knot, has generally been experienced in calm weather by the surveying ship *Surveyor* when hove to at night 20 miles or more offshore, westward of Prince of Wales, Baker, and Noyes Islands.

Tidal currents.—The tidal currents in the passages of British Columbia and southeastern Alaska have considerable velocity in places, and must be kept in mind. In crossing the entrances to inlets and estuaries, it is necessary to make allowance for the current setting into or from them, according to the stage of tide. The tidal currents follow the general direction of the straits, deflecting into the many inlets and passages. In the larger connecting channels the flood usually sets in from either end, meeting at some central position, the ebb running out in both directions from this point. The range of the tide determines the relative velocity of the tidal currents. The ebb current usually has the greater velocity. In closed canals the velocity of the current, in general, decreases toward their heads, and the turn of the current occurs practically at the time of high and low water, or soon after. See also the remarks on tidal currents under their respective headings in this volume.

Current Tables, Pacific Coast, North America and Asia, published annually in advance by the Coast and Geodetic Survey, give the times of slack water, also the times and strengths of flood and ebb for every day in the year for the Strait of Juan de Fuca Entrance, Admiralty Inlet, The Narrows, Deception Pass, Turn Point, Active Pass, Burrard Inlet, Seymour Narrows, Wrangell Narrows, Sergius Narrows, and North Inian Pass. From the Table of Current Differences and Constants the approximate time of slack water and the velocity and direction of flood may be found for many points in the main channels. Hourly directions and velocities of the tidal current for the northern part of Puget Sound, including Admiralty Inlet, are shown on the *Tidal Current Charts, Puget Sound, Northern Part.*

Tide rips and swirls occur at numerous places, caused by the meeting of currents or a change in the direction of the current, and over shoals or in places where the bottom is uneven. These are at their worst with the wind opposing the current, and in some places are dangerous, especially to small craft.

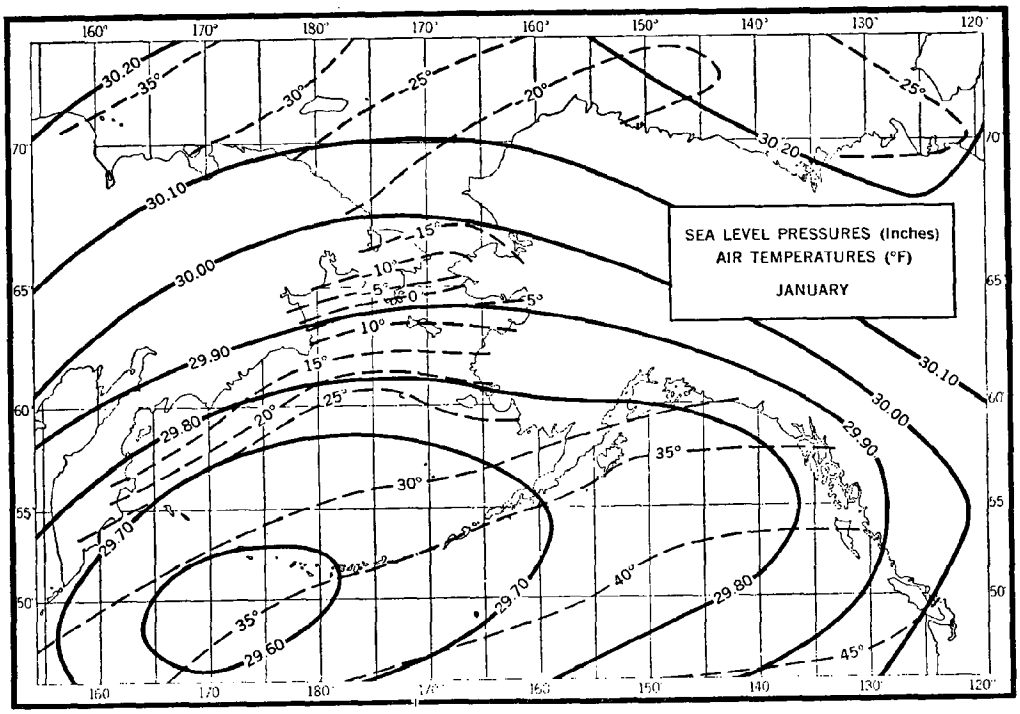
For currents, British Columbia, see Chapter 4. Further information concerning currents in Alaska is given in the descriptions of the harbors and channels.

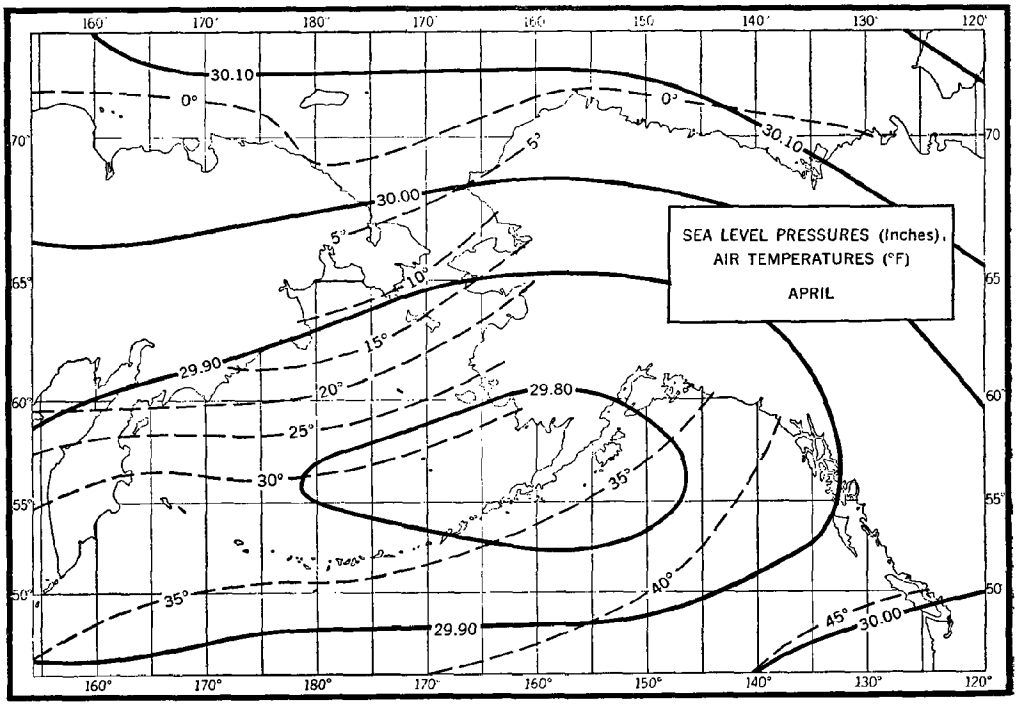
LOCAL MAGNETIC DISTURBANCE is prevalent in southeastern Alaska, as shown by magnetic observations at a great many places. The magnetic variations shown on a chart are intended to represent average conditions. In regions where there is marked local disturbance, great care should be exercised, as there may be places where the variation differs several degrees from the average. Even if the local disturbance has been investigated in considerable detail by shore observations, the navigator should not rely entirely on his compass in such areas, for the reason that such investigations can give only values at specified points but do not give the extent over which each observed value applies.

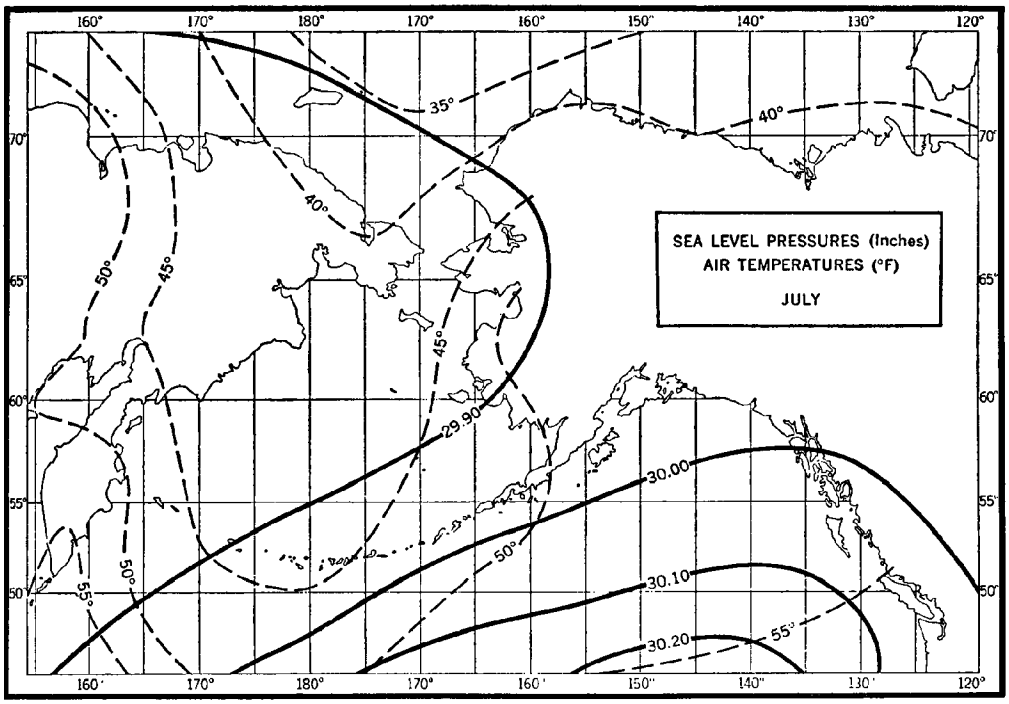
Significant local disturbance has been observed at East Island (Dixon Entrance), Shakan Strait, Ernest Sound, Keku Strait, Gastineau Channel, Port Snettisham, Chilkoot Inlet, and in Peril Strait between Fairway Island and Povorotni Island. It has been investigated in considerable detail by shore observations in the vicinity of Gastineau Channel, Port Snettisham, and Chilkoot Inlet. In the vicinity of Chilkoot Inlet, the variation observed at several points ranges from about 20° west of normal to 5° east of normal variation.

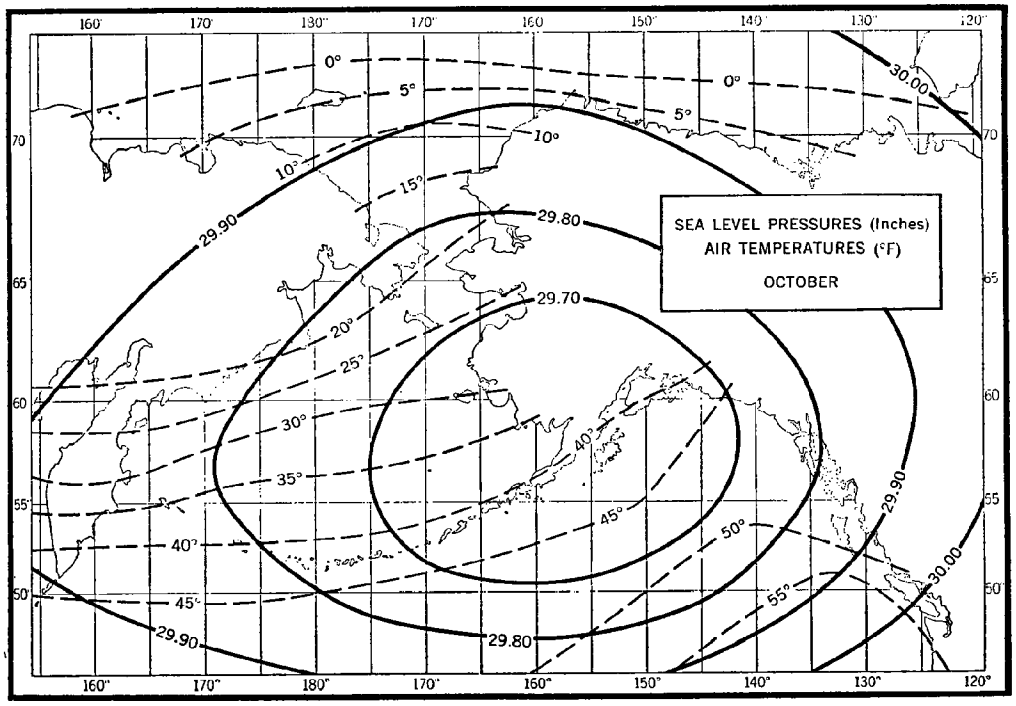
WEATHER AND CLIMATE.—The following description of general weather conditions in southeastern Alaska was prepared by the Climatological Services Division of the United States Weather Bureau. Details of local weather appear in the subsequent chapters discussing those areas. In the Appendix are climatological tables for 9 coastal stations and 18 ocean areas.

The coastal area covered by this volume is rugged and mountainous, some parts of which are fully exposed to the open sea and others protected, with the result that the climate is as diversified as the terrain. However, the southeastern Alaska region in general has an essentially marine climate on the outer exposed coasts, which becomes more continental toward the interior and on the inner coasts, whether of the islands or the mainland. The effects of the terrain and of the contrasting marine and continental climatic regimes are brought out in this section as the various weather elements are discussed.


SEA LEVEL PRESSURES (Inches)
AIR TEMPERATURES (°F)
JANUARY
30.20
30.10
30.00
29.90
29.80
29.70
29.60
35°
30°
25°
20°
15°
10°
5°
0°
40°
45°
160°
170°
180°
150°
140°
130°
120°
70°
65°
60°
55°
50°


SEA LEVEL PRESSURES (Inches)
AIR TEMPERATURES (°F)
APRIL
30.10
30.00
29.90
29.80
0°
5°
10°
15°
20°
25°
30°
35°
40°
45°
160°
170°
180°
150°
140°
130°
120°
70°
65°
60°
55°
50°

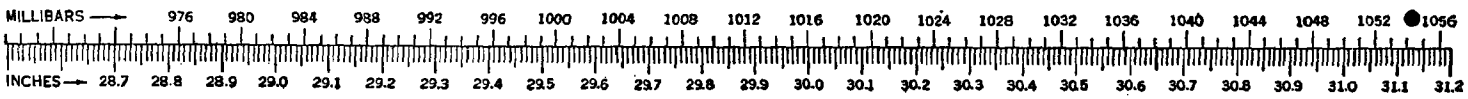

SEA LEVEL PRESSURES (Inches)
AIR TEMPERATURES (°F)
JULY
29.90
30.00
30.10
30.20
35°
40°
45°
50°
55°


SEA LEVEL PRESSURES (Inches)
AIR TEMPERATURES (°F)
OCTOBER
29.90
29.80
29.70
30.00
0°
5°
10°
15°
20°
25°
30°
35°
40°
45°
50°
55°

Wind Force and State of Sea Surface with Specifications and Equivalents

Beaufort No.	Description of wind	Sea area: State of sea surface	Sea area: Description of sea	Sea area: Scale	Specifications for use on land	Nautical miles per hour	Terms used in U. S. Weather Bureau forecasts
0	Calm	Sea like a mirror—smooth	Glassy-calm	0	Calm; smoke rises vertically	Less than 1	Light.
1	Light air	Ripples with the appearance of scales are formed but without foam crests.	Rippled	1	Direction of wind shown by smoke drift, but not by wind vanes	1 to 3	
2	Light breeze	Small wavelets, still short but more pronounced. Crests have a glassy appearance and do not break.	Smooth	2	Wind felt on face; leaves rustle; ordinary vane moved by wind.	4 to 6	
3	Gentle breeze	Large wavelets; crests begin to break; foam is not white but of glassy appearance, perhaps scattered whitecaps.		3	Leaves and small twigs in constant motion; wind extends light flag.	7 to 10	Gentle.
4	Moderate breeze	Small waves, becoming longer; fairly frequent whitecaps.	Slight	4	Raise dust and loose paper; small branches are moved.	11 to 16	Moderate.
5	Fresh breeze	Moderate waves, taking a more pronounced long form; many whitecaps are formed. (Chance of some spray.)	Moderate	5	Small trees in leaf begin to sway; crested wavelets form on inland waters.	17 to 21	Fresh.
6	Strong breeze	Large waves begin to form; white foam crests are more extensive everywhere. (Probably some spray.)	Rough	6	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.	22 to 27	Strong.
7	Moderate gale (high wind)	Sea piles up and white foam from breaking waves begins to be blown in streaks along the direction of the wind.	Very rough	7	Whole trees in motion; inconvenience felt in walking against wind.	28 to 33	
8	Fresh gale	Moderately high waves of greater length; edges of crest begin to break into the spindrift. The foam is blown in well-marked streaks along the direction of the wind.	High	8	Breaks twigs off trees; generally impedes progress.	34 to 40	Gale.
9	Strong gale	High waves. Dense streaks of foam along the direction of the wind. Sea begins to "roll." Spray may affect visibility.		9	Slight structural damage occurs (chimney pots and slate removed).	41 to 47	
10	Whole gale (heavy gale).	Very high waves with long overhanging crests. The resulting foam, in great patches, is blown in dense white streaks along the direction of the wind. On the whole, the surface of the sea takes a white appearance. The rolling of the sea becomes heavy and shock-like. Visibility affected.	Very high	10	Seldom experienced inland; trees uprooted; considerable structural damage occurs.	48 to 55	Whole gale.
11	Storm	Exceptionally high waves (small and medium-sized ships might be for a time lost to view behind the waves). The sea is completely covered with long white patches of foam along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility affected.	Phenomenal [1]	11	Very rarely experienced; accompanied by widespread damage.	55 to 65	
12	Hurricane	The air is filled with foam and spray. Sea completely white with driving spray; visibility very seriously affected.		12		Above 65	Hurricane.

[1] As might exist at the center of a hurricane.



Pressure.—The average distribution of atmospheric pressure for selected months is shown on the accompanying charts. The late fall, winter, and early spring months, represented by January, have steep pressure gradients. This is due to the intensity of the semi-permanent Aleutian LOW, which is in sharp contrast to the continental HIGH, covering Siberia and a considerable part of the Arctic Ocean to the northward, and to the well established Pacific HIGH to the southeastward.

The season of least storm activity, with correspondingly weaker pressure gradients, is well represented in the chart for July. In this month the Aleutian LOW is relatively weak, the normal pressure for the month in the western Aleutian area being about 29.95 inches (1014.2 mb.) and the day-to-day changes in pressure varying much less than is the case in the winter season. Also, the powerful northern anticyclone has disappeared over Siberia and is replaced by widespread low pressure. The North Pacific HIGH, which during the winter has centered off the California coast at about 32° N. latitude with a central pressure of 30.20 inches, moves northward about 10° during the early summer, strengthening to a central pressure of about 30.27 inches, and more than doubling its area of influence until most of the eastern North Pacific between the 10° N. parallel and the Aleutians is dominated by it. This high pressure area also extends eastward from the west coast of the United States to 165° E. longitude. The stormy spring and fall months make up the two transition periods.

In examining the mean charts, it should be remembered that the mean monthly pressure distribution is apt to give a misleading picture of the prevailing conditions. This is particularly true over the North Pacific and southeastern Alaska, as well as over much of the rest of the middle and high latitude of the earth where great cyclonic activity occurs. In reality, there is an almost continuous procession of cyclones and anticyclones rather than a stationary pressure distribution. A measure of the extent to which persistent weather prevails is shown by the table giving data on the average annual frequency of dry and wet spells.

Wind.—Because of the differing exposures relative to the sea, to the inland waterways, and to the land masses, the winds vary greatly in direction and intensities. Among the winding passages in which the gorge effect is more or less pronounced, the wind naturally will tend to follow the contours, sometimes sweeping strongly along the channels and at other times falling to a calm.

In general, southeasterly winds prevail from the end of October to the middle of May. They are usually accompanied by rain or drizzle during this colder season; east to northeast winds often bring snow. Southwest and northwest winds bring clearing weather. A northerly wind in winter usually is accompanied by a high barometer; under such conditions, clear, cold, frost weather may be expected to continue for several days.

Local conditions largely govern the strength and persistency of summer winds. They often blow fresh along northwest-southeast channels between high shores. The nights are likely to be calm with the wind starting up at sunrise and increasing in strength until about 3 p.m., then gradually moderating toward sunset. If a northwest wind is felt at night, it will probably blow hard from that quarter the following day.

Gales blow at all seasons, but in summer are least likely and of shortest duration, seldom lasting more than 48 hours and usually occurring as southeast gales accompanied by thick rainy weather. In autumn and winter, gales may continue for several days, setting in gradually from the southeast with falling pressure, bringing precipitation and low visi-

bility. When the barometer becomes stationary the wind shifts to the southwest and blows heavily with clearing weather accompanied by frequent rain squalls.

Southeast gales accompanied by thick rainy weather occur at all seasons. They are generally preceded by a short interval of calm cloudy weather and usually but not invariably by a falling barometer and rising temperature. They spring up gradually from east or east-southeast, hauling southward, accompanied by rain or thick weather, the barometer falling rapidly. When the barometer becomes stationary the wind shifts to the southwest and blows heavily with clearing weather, but with frequent squalls of rain.

When the *southwest gale* of winter is not preceded by one from the southeast, the barometer seldom falls but either remains stationary, in which case the gale may be expected to continue longer, or slowly rises, which means the wind will gradually subside and be followed by fine weather. Though not always accompanied by a gale or bad weather, a low barometer in winter often is accompanied by a heavy fall of snow on the hills and a sudden drop in temperature.

Northerly gales are confined almost exclusively to the winter—November to April. They rarely occur as far south as the Strait of Juan de Fuca, but increase in frequency toward the northward over southeastern Alaska. These winds sometimes blow with great force, especially through the inlets lying in a north-south direction and having high land on both sides. Usually they begin from the northeast, accompanied by snow or rain, and back through the north to northwest. From this last quarter the wind moderates and the weather clears.

Localized strong downslope mountain winds, popularly known as **williwaws** in western Alaska and the Aleutians, represent a wind phenomenon of considerable importance in this region. They have been observed to raise water as high as 200 feet and reduce visibility to as little as 50 feet. Williwaws occur when the air dams up in great quantity on the windward side of the mountain and then spills over suddenly as an overwhelming surge down the leeward side. The local topography determines the direction from which these excessively strong and gusty winds blow, and the probability of occurrence at a particular location is governed by the pressure pattern at the time. The violence and exact direction of the wind will depend both on the steepness of the mountainous elevations and on the exact position of such elevations with respect to the coast affected.

Locally in southeastern Alaska these winds also are known as **takus**, because they build up from a strong northerly circulation over Taku Glacier and then descend downslope through Taku Inlet and across Stephens Passage, often with great speed and gustiness. Frequently they are accompanied by blinding snowstorms. Through passes toward Juneau they sometimes sweep with terrific gusts, but their force is modified somewhat under the lee of the highlands east of Juneau. Similar fierce mountain winds pour down in Glacier Bay from Muir Glacier. In general, these williwaw winds are fairly common, blowing down steep slopes during periods of steep pressure gradients among the southeastern islands and on precipitous continental coastal slopes. In cases of similar pressure patterns, greater strength and gustiness will usually occur in the situation involving the colder air mass.

Temperature.—The southeastern Alaska region has two climatic regimes which affect temperature. On the outer exposed coasts, the regime is essentially marine. On the inner coasts, whether of the islands or the mainland, it is more continental. *Continentality* is defined as "a measure of the degree to which the climate of a particular region approaches the typical continental climate" with its wide range of temperature variations. In con-

trast, the oceans smooth out the temperature extremes and, in the more marine exposures, temperatures are not likely to rise as high in summer nor fall as low in winter as in less exposed locations. The frost-free season is longest on the outer coasts, and the mean annual temperatures are highest there. The coldest point of record in the region is Klukwan with a mean annual temperature of 37° F. Here the continental influences north of the inland waterways are strongly evident. The warmest locations are the ones near the extreme southern border. The island stations of Annette and View Cove and Tree Point on the mainland north of Chatham Sound all have an average of 46° F. The mean range of temperature is therefore 9° F.

In contrast to the many localities with pronounced moderating maritime influence, Klukwan's mean temperature is 11° F. during the coldest month and 57° F. in July. The extremes recorded at this northern interior station are —36° F. in December and 99° F. in July, producing an extreme range of 135° F.

Additional details on temperature over the region are included in the climatological tables in the Appendix. The annual mean temperature for Juneau airport as given in one of the tables is about 2° lower than the average established by observations taken in the city itself prior to 1943, thus providing an example of a common short-distance variation of climate. However, the average temperature at either location in winter and, as a result, for any given year, is sharply affected by the prevailing pressure pattern or windflow. For example, during January of 1950 the usual southeasterly prevailing wind was replaced by a predominating cold northerly circulation which resulted in a mean temperature for the month of 18° in the city and 8° at the airport as compared with the normal January means of 28° and 26° at the city and airport locations, respectively.

Precipitation.—For the most part precipitation is frequent and abundant, rising to well above 100 inches in 200 or more wet days at all localities exposed to the moist sea winds. Yet, owing to the successive mountain barriers which in parts of the region intercept the prevalent southerly winds, there is an irregular diminution away from the open sea until, in the northern portion, as at Skagway and Klukwan, the mean fall is about 21 to 26 inches. In actual averages for the whole area there is a precipitation range of more than 200 inches between the extremes of 231 inches at Little Port Walter and 21 inches at Klukwan. The larger amount cannot be matched in any other known Alaskan records. The smaller amount, though strongly showing continental influence, is about 2 inches greater than the mean annual falls over much of the Yukon Valley. In average number of precipitation days, the range is from 269 at Little Port Walter to 115 at Skagway. The increase of precipitation with elevation on slopes subject to moisture-bearing winds is strikingly exemplified in the comparison between the average annual amount of approximately 152 inches at Perserverance Camp, 1,400 feet, and 84 inches in the city of Juneau, 4 miles distant, with a rain gage elevation of less than 100 feet.

The snowfall amount is even more variable than that of rainfall, according to locality and exposure. At short-record stations the mean monthly or annual amounts may be unduly increased or lessened by especially heavy or light snow periods. As compared with total amounts of precipitation, the total snowfall varies enormously. For example, at Annex Creek where the mean precipitation from rain and melted snow is 109 inches, the total snowfall is 241 inches, which is the highest near-sea-level amount on record for the region. At Craig the mean precipitation likewise is 109 inches, but the average snowfall is only 11 inches, which appears to be the lightest amount known for all Alaska.

At most southeastern stations that have the three summer months free of snow, many localities have the snowless period extending through September. At a few places like Tree Point, Petersburg, and Cape Spencer, May is included in the snowless months. For the record at Cape Spencer, there is no average higher than a trace for the included months, April to November. At Skagway, by comparison, only June and July have been without a trace.

The rarity of extended periods of settled weather and persistent pressure patterns, particularly anticyclonic good-weather situations, over all of southeastern Alaska and the adjacent North Pacific area, was brought out in the preceding discussion of mean pressure charts. A comparison of annual Wet and Dry Spell duration frequencies, in which a wet day is defined as a day with 0.01 inch or more precipitation and a dry day as one with less than 0.01 inch, is shown in the following table:

Average Annual Number of Wet and Dry Spells

Station	Years of record	Wet spells (Consecutive days with precipitation 0.01 in. or more)		Dry spells (Consecutive days with precipitation less than 0.01 in.)	
		4 – 6 days	7 days or more	4 – 6 days	7 days or more
Annette Is.	6	13	9	8	5
Cape Decision	8	8	6	7	3
Cape Spencer	9	9	8	7	4
Juneau	10	9	9	7	3
Sitka	9	9	6	7	2
Wrangell	10	10	11	7	3
Yakutat	7	9	8	5	3

Thunderstorms, while not unknown, are mild and infrequent, averaging no more than 1 to 3 annually. They have been known to attend heavy snowfall, and hence may occur in cold as well as in warm seasons.

Cloudiness.—The percentage of possible sunshine is low over all of southeastern Alaska and, except in localities best protected by mountains from the sea influences—such as Haines and Skagway where the average number of clear days barely exceeds 100—the annual number of cloudy days exceeds the combined total of clear and partly cloudy days. This fact is exemplified at Juneau where 60 days are clear, 44 are partly cloudy, and 261 are cloudy. Skagway has an average of 10 to 12 clear days during May, June, and July. However, at the other stations that have recorded this data, the mean monthly number of clear days does not exceed 10 at any time during the year.

Over the years no significant diurnal variations in cloudiness are indicated by comparison of amounts observed at the hours of 8 a.m. and 8 p.m. Though the percentage figures for cloud cover are slightly higher for 8 p.m., the excess over 8 a.m. averages is less than 7 percent at all stations for which comparative data are available.

Fog.—On the outside coast of British Columbia and southeastern Alaska and in the inlets opening from the ocean, fog may occur at any time but is most frequent in July, August, and September. Among the noon GMT ships' observations taken along the coasts and inlets, the percentage of frequency of 9 in August is the highest, followed by 5 to 6 percent in July and September. During the latter season the fog most often comes in after midnight and holds until the following noon, or later, unless previously dispelled

by clearing winds or the drying effect of the sun on a very shallow layer of fog. The fall and winter fogs are less frequent but are likely to be of longer duration than those of summer. Continuous fogs of varying densities lasting 2 to 10 days have been known. The spring fogs are rare and of brief duration. Westerly winds are those which drive in sea fog; easterly and northerly winds usually are the clearing winds. Southeast winds, which also clear away fog, usually are accompanied by rain or drizzle. Patches of fog hanging about the summits, a moist atmosphere and a fogbank seaward together with a westerly wind, are certain indications of a coming fog.

The fogs predominating from July to September are invariably of the *advection* type resulting from the cooling effect of a relatively cold water surface upon a warm moist air mass flowing over it. This type *settles down* on the region, and sometimes even winds of gale force do not dissipate it. Zero to near-zero visibility occurs on the windward side of an island more often than on the leeward side because of these three possible situations:

(1) A shallow advection fog may flow around an island, leaving a clear space on the leeward side.

(2) A thick fog may flow over (as well as around) an island, but the slight heating produced by the down-draft on the lee side of the island causes the fog to lift into low stratus clouds and causes breaks in the low stratus overcast.

(3) The fog flowing over an island may be too thick for the heating on the lee side to cause breaks, yet the heating may still be sufficient to lift the fog a short distance off the water.

Even in the foggiest days of summer there is always a chance that there will be clear areas, breaks, or a slight lifting on the leeward sides of mountains if there is any kind of consistent wind movement.

Like the summer advection fogs, additional visibility hazards such as other types of fog, blowing and falling snow or rain, haze, etc., are generally worse on windward coasts.

Details on low visibility occurrence at coastal stations are entered in the climatological tables, and an additional table showing the number of hours per month that fog signals were operated at selected light stations is included in the Appendix.

LOCAL SERVICES.—Pilots and Pilotage.—Pilotage is not compulsory for the inland passage through British Columbia, nor for ports in Alaska. Reliable licensed pilots can be had at Seattle on inquiry, or communication by radio to marine station KPE. All vessels navigating the inland waters of British Columbia and Alaska should carry a pilot or pilots.

Vessels making canneries, mines, and other settlements in unsurveyed areas can usually obtain the services of someone with local knowledge, although not a pilot. Nearly all canneries in Alaska now have radio stations, telegraphic or radio telephonic, and vessels desiring a pilot should arrange by radio for one of the cannery men to come out and pilot the ship in.

Towboats are stationed at the principal ports of Washington and British Columbia. In the absence of able tugs in southeastern Alaska, any towing that is required is done by small cannery tenders and other small local craft. Vessels requiring this service are those that go to Alaska in the interests of the canneries, and the towboat is sent to meet them when expected.

Standard time.—The standard time of the meridian 120° west, eight hours slow of Greenwich time, is used from Dixon Entrance to Cape Spencer. The standard time of the meridian 130° west, nine hours slow of Greenwich time, is used from Cape Spencer to westward of Yakutat Bay.

Holidays in Alaska are as follows: January 1, New Year's Day; February 12, Lincoln's Birthday; February 22, Washington's Birthday; March 30, Seward's Day; May 30, Memorial Day; July 4, Independence Day; First Monday in September, Labor Day; October 18, Alaska Day; November 11, Armistice Day; Fourth Thursday in November, Thanksgiving Day; December 25, Christmas Day.

Supplies.—Vessels usually obtain their provisions and ship-chandler's stores at Puget Sound ports. The principal towns and settlements in southeastern Alaska can furnish provisions and a limited supply of ship-chandler's stores. Nearly all the canneries and mining settlements carry a limited supply of provisions for sale.

Water can be obtained through pipe and hose at most of the ports and canneries (while in operation) in southeastern Alaska. From the great amount of rainfall at certain seasons and melting of the snow on the mountains, fresh water is obtainable from streams in all parts of southeastern Alaska.

Coal, fuel oil, motor, and lubricating oils can be obtained at Ketchikan and Juneau. Coal can usually be obtained in limited quantities at Skagway. Oil stations are found at all of the larger towns, and gasoline and lubricating oils can be obtained at many of the canneries during the summer season.

Repairs.—No docking facilities for large vessels are available in southeastern Alaska. Docks and facilities for repairs to hulls and the machinery of ships are found at the principal ports of Washington and British Columbia, where the floating drydock has a capacity of 20,000 tons. At Ketchikan are two marine ways, the largest of which can haul vessels up to 400 tons and 115 feet in length. At Juneau is a marine railway which can haul vessels up to 110 feet in length and 300 tons. At Wrangell are two marine ways, the largest of which can haul vessels up to 65 feet in length and 8 feet draft. At Petersburg are two marine ways, the largest of which can haul vessels up to 90 feet in length. The range of tide being considerable, small vessels are frequently beached for hull repairs. Minor repairs to machinery of vessels can be made at most of the principal towns.

Transportation.—Regular lines of steamers operate from Seattle to southeastern Alaska ports. From these main ports there is intercommunication with the nearby smaller ports. Local airplane service is also maintained by several independent companies operating to all points in southeastern Alaska and the interior.

Communication in Alaska is conducted mainly by radiotelegraph and radiotelephone. There is also cable connection between Seattle, the principal ports of southeastern Alaska, and Valdez and Seward.

The Signal Corps of the United States Army operates the **Alaska Communication System,** which consists of a network of radio stations in Alaska with the net control station located in Seattle, Washington. This system constitutes the backbone of radio communications in Alaska. Practically all of the canneries and mining activities operate radio stations and, in addition, several stations are operated by the Territory of Alaska and other Government agencies, all of which have connections with the Alaska Communication System. Many of the shore stations of these various interests as well as certain stations of the Alaska Communication System listen on 500 kc., have ship to shore service, and are open to public correspondence. Most shore stations, except the Alaska Communication System, have no

fixed hours of service and some are closed between the normal periods of Alaskan fishing operations. For a list of Alaskan radio stations, hours, and nature of service concerned, consult the *List of Coast Stations and Ship Stations,* published by the International Telecommunication Union. A list of commercial radio stations located in Alaska may be obtained from the Federal Communications Commission, Washington 25, D. C. 5

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CHAPTER 3

Sailing Directions

ROUTES AND SAILING DIRECTIONS for vessels using the inside passage through British Columbia to Alaska and between the major ports of Southeastern Alaska are given in tabular form for the convenience of the navigator. These courses, used by vessels of various sizes, will be found dependable if used judiciously in connection with the latest charts.

These are slack-water courses and due allowance must be made for currents and wind. These courses as tabulated should be used in conjunction with the general information given concerning the currents, depths, and cautions.

All bearings and directions are true. The geographical positions given are those of the turning points and not the reference objects. In cases where a course extends across two or more charts the geographical position of a junction point has been given.

Diagrams of the routes followed have been inserted in Tables 1 and 2. The other tables are shown on parts of these diagrams. The names of the various waterways have been inserted in the tables in ***boldface italics*** following the first turning point in the waterway.

Sailing directions for bays, harbors, channels, and the like not shown in the tables will be found under the headings of the various features.

Table 1.—Seattle to Yakutat

Position (Reverse directions in *italics*—read upward)	True course	Distance
Elliott Bay		
1. Seattle (Colman Dock); 47°36′.2 N., 122°20′.3 W., Chart 6449:	*Degrees*	*Nautical miles*
Direct	296	3.2
Reverse	*116*	*3.2*
2. Fourmile Rock Light bearing 000°, distant 1.0 mile; 47°37′.3 N., 122°24′.7 W.:		
Direct	320	3.1
Reverse	*140*	*3.1*
Puget Sound		
3. West Point Light bearing 090°, distant 1.1 miles; 47°39′.7 N., 122°27′.7 W.:		
Direct	022	3.0
Reverse	*202*	*3.0*

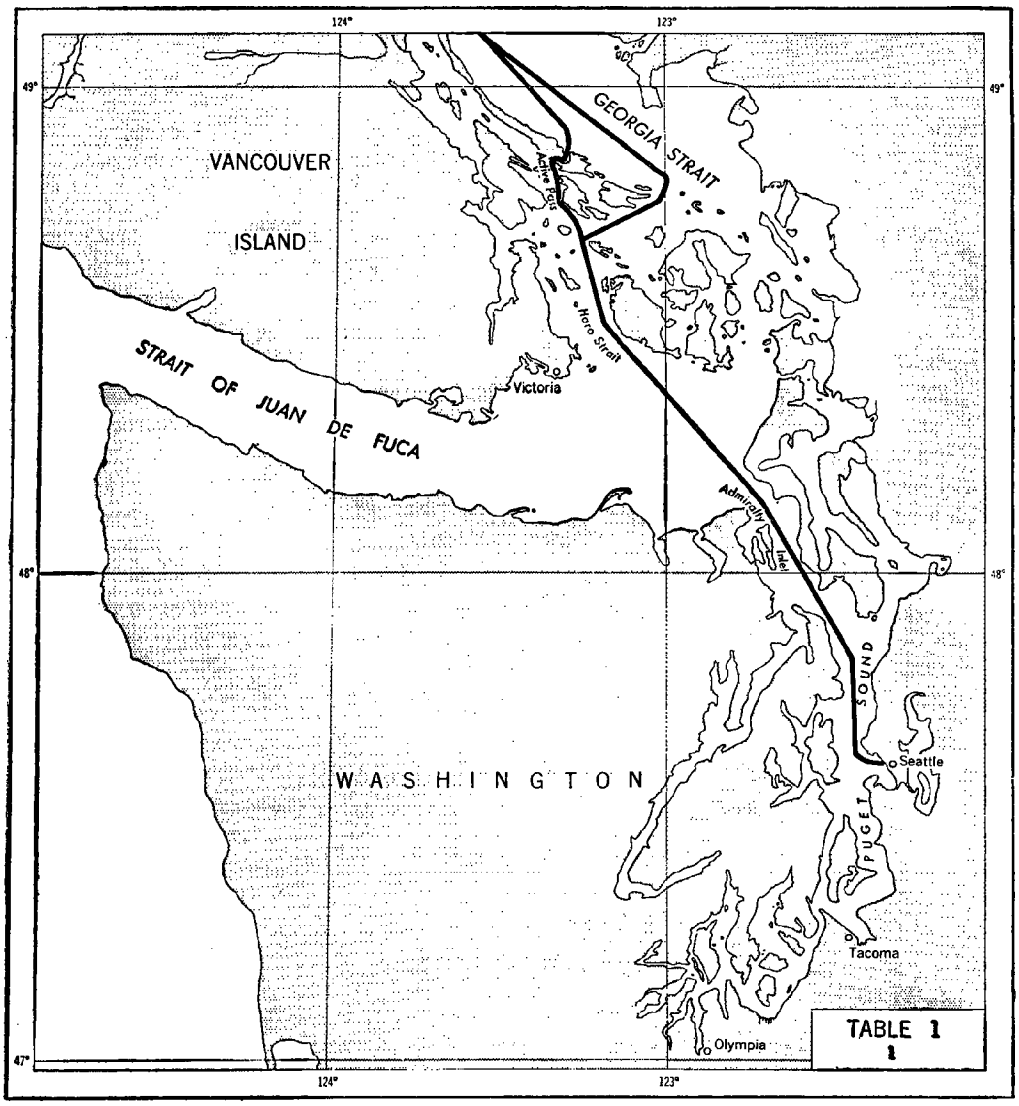

124°
123°
49°
48°
47°
VANCOUVER
ISLAND
GEORGIA STRAIT
Active Pass
Haro Strait
Victoria
STRAIT OF JUAN DE FUCA
Admiralty Inlet
PUGET SOUND
Seattle
WASHINGTON
Tacoma
Olympia
TABLE 1
1

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
4. Point Monroe Light bearing 270°, distant 3.1 miles; 47°42′.5 N., 122°26′.1 W.:		
Direct	000	4.5
Reverse	*180*	*4.5*
5. Point Wells Range Front Light bearing 090°, distant 1.6 miles; 47°47′.1 N., 122°26′.1 W.:		
Direct	337	8.3
Reverse	*157*	*8.3*
6. Point No Point Light bearing 270°, distant 0.5 mile; 45°54′.7 N., 122°30′.8 W.:		
Direct	327	8.5
Reverse	*147*	*8.5*
7. Bush Point Light bearing 090°, distant 1.0 mile; 48°01′.9 N., 122°37′.8 W.:		
Direct	344	4.4
Reverse	*164*	*4.4*
8. Marrowstone Point Light bearing 270°, distant 1.0 mile; 48°06′.1 N., 122°39′.7 W. Pass Point Wilson Light, pass Partridge Bank Lighted bell buoy 1A:		
Direct	317	14.4
Reverse	*137*	*14.4*
Strait of Juan de Fuca		
9. Smith Island Light bearing 045°, distant 3.6 miles; 48°16′.6 N., 122°54′.4 W. Pass Hein Bank lighted bell buoy. Change to Chart 6380 (*6449*):		
Direct	323	17.3
Reverse	*143*	*17.3*
Haro Strait		
10. Lime Kiln Light bearing 050°, distant 1.0 mile; 48°30′.4 N., 122°10′.2 W. Pass Kellett Bluff Light:		
Direct	344	11.7
Reverse	*164*	*11.7*
11. Turn Point Light bearing 100°, distant 0.8 mile; 48°41′.5 N., 123°15′.4 W.		
Via Active Pass		
11. Turn Point Light bearing 100°, distant 0.8 mile; 48°41′.5 N., 123°15′.4 W.:		
Direct	332	5.3
Reverse	*152*	*5.3*
12A. Mouat Point, west extremity, bearing 000°, distant 0.5 mile; 48°46′.2 N., 123°19′.1 W.:		
Direct	345	3.6
Reverse	*155*	*3.6*
13A. Portlock Point Light bearing 270°, distant 0.3 mile; 48°49′.6 N., 123°20′.5 W.:		
Direct	335	1.1
Reverse	*155*	*1.1*
14A. Enterprise Reef Light bearing 090°, distant 0.3 mile; 48°50′.7 N., 123°20′.2 W. Change to H. O. Chart 2336 (*6380*):		
Direct	020	0.8
Reverse	*200*	*0.8*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
15A. Helen Point Light bearing 090°, distant 0.2 mile; 48°51′.4 N., 123°20′.8 W.:		
Direct	038	0.4
Reverse	*218*	*0.4*
16A. Helen Point Light bearing 180°, distant 0.3 mile; 48°51′.7 N., 123°20′.6 W.:		
Direct	100	1.2
Reverse	*280*	*1.2*
17A. Mary Anne Point Light bearing 000°, distant 0.2 mile; 48°51′.5 N., 123°18′.7 W. Pass Active Point Light:		
Direct	026	1.9
Reverse	*206*	*1.9*
18A. Gossip Shoal lighted bell buoy bearing 270°, distant 0.5 mile; 48°53′.3 N., 123°17′.5 W. Change to Chart H. O. 1769 (*H. O. 2336*):		
Direct	320	20.1
Reverse	*140*	*20.1*
14. Gabriola Reefs Light bearing 275°, distant 1.0 mile; 49°08′.9 N., 123°36′.8 W.		
Via Boundary Pass		
11. Turn Point Light bearing 100°, distant 0.8 mile; 48°41′.5 N., 123°15′.4 W. Chart 6380:		
Direct (Patos Island Light ahead)	062	10.0
Reverse (Patos Island Light astern)	*242*	*10.0*
12. Saturna Island Light bearing 330°, distant 1.1 miles; 48°46′.1 N., 123°01′.8 W. Change to Chart 6300 (*6380*):		
Direct	038	4.2
Reverse	*218*	*4.2*
13. Patos Island Light bearing 185°, distant 2.0 miles; 48°49′.3 N., 122°57′.9 W.:		
Direct	308	32.2
Reverse	*128*	*32.2*
Georgia Strait		
14. Gabriola Reefs Light bearing 275°, distant 1.0 mile; 49°08′.9 N., 123°36′.8 W. Change to Chart H. O. 1772 (*6300*):		
Direct	301	25.1
Pass Entrance Island Light, distant 0.8 mile.		
Reverse	*121*	*25.1*
Ballenas Channel		
15. Ballenas Islands Light bearing 180°, distant 1.0 mile; 49°22′.0 N., 124°09′.5 W. Change to Chart H. O. 1773 (*H. O. 1772*):		
Direct	300	12.4
Reverse	*120*	*12.4*
16. Sisters Light bearing 000°, distant 1.0 mile; 49°28′.2 N., 124°26′.0 W.:		
Direct	315	20.0
Reverse	*135*	*20.0*

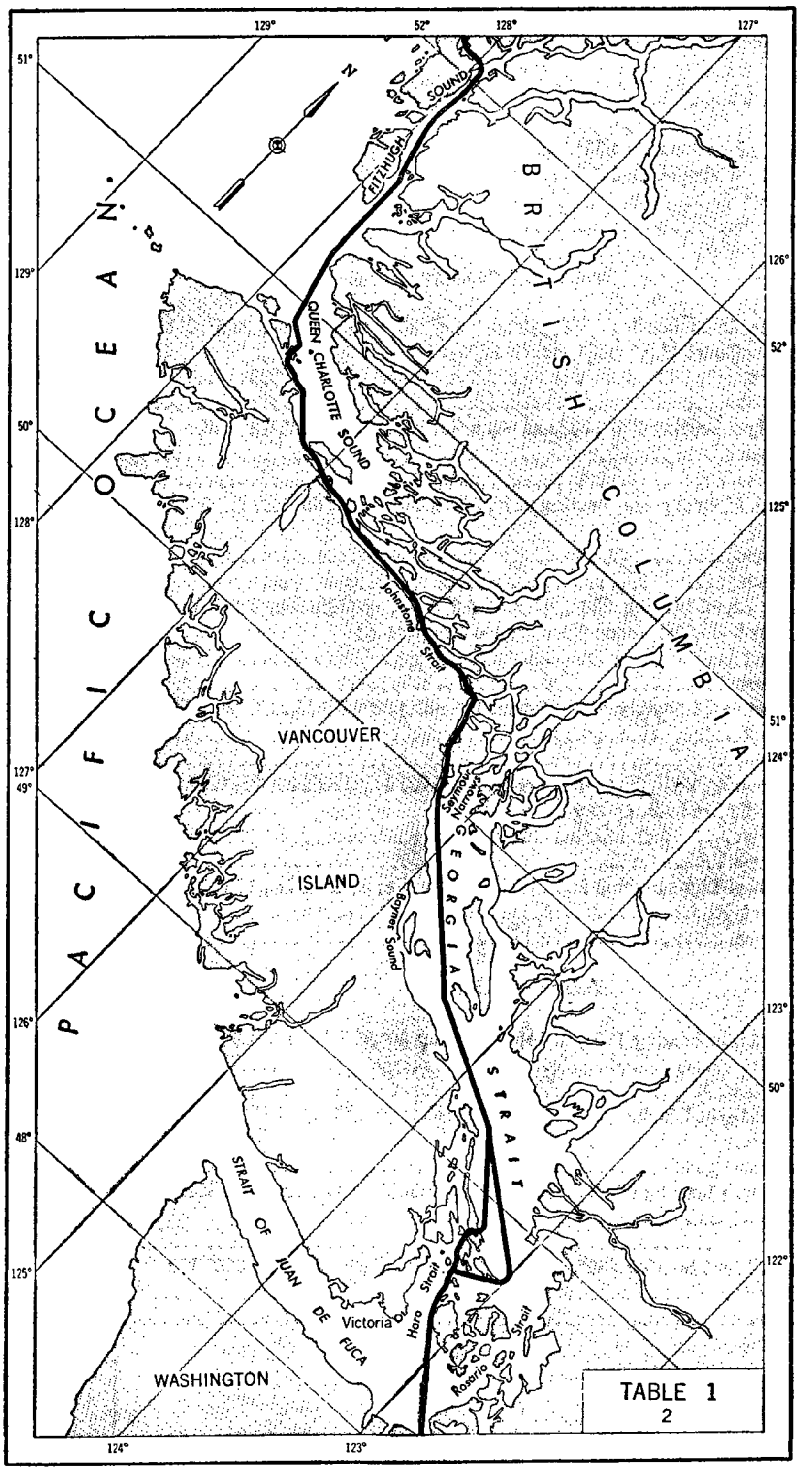

PACIFIC OCEAN
BRITISH COLUMBIA
FITZHUGH SOUND
QUEEN CHARLOTTE SOUND
Johnstone Strait
VANCOUVER
ISLAND
Seymour Narrows
GEORGIA STRAIT
Baynes Sound
STRAIT OF JUAN DE FUCA
Victoria
Haro Strait
Rosario Strait
WASHINGTON
N
TABLE 1
2

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
17. Cape Lazo Light bearing 270°, distant 2.5 miles; 49°42′.4 N., 124°47′.7 W. Change to Chart H. O. 1775 (*H. O. 1773*):	*Degrees*	*Nautical miles*
Direct	318	23.7
Reverse	*138*	*23.7*
Discovery Passage		
18. Cape Mudge Light bearing 090°, distant 0.5 mile; 49°59′.9 N., 125°12′.4 W. Change to Chart H. O. 2091 (*H. O. 1775*):		
Direct	349	1.4
Reverse	*169*	*1.4*
19. Campbell Light bearing 270°, distant 0.8 mile; 50°01′.3 N., 125°12′.9 W.:		
Direct	333	3.0
Reverse	*153*	*3.0*
20. Steep Island, highest point, bearing 357°, distant 0.8 mile; 50°04′.0 N., 125°15′.1 W.:		
Direct	318	3.7
Reverse	*138*	*3.7*
21. Race Point Light bearing 270°, distant 0.3 mile; 50°06′.8 N., 125°18′.9 W.: (Southern end of Seymour Narrows see Chapter 4.)		
Direct	301	1.5
Reverse	*121*	*1.5*
22. Maud Island Light bearing 015°, distant 0.3 mile; 50°07′.6 N., 125°20′.8 W.:		
Direct	348	9.8
Reverse	*168*	*9.8*
23. Elk Point bearing 270°, distant 1.2 miles; 50°17′.2 N., 125°24′.0 W. Change to Chart H. O. 2168 (*H. O. 2091*):		
Direct	338	3.3
Reverse	*158*	*3.3*
24. Chatham Point Light bearing 225°, distant 0.3 mile; 50°20′.2 N., 125°26′.0 W.:		
Direct	282	2.6
Reverse	*102*	*2.6*
Johnstone Strait		
25. Rock Point Light bearing 180°, distant 0.3 mile; 50°20′.8 N., 125°30′.0 W.:		
Direct	298	3.3
Reverse	*118*	*3.3*
26. Ripple Point Light bearing 180°, distant 0.3 mile; 50°22′.3 N., 125°34′.6 W.:		
Direct	270	6.3
Reverse	*090*	*6.3*
27. Vansittart Light bearing 000°, distant 0.3 mile; 50°22′.3 N., 125°44′.4 W.:		
Direct	288	3.4
Reverse	*108*	*3.4*
28. Camp Point Light bearing 180°, distant 0.3 mile; 50°23′.4 N., 125°49′.5 W.:		
Direct	269	1.7
Reverse	*089*	*1.7*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Race Passage		
29. Helmcken Island Light bearing 000°, distant 0.3 mile; 50°23′.4 N., 125°52′.2 W. Change to Chart H. O. 2169 (*H. O. 2168*):	*Degrees*	*Nautical miles*
Direct	295	9.1
Reverse	*115*	*9.1*
30. Hickey Point Light bearing 180°, distant 0.3 mile; 50°27′.3 N., 125°05′.1 W.:		
Direct	287	8.4
Reverse	*107*	*8.4*
31. Broken Island Light bearing 000°, distant 1.0 mile; 50°29′.7 N., 126°17′.8 W. Change to Chart H. O. 2185 (*H. O. 2169*):		
Direct	273	10.7
Reverse	*093*	*10.7*
32. Cracroft Island Light bearing 000°, distant 1.0 mile; 50°30′.2 N., 126°34′.6 W.:		
Direct	290	8.3
Reverse	*110*	*8.3*
33. Blinkhorn Island Light bearing 180°, distant 0.5 mile; 50°33′.1 N., 126°46′.8 W. Change to Chart H. O. 2161 (*H. O. 2185*):		
Direct	280	4.8
Reverse	*100*	*4.8*
34. Gordon Point, east extremity, bearing 000°, distant 0.8 mile; 50°34′.0 N., 126°54′.2 W.:		
Direct	300	5.5
Reverse	*120*	*5.5*
Broughton Strait		
35. Haddington Island, west end, bearing 180°, distant 0.5 mile; 50°36′.7 N., 127°01′.7 W.:		
Direct	278	4.8
Reverse	*098*	*4.8*
36. Pulteney Point Light bearing 000°, distant 0.5 mile; 50°37′.4 N., 127°09′.2 W. Change to Chart H. O. 2236 (*H. O. 2161*):		
Direct	310	13.6
Reverse	*130*	*13.6*
Queen Charlotte Strait		
37. Masterman Islands Light bearing 180°, distant 0.5 mile; 50°46′.2 N., 127°25′.5 W.:		
Direct	293	7.3
Reverse	*113*	*7.3*
Goletas Channel		
38. Noble Islets Light bearing 045°, distant 0.5 mile; 50°49′.0 N., 127°36′.2 W. Change to Chart H. O. 1442 (*H. O. 2236*):		
Direct	001	2.6
Reverse	*181*	*2.6*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Christie Passage		
39. Scarlett Point Light bearing 270°, distant 0.4 mile; 50°51′.6 N., 127°36′.2 W. Change to Chart H. O. 1767 (*H. O. 1442*):	*Degrees*	*Nautical miles*
Direct	322	8.3
Reverse	*142*	*8.3*
Gordon Channel		
40. Pine Island Light bearing 045°, distant 0.5 mile; 50°58′.2 N., 127°44′.2 W.:		
Direct	342	17.4
Reverse	*162*	*17.4*
Queen Charlotte Sound		
41. Egg Island Light bearing 090°, distant 1.5 miles; 51°14′.7 N., 127°52′.7 W.:		
Direct	005	10.9
Reverse	*185*	*10.9*
42. Clark Point Light bearing 270°, distant 1.2 miles; 51°25′.6 N., 127°51′.2 W. Change to Chart H. O. 5361 (*H. O. 1767*):		
Direct	355	10.5
Reverse	*175*	*10.5*
Fitzhugh Sound		
43. Addenbrooke Island Light bearing 090°, distant 0.5 mile; 51°36′.2 N., 127°52′.3 W.:		
Direct	342	8.2
Reverse	*162*	*8.2*
44. Kelpie Point Light bearing 270°, distant 2.0 miles; 51°44′.0 N., 127°56′.4 W.:		
Direct	003	14.4
Reverse	*183*	*14.4*
45. Fog Rocks Light bearing 090°, distant 0.5 mile; 51°58′.4 N., 127°55′.6 W. Change to Chart H. O. 5373A (*H. O. 5361*):		
Direct	358	5.3
Reverse	*178*	*5.3*
Fisher Channel		
46. Pointer Island Light bearing 270°, distant 0.6 mile; 52°03′.6 N., 127°55′.9 W.:		
Direct	294	2.5
Reverse	*114*	*2.5*
Lama Passage		
47. Serpent Point Light bearing 180°, distant 0.2 mile; 52°04′.7 N., 127°59′.6 W.:		
Direct	268	3.3
Reverse	*088*	*3.3*

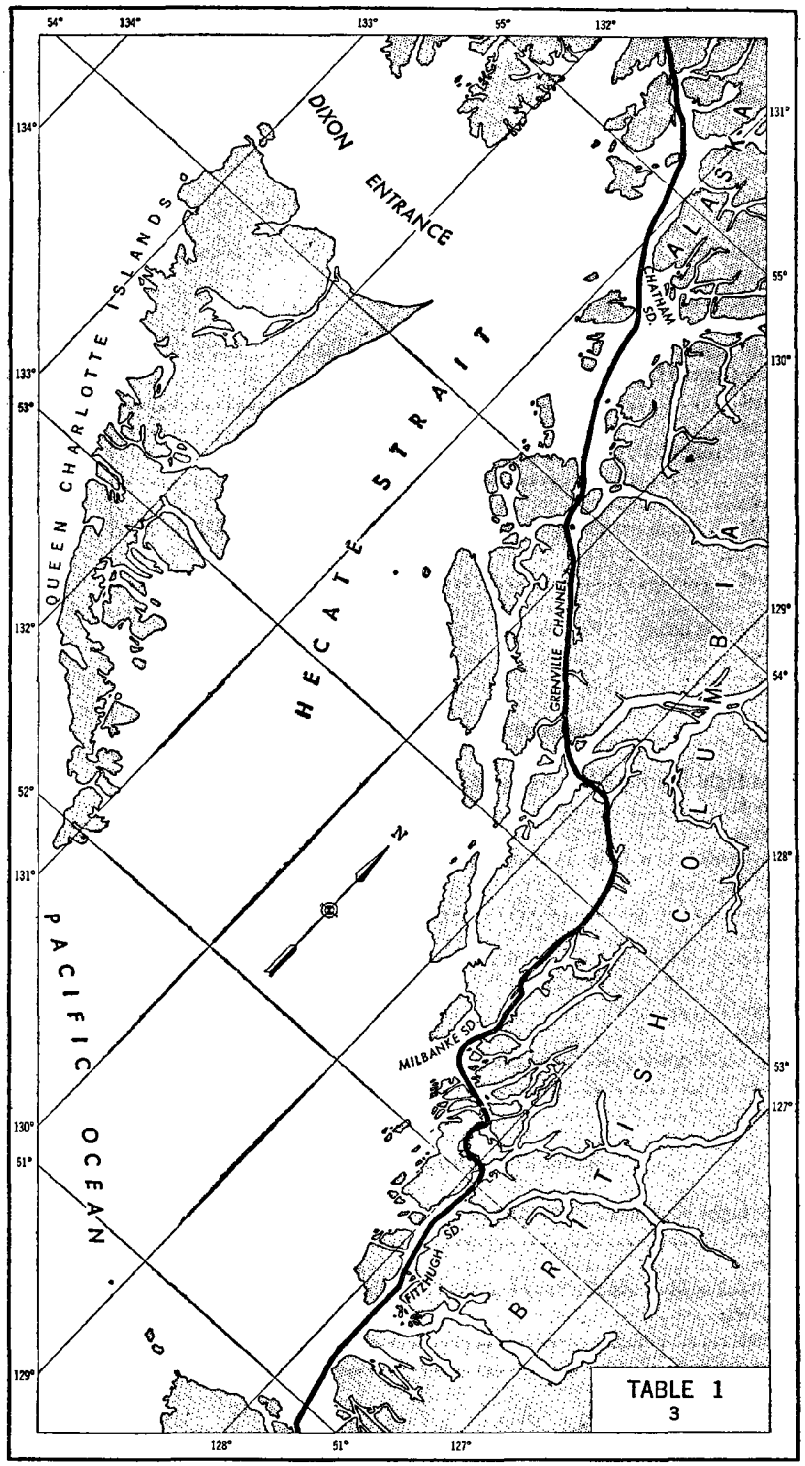

DIXON ENTRANCE
QUEEN CHARLOTTE ISLANDS
HECATE STRAIT
PACIFIC OCEAN
ALASKA
BRITISH COLUMBIA
CHATHAM SD.
GRENVILLE CHANNEL
MILBANKE SD.
FITZHUGH SD.
N
TABLE 1
3

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
48. Walker (Camp) Island Light bearing 320°, distant 1.8 miles; 52°04′.5 N., 128°05′.0 W.:		
Direct	310	2.2
Reverse	*130*	*2.2*
49. Walker (Camp) Island Light bearing 090°, distant 0.5 mile; 52°05′.9 N., 128°07′.7 W.:		
Direct	358	2.1
Reverse	*178*	*2.1*
50. Napier Point Light bearing 225°, distant 0.1 mile; 52°08′.0 N., 128°07′.9 W. Change to Chart H. O. 5373 (*H. O. 5373A*):		
Direct	345	0.9
Reverse	*165*	*0.9*
51. Story Point bearing 090°, distant 0.1 mile; 52°08′.9 N., 128°08′.3 W.:		
Direct	016	1.5
Reverse	*196*	*1.5*
52. Saunders Island, south extremity, bearing 090°, distant 0.4 mile; 52°10′.4 N., 128°07′.6 W.:		
Direct	041	1.1
Reverse	*221*	*1.1*
53. Dryad Point Light bearing 270°, distant 0.2 mile; 52°11′.2 N., 128°06′.4 W.:		
Direct	331	0.7
Reverse	*151*	*0.7*
Seaforth Channel		
54. Dryad Point Light bearing 164°, distant 0.7 mile; 52°11′.8 N., 128°07′.0 W.:		
Direct	313	2.0
Reverse	*133*	*2.0*
55. Dall Rocks lighted bell buoy bearing 180°, distant 150 yards; 52°13′.1 N., 128°09′.3 W.:		
Direct	287	4.6
Reverse	*107*	*4.6*
56. Idol Point Light bearing 180°, distant 0.2 mile; 52°14′.5 N., 128°16′.6 W. Change to Chart H. O. 1761 (*H. O. 5373*):		
Direct	283	5.9
Reverse	*103*	*5.9*
57. Ivory Island Light bearing 072°, distant 1.0 mile; 52°15′.9 N., 128°24′.8 W.:		
Direct	317	2.9
Reverse	*137*	*2.9*
Milbanke Sound		
58. Susan Rock Light bearing 225°, distant 1.0 mile; 52°17′.9 N., 128°29′.1 W.:		
Direct	330	3.6
Reverse	*150*	*3.6*
59. Vancouver Rock lighted whistle buoy bearing 090°, distant 1.0 mile; 52°21′.1 N., 128°32′.0 W.:		
Direct	024	5.9
Reverse	*204*	*5.9*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
60. Jorkins Point Light bearing 270°, distant 0.6 mile; 52°26′.4 N., 128°28′.1 W. Change to Chart H. O. 1762 (*H. O. 1761*).:	*Degrees*	*Nautical miles*
Direct	035	1.5
Reverse	*215*	*1.5*
Finlayson Channel		
61. Legge Point, south extremity, bearing 090°, distant 1.0 mile; 52°27′.8 N., 128° 26′.8 W.:		
Direct	349	5.7
Reverse	*169*	*5.7*
62. Cone Island, south end, bearing 270°, distant 0.5 mile; 52°33′.2 N., 128°28′.5 W.:		
Direct	350	4.9
Reverse	*170*	*4.9*
63. Boat Bluff Light bearing 311°, distant 1.0 mile; 52°38′.0 N., 128°29′.9 W.:		
Direct	302	1.3
Reverse	*122*	*1.3*
North Passage		
64. Boat Bluff Light bearing 090°, distant 0.4 mile; 52°38′.7 N., 128°31′.7 W.:		
Direct	354	4.2
Reverse	*174*	*4.2*
Tolmie Channel		
65. Tenas Island Light bearing 090°, distant 0.3 mile; 52°42′.8 N., 128°32′.7 W.:		
Direct	006	10.2
Reverse	*186*	*10.2*
66. Sarah Island Light bearing 090°, distant 0.5 mile; 52°53′.2 N., 128°31′.0 W.:		
Direct	048	1.0
Reverse	*228*	*1.0*
67. Quarry Point Light bearing 315°, distant 0.4 mile; 52°53′.7 N., 128°30′.0 W.:		
Direct	355	6.0
Reverse	*175*	*6.0*
Graham Reach		
68. Carroll Island bearing 270°, distant 0.2 mile; 52°59′.8 N., 128°30′.8 W.:		
Direct	343	9.5
Reverse	*163*	*9.5*
69. Red Cliff Point Light bearing 328°, distant 1.5 miles; 53°08′.8 N., 128°35′.2 W.:		
Direct	329	2.8
Reverse	*149*	*2.8*
70. Work Island, east end, bearing 225°, distant 0.4 mile; 53°11′.3 N., 128°37′.9 W.:		
Direct	290	2.3
Reverse	*110*	*2.3*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Fraser Reach		
	Degrees	*Nautical miles*
71. Work Island Light bearing 135°, distant 1.0 mile; 53°12′.1 N., 128°41′.5 W.:		
Direct	304	6.7
Reverse	*124*	*6.7*
72. Kingcombe Point Light bearing 328°, distant 3.2 miles; 53°15′.8 N., 128°50′.5 W. Change to Chart H. O. 1584 (*H. O. 1762*):		
Direct	336	3.3
Reverse	*156*	*3.3*
McKay Reach		
73. Kingcombe Point Light bearing 225°, distant 0.5 mile; 53°18′.8 N., 128°53′.0 W.:		
Direct	275	5.2
Reverse	*095*	*5.2*
74. Trivett (Trinett) Point Light bearing 180°, distant 0.5 mile; 53°19′.3 N., 129°01′.5 W.:		
Direct	257	3.9
Reverse	*077*	*3.9*
75. Point Cumming Light bearing 000°, distant 0.5 mile; 53°18′.5 N., 129°07′.7 W.:		
Direct	299	7.5
Reverse	*119*	*7.5*
Wright Sound		
76. Sainty (Camp) Point Light bearing 000°, distant 0.5 mile; 53°22′.1 N., 129°18′.8 W.:		
Direct	310	6.3
Reverse	*130*	*6.3*
Grenville Channel		
77. Union Passage, west side of entrance, bearing 000°, distant 1.1 miles; 52°26′.1 N., 129°27′.0 W.:		
Direct	317	11.0
Reverse	*137*	*11.0*
78. Ormiston (Mountain) Point Light bearing 270°, distant 0.2 mile; 53°34′.2 N., 129°39′.0 W.:		
Direct	323	6.6
Reverse	*143*	*6.6*
79. Klewnuggit Light bearing 090°, distant 0.5 mile; 53°39′.5 N., 129°45′.8 W.:		
Direct	320	18.1
Reverse	*140*	*18.1*
80. Pitt Point Light bearing 225°, distant 1.0 mile; 53°53′.4 N., 130°05′.3 W. Change to Chart H. O. 2829 (*H. O. 1584*):		
Direct	294	3.8
Reverse	*114*	*3.8*
81. Watson Rock Light bearing 045°, distant 0.6 mile; 53°54′.9 N., 130°11′.1 W.:		
Direct	347	6.6
Reverse	*167*	*6.6*

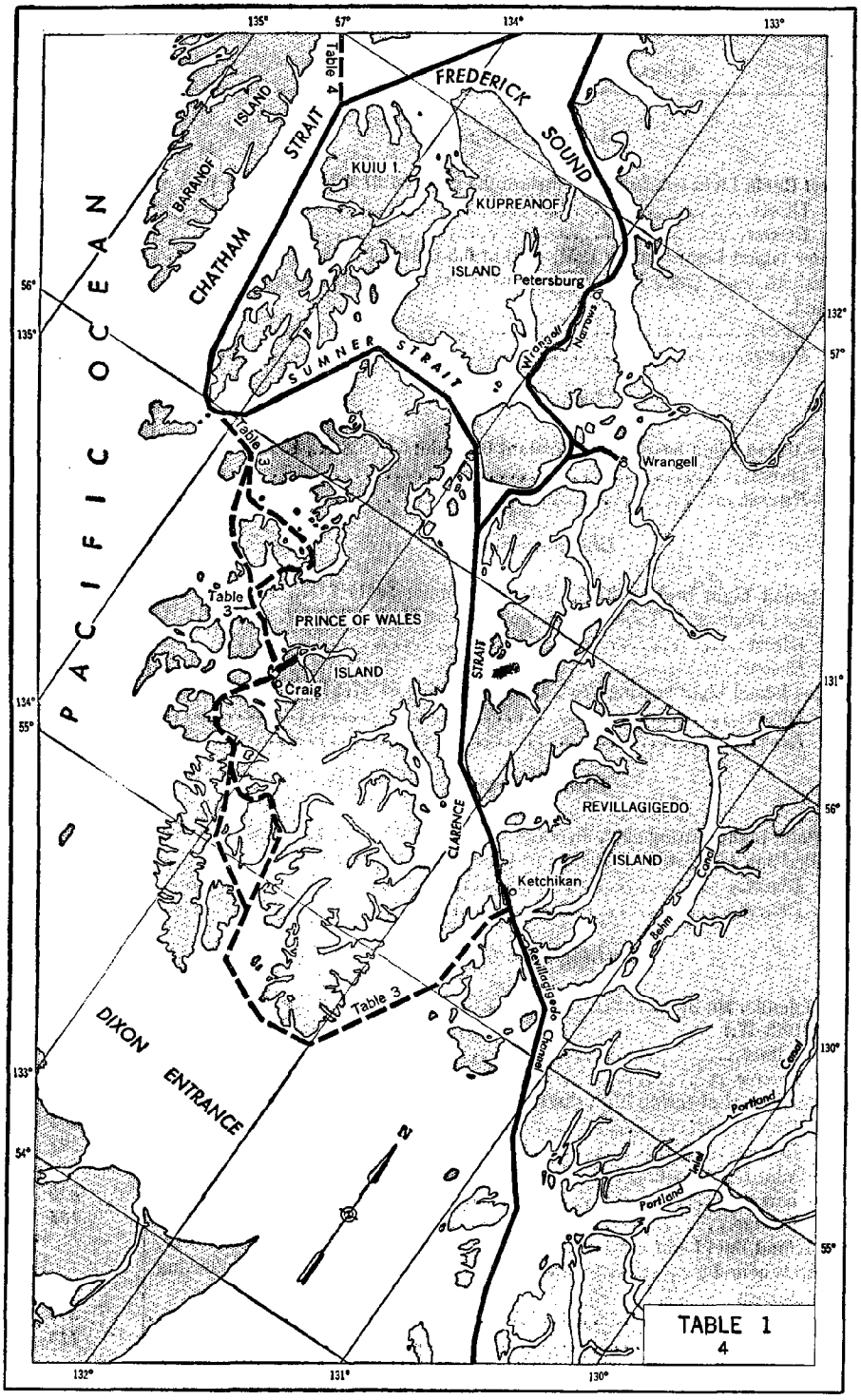

PACIFIC OCEAN
BARANOF ISLAND
CHATHAM STRAIT
FREDERICK SOUND
KUIU I.
KUPREANOF ISLAND
Petersburg
Wrangell Narrows
SUMNER STRAIT
Wrangell
Table 4
Table 3
PRINCE OF WALES ISLAND
Craig
CLARENCE STRAIT
REVILLAGIGEDO ISLAND
Ketchikan
Revillagigedo Channel
Behm Canal
Portland Canal
Portland Inlet
DIXON ENTRANCE
N
TABLE 1
4
135°
57°
134°
133°
56°
132°
131°
130°
55°
54°

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italic* —read upward)	True course	Distance
Arthur Passage		
82. Herbert Reefs Light bearing 270°, distant 0.4 mile; 54°01′.4 N., 130°13′.6 W.:	*Degrees*	*Nautical miles*
Direct	329	2.8
Reverse	*149*	*2.8*
83. Hammer Island Light bearing 125°, distant 0.8 mile; 54°03′.8 N., 130°16′.0 W. Elizabeth Peak (2280 feet) in range with the south extremity of Hammer Island.		
Direct	307½	3.4
Reverse	*127½*	*3.4*
Malacca Passage		
84. Lawyer Island Light bearing 000°, distant 0.9 mile; 54°05′.8 N., 130°20′.6 W.:		
Direct	325	14.6
Reverse	*145*	*14.6*
Chatham Sound		
85. Lucy Island Light bearing 270°, distant 0.9 mile; 54°17′.7 N., 130°35′.0 W. Same as Position 1, Table 2. Change to Chart H. O. 2828 (*H. O. 2829*):		
Direct	344	20.5
Reverse	*164*	*20.5*
86. Holliday Island Light bearing 270°, distant 0.5 mile; 54°37′.4 N., 130°44′.7 W.:		
Direct	324	13.5
Reverse	*144*	*13.5*
Dixon Entrance		
87. Tree Point Light bearing 090°, distant 1.5 miles; 54°48′.2 N., 130°58′.5 W. Same as Position 1A, Table 2. Change to Chart 8075 (*H. O. 2828*):		
Direct	341	21.4
Reverse	*161*	*21.4*
Revillagigedo Channel		
88. Twin Islands, south extremity, bearing 270°, distant 1.1 miles; 55°08′.4 N., 131°10′.8 W.:		
Direct	309	3.8
Reverse	*129*	*3.8*
89. Hog Rocks Light bearing 270°, distant 0.5 mile; 55°10′.7 N., 131°16′.0 W.:		
Direct	303	6.7
Reverse	*123*	*6.7*
90. Angle Point Light bearing 090°, distant 0.5 mile; 55°14′.3 N., 131°25′.9 W.:		
Direct	315	3.2
Reverse	*135*	*3.2*
91. Spire Island Reef Light bearing 180°, distant 0.5 mile; 55°16′.6 N., 131°29′.9 W. Vessels bound for Ketchikan via West Channel see alternate route following Ketchikan:		
Direct	299	3.2
Reverse	*119*	*3.2*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
92. Potter Rock Lighted bell buoy bearing 090°, distant 350 yards; 55°18′.2 N., 131°34′.9 W. Same as Position 3, Table 3. Change to Chart 8094 (*8075*):	*Degrees*	*Nautical miles*
Direct	322	1.1
Reverse	*142*	*1.1*
Tongass Narrows		
93. Idaho Rock lighted buoy 2 bearing 090°, distant 50 yards; 55°19′.0 N., 131°36′.0 W. Same as Position 2, Table 3. Change to Chart 8095 (*8094*).		
Direct	312	1.8
Reverse	*132*	*1.8*
94. Thomas Basin West Light bearing 000°, distant 100 yards; 55°20′.3 N., 131°38′.5 W.:		
Direct	326	0.3
Reverse	*146*	*0.3*
95. Ketchikan water front; 55°20′.5 N., 131°38′.7 W. Same as Position 1, Table 3:		
Alternative courses through West Channel		
Large vessels from southward use this passage, turning around the west end of Pennock Island to make a port landing at the wharves.		
91. Spire Island Reef Light bearing 180°, distant 0.5 miles; 55°16′.6 N., 131°29′.9 W. Chart 8094:		
Direct	292	2.8
Reverse	*112*	*2.8*
92B. Mountain Point Light bearing 090°, distant 0.9 mile; 55°17′.6 N., 131°34′.5 W.:		
Direct	285	1.4
Reverse	*105*	*1.4*
Tongass Narrows		
93B. Pennock Island, southeast extremity, bearing 062°, distant 0.6 mile; 55°18′.0 N., 131°36′.9 W. Change to Chart 8095 (*8094*):		
Direct	319	1.5
Reverse	*139*	*1.5*
94B. Tongass Narrows, West Channel Light, bearing 000°, distant 200 yards; 55°19′.1 N., 131°38′.5 W.:		
Direct	318	1.7
Reverse	*138*	*1.7*
95B. East Clump Light bearing 310°, distant 0.5 mile; 55°20′.4 N., 131°40′.6 W.:		
Direct	Various	1.1
Reverse	*Various*	*1.1*
95. Ketchikan, water front, 55°20′.5 N., 131°38′.7 W., same as Position 1, Table 3.		
95. Ketchikan, water front, 55°20′.5 N., 131°38′.7 W., same as Position 1, Table 3:		
Direct	280	1.3
Reverse	*100*	*1.3*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
96. East Clump Light bearing 270°, distant 400 yards; 55°20′.7 N., 131°40′.9 W.:		
Direct	316	0.9
Reverse	*136*	*0.9*
97. Sunny Point Light bearing 090°, distant 150 yards; 55°21′.3 N., 131°42′.0 W. Change to Chart 8094 (*8095*):		
Direct	315	1.6
Reverse	*135*	*1.6*
98. Lewis Reef Light bearing 270°, distant 300 yards; 55°22′.5 N., 131°44′.0 W.:		
Direct	314	1.8
Reverse	*134*	*1.8*
99. Channel Island Light bearing 090°, distant 0.3 mile; 55°23′.7 N., 131°46′.3 W.:		
Direct	328	1.3
Reverse	*148*	*1.3*
100. Rosa Reef Light bearing 270°, distant 0.3 mile; 55°24′.7 N., 131°47′.5 W.:		
Direct	316	2.8
Reverse	*136*	*2.8*
101. Guard Island Light bearing 270°, distant 1.0 mile; 55°26′.8 N., 131°50′.9 W. Change to Chart 8102 (*8094*):		
Direct	300	6.5
Reverse	*120*	*6.5*
Clarence Strait		
102. Caamano Point Light bearing 090°, distant 1.0 mile; 55°29′.9 N., 132°00′.8 W.:		
Direct	300	4.4
Reverse	*120*	*4.4*
103. Niblack Point Daybeacon bearing 000°, distant 1.0 mile; 55°32′.0 N., 132°07′.0 W.:		
Direct	314	5.5
Reverse	*134*	*5.5*
104. Ship Island Light bearing 090°, distant 1.2 miles; 55°36′.0 N., 132°14′.0 W.:		
Direct	332	13.2
Reverse	*152*	*13.2*
105. Narrow Point Light bearing 270°, distant 2.0 miles; 55°47′.5 N., 132°25′.0 W.:		
Direct	326	19.0
Reverse	*146*	*19.0*
NOTE: Courses and distances from Lincoln Rock Light to Stephens Passage, by way of Snow Passage, Sumner Strait, Chatham Strait, and Frederick Sound, are for vessels desiring not to pass through Wrangell Narrows and follow Position 136 below.		
106. Lincoln Rock Light bearing 090°, distant 1.0 mile; 56°03′.4 N., 132°43′.6 W. Change to Chart 8160 (*8102*):		
Direct	351	6.3
Reverse	*171*	*6.3*
107. Key Reef Light bearing 270°, distant 2.5 miles; 56°09′.6 N., 132°45′.3 W.:		
Direct	010	3.8
Reverse	*190*	*3.8*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
108. Steamer Point Light bearing 090°, distant 0.8 mile; 56°13′.4 N., 132°44′.1 W.:	*Degrees*	*Nautical miles*
Direct	043	4.5
Reverse	*223*	*4.5*
Stikine Strait		
109. Round Point Light bearing 270°, distant 0.4 mile; 56°16′.7 N., 132°38′.7 W.		
To Wrangell		
109. Round Point Light bearing 270°, distant 0.4 mile; 56°16′.7 N., 132°38′.7 W.:		
Direct	016	10.7
Reverse	*196*	*10.7*
110C. Vank Island Light bearing 270°, distant 1.5 miles; 56°26′.9 N., 132°33′.3 W.:		
Direct	077	5.8
Reverse	*257*	*5.8*
111C. Wrangell Wharf, 56°28′.2 N., 132°23′.2 W. Chart 8164.		
111C. Wrangell Wharf, 56°28′.2 N., 132°23′.2 W.:		
Direct	252	7.5
Reverse	*072*	*7.5*
111. Vank Island Light bearing 000°, distant 1.0 mile; 56°25′.9 N., 132°36′.0 W.:		
109. Round Point Light bearing 270°, distant 0.4 mile; 56°16′.7 N., 132°38′.7 W.:		
Direct	011	7.8
Reverse	*191*	*7.8*
110. Port Ancon Light bearing 090°, distant 1.6 miles; 56°24′.4 N., 132°36′.0 W.:		
Direct	000	1.6
Reverse	*180*	*1.6*
111. Vank Island Light bearing 000°, distant 1.0 mile; 56°25′.9 N., 132°36′.0 W.:		
Direct	300	5.0
Reverse	*120*	*5.0*
Sumner Strait		
112. Craig Point Daybeacon bearing 180°, distant 1.0 mile; 56°28′.5 N., 132°44′.0 W.:		
Direct	282	7.3
Reverse	*102*	*7.3*
NOTE: Because of the currents, the courses in Wrangell Narrows should be used with caution. They cannot be followed in all cases by large vessels which on the short courses must cover the greater part of the distance in making the turns. Passage should not be attempted in thick weather. Large vessels should employ a pilot. See also Chapter 7.		

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
113. Point Alexander Light bearing 000°, distant 0.5 mile; 56°30′.1 N., 132°56′.9 W. Change to Chart 8170 (*8160*):	*Degrees*	*Nautical miles*
Direct	341	1.8
Reverse	*161*	*1.8*
Wrangell Narrows		
114. Midway Rock Light bearing 090°, distant 200 yards; 56°31′.8 N., 132°58′.0 W.:		
Direct	006	1.1
Reverse	*186*	*1.1*
115. December Point, north tangent, bearing 090°, distant 225 yards; 56°32′.9 N., 132°56′.8 W. On this course there is a strong set to westward with the flood current:		
Direct	013	0.5
Reverse	*193*	*0.5*
116. Point Lockwood Light bearing 270°, distant 200 yards; 56°33′.3 N., 132°57′.6 W.:		
Direct	341	0.6
Reverse	*161*	*0.6*
117. Wrangell Narrows Channel Light 1 bearing 270°, distant 100 yards; 56°33′.9 N., 132°58′.0 W. The turn at this light is very sharp. Large vessels usually swing with hard left and then hard right rudder without steadying:		
Direct	325	0.1
Reverse	*145*	*0.1*
118. Wrangell Narrows Channel Light 1 bearing 180°, distant 100 yards: 56°34′.0 N., 132°58′.0 W.:		
Direct	333	0.5
Reverse	*153*	*0.5*
119. Wrangell Narrows Channel Light 4 bearing 090°, distant 175 yards; 56°34′.5 N., 132°58′.5 W.:		
Direct	015	0.4
Reverse	*195*	*0.4*
120. Wrangell Narrows Channel Light 5 bearing 270°, distant 250 yards; 56°34′.9 N., 132°58′.3 W.:		
Direct	356	0.8
Reverse	*176*	*0.8*
121. Wrangell Narrows Channel Light 8 bearing 090°, distant 50 yards; 56°35′.7 N., 132°58′.4 W.:		
Direct	Various	1.0
Reverse	*Various*	*1.0*
122. Wrangell Narrows Channel Light 14 bearing 090°, distant 50 yards; 56°36′.7 N., 132°58′.2 W. On this course there may be a set to westward on the flood current:		
Direct	029	0.8
Reverse	*209*	*0.8*
123. Wrangell Narrows Channel Light 15 bearing 270°, distant 100 yards; 56°37′.4 N.,132°57′.5 W.:		
Direct	036	0.6
Reverse	*216*	*0.6*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
124. Wrangell Narrows Channel Light 18 bearing 090°, distant 90 yards; 56°37′.9 N., 132°56′.9 W.:		
Direct	049	1.0
Reverse	*229*	*1.0*
125. Wrangell Narrows Channel lighted buoy 23 bearing 270°, distant 90 yards; 56°38′.5 N., 132°55′.5 W.:		
Direct	Swing left	0.6
Reverse	*Swing right*	*0.6*
126. Wrangell Narrows Channel Light 29 bearing 270°, distant 75 yards; 56°39′.1 N., 132°55′.2 W.:		
Direct	Swing left	0.4
Reverse	*Swing right*	*0.4*
127. Wrangell Narrows Channel lighted buoy 33 bearing 270°, distant 75 yards; 56°39′.5 N., 132°55′.5 W.:		
Direct	346	0.5
Reverse	*166*	*0.5*
128. Wrangell Narrows Channel Light 37 bearing 225°, distant 90 yards; 56°40′.0 N., 132°55′.8 W.:		
Direct	330	0.4
Reverse	*150*	*0.4*
129. Wrangell Narrows Channel lighted buoy 42 bearing 045°, distant 100 yards; 56°40′.4 N., 132°56′.2 W.:		
Direct	342	0.7
Reverse	*162*	*0.7*
130. Wrangell Narrows Channel Light 44 bearing 090°, distant 75 yards; 56°41′.0 N., 132°56′.6 W.:		
Direct	338	0.7
Reverse	*158*	*0.7*
131. Wrangell Narrows Channel Light 48 bearing 045°, distant 175 yards; 56°41′.6 N., 132°57′.0 W.:		
Direct	011	0.6
Reverse	*191*	*0.6*
132. Wrangell Narrows Channel Light 49 bearing 225°, distant 200 yards; 56°42′.2 N., 132°56′.8 W.:		
Direct	000	2.1
Reverse	*180*	*2.1*
133. Mountain Point Light and Echo Board bearing 270°, distant 0.3 mile; 56°44′.3 N., 132°56′.8 W.:		
Direct	336	2.7
Reverse	*156*	*2.7*
134. Wrangell Narrows Channel Light 52 bearing 090°, distant 150 yards; 56°46′.8 N., 132°58′.8 W.:		
Direct	352	1.6
Reverse	*172*	*1.6*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
135. Petersburg Creek Range Front Light bearing 352°, distant 100 yards; 56°48′.4 N., 132°49′.2 W.:	*Degrees*	*Nautical miles*
Direct	055	2.1
Reverse	*235*	*2.1*
136. Wrangell Narrows Channel Daybeacon 61 bearing 256°, distant 0.4 mile; **Wrangell Narrows Channel lighted bell buoy 62** bearing 180°, distant 100 yards; 56°49′.6 N., 135°56′.0 W.:		
Direct	080	0.6
Reverse	*260*	*0.6*
137. Wrangell Narrows Channel Daybeacon 61 bearing 258°, distant 1.0 mile; **Wrangell Narrows North Entrance lighted bell buoy 63** bearing 270°, distant 0.5 mile; 56°49′.8 N., 132°54′.8 W.		
To Petersburg		
135. Petersburg Creek Range Front Light bearing 352°, distant 100 yards; 56°48′.4 N., 132°59′.2 W.:		
Direct	055	0.5
Reverse	*235*	*0.5*
136D. Petersburg Creek Range Rear Light bearing 261°, distant 0.5 mile; 56°48′.6 N., 132°58′.4 W.:		
Direct	081	0.4
Reverse	*261*	*0.4*
137D. Petersburg, Citizens wharf, 56°48′.8 N., 132°57′.7 W.		
From Petersburg Northbound		
137D. Petersburg, Citizens wharf, 56°48′.8 N., 132°57′.7 W.		
Direct	033	0.4
Reverse	*213*	*0.4*
138D. Wrangell Narrows Channel lighted buoy 60 bearing 180°, distant 100 yards; 56°49′.1 N., 132°57′.4 W.:		
Direct	055	0.9
Reverse	*235*	*0.9*
136. Wrangell Narrows Channel Daybeacon 61 bearing 256°, distant 0.4 mile, and **Wrangell Narrows Channel lighted bell buoy 44** bearing 180°, distant 100 yards; 56°49′.6 N., 132°56′.0 W.		
To Point Hugh via Snow Passage		
Courses and distances from Lincoln Rock Light to Stephens Passage, by way of Snow Passage, Sumner Strait, Chatham Strait, and Frederick Sound for vessels not desiring to pass through Wrangell Narrows.		

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Clarence Strait		
106. Lincoln Rock Light bearing 090°, distant 1.0 mile; 56°03′.4 N., 132°43′.6 W. Chart 8160:	*Degrees*	*Nautical miles*
Direct	326	7.6
Reverse	*146*	*7.6*
107E. Key Reef Light bearing 090°, distant 0.8 mile; 56°09′.6 N., 132°51′.2 W.:		
Direct	335	7.9
Pass Nesbitt Reef Light and Snow Passage Lighted buoy 2.		
Reverse	*155*	*7.9*
108E. Bushy Island Light bearing 225°, distant 0.2 mile; 56°16′.7 N., 132°57′.3 W.:		
Direct	298	4.6
Reverse	*118*	*4.6*
109E. Rookery Island Light bearing 270°, distant 0.9 mile; 56°18′.9 N., 133°04′.6 W.:		
Direct	304	4 8
Reverse	*124*	*4.8*
110E. Point Colpoys Light bearing 180°, distant 1.4 miles; 56°21′.6 N., 133°11′.8 W. Change to Chart 8201 (*8160*):		
Direct	276	14.7
Reverse	*096*	*14.7*
Sumner Strait		
111E. Helm Rock lighted whistle buoy 6 bearing 180°, distant 1.0 mile, and **Point Baker Anchorage Light** bearing 157°, distant 1.8 miles; 56°23′.0 N., 133°38′.2 W.:		
Direct	210	8.8
Reverse	*030*	*8.8*
112E. Beauclerc Island Light bearing 270°, distant 2.8 miles; 56°15′.2 N., 133°46′.0 W.:		
Direct	195	12.5
Reverse	*015*	*12.5*
113E. Point St. Albans Reef lighted whistle buoy 1 bearing 315°, distant 2.3 miles; 56°03′.5 N., 133°52′.0 W.:		
Direct	245	8.8
Reverse	*065*	*8.8*
114E. Spanish Islands Light bearing 180°, distant 0.6 mile; 55°59′.6 N., 134°06′.1 W. Same as Position 43, Table 3. Change to Chart 8173 (*8201*):		
Direct	248	1.1
Reverse	*068*	*1.1*
115E. Cape Decision Light bearing 000°, distant 0.7 mile; 55°59′.4 N., 134°08′.1 W. Same as Position 44, Table 3.:		
Direct	244	1.5
Reverse	*064*	*1.5*
116E. Cape Decision Light bearing 043°, distant 2.0 miles; 55°58′.6 N., 134°10′.5 W.: Change to Chart 8252 (*8173*):		
Direct	323	10.5
Reverse	*143*	*10.5*

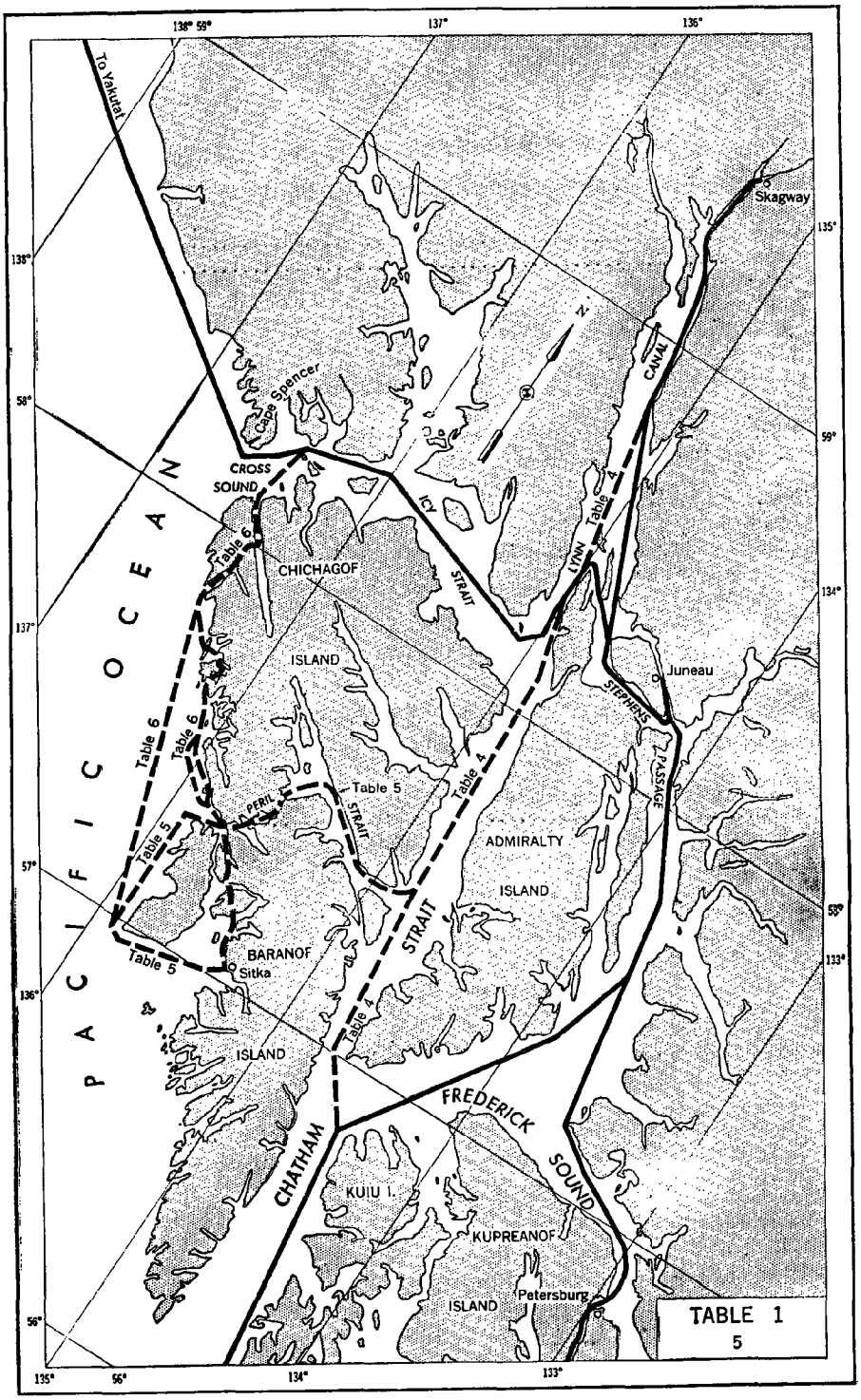

To Yakutat
Skagway
Cape Spencer
CROSS SOUND
ICY STRAIT
LYNN CANAL
Table 4
Table 6
CHICHAGOF
ISLAND
Juneau
STEPHENS PASSAGE
PACIFIC OCEAN
Table 5
PERIL STRAIT
ADMIRALTY
ISLAND
BARANOF
Sitka
ISLAND
FREDERICK SOUND
CHATHAM STRAIT
KUIU I.
KUPREANOF
ISLAND
Petersburg
TABLE 1
5

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Chatham Strait		
117E. Point Crowley Light bearing 090°, distant 3.5 miles; 56°07′.2 N., 134°21′.7 W:	*Degrees*	*Nautical miles*
Direct	355	45.7
Pass Point Harris Light bearing 090°, distant 3.0 miles; **Pillar Bay Lighted** bell buoy 2 bearing 090°, distant 3.7 miles, and Washington Bay Light bearing 090°, distant 2.3 miles.		
Reverse	*175*	*45.7*
118E. Kingsmill Point Light bearing 135°, distant 3.0 miles; 56°52′.7 N., 134°28′.8 W. Same as Position 1, Table 4.:		
Direct	037	29.5
Pass Turnabout Island Light bearing 180°, distant 6.1 miles.		
Reverse	*217*	*29.5*
119E. Round Rock Light bearing 180°, distant 0.5 mile; 57°16′.2 N., 133°56′.2 W. Change to Chart 8201 (*8252*):		
Direct	037	9.4
Reverse	*217*	*9.4*
120E. Point Gambier Light bearing 315°, distant 3.5 miles; 57°23′.6 N., 133°45′.7 W.:		
Direct	000	13.5
Pass Point Gambier Light bearing 270°, distant 2.5 miles.		
Reverse	*180*	*13.5*
143. Point Hugh Light bearing 270°, distant 1.5 miles; 57°37′.0 N., 133°45′.7 W.		
Frederick Sound		
137. Wrangell Narrows Channel Daybeacon 61 bearing 258°, distant 1.0 mile; **Wrangell Narrows North Entrance lighted bell buoy 63** bearing 270°, distant 0.5 mile; 56°49′.8 N., 132°54′.8 W. Chart 8201:		
Direct	340	4.2
Reverse	*160*	*4.2*
138. Sukoi Islets Light bearing 090°, distant 0.5 mile; 56°54′.0 N., 132°57′.5 W.:		
Direct	346	2.7
Reverse	*166*	*2.7*
139. Beacon Point Daybeacon bearing 270°, distant 0.7 mile; 56°56′.3 N., 132°58′.5 W.:		
Direct	320	6.0
Reverse	*140*	*6.0*
140. Cape Strait Light bearing 180°, distant 1.0 mile; 57°00′.9 N., 133°05′.5 W.:		
Direct	298	19.2
Reverse	*118*	*19.2*
141. Cape Fanshaw Light bearing 045°, distant 1.8 miles; 57°10′.0 N., 133°36′.5 W.:		
Direct	002	6.3
Reverse	*182*	*6.3*
142. Five Finger Light bearing 270°, distant 1.0 mile; 57°16′.1 N., 133°36′.0 W. :		
Direct	346	21.6
Reverse	*166*	*21.6*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Stephens Passage		
143. Point Hugh Light bearing 270°, distant 1.5 miles; 57°37′.0 N., 133°45′.7 W.:	*Degrees*	*Nautical miles*
Direct	348	13.4
Reverse	*168*	*13.4*
144. Midway Islands Light bearing 090°, distant 1.0 mile; 57°50′.2 N., 133°50′.5 W. Change to Chart 8202 (*8201*):		
Direct	333	15.3
Reverse	*153*	*15.3*
145. Grave Point Light bearing 090°, distant 0.5 mile; 58°03′.6 N., 134°03′.8 W.:		
Direct	340	2.3
Reverse	*160*	*2.3*
146. Grand Island Light bearing 270°, distant 0.5 mile; 58°06′.0 N., 134°05′.3 W.:		
Direct	328	4.3
Reverse	*148*	*4.3*
147. Point Arden Light bearing 270°, distant 0.5 mile; 58°09′.4 N., 134°09′.6 W. *Chart 8201*.		
To Juneau		
147. Point Arden Light bearing 270°, distant 0.5 mile; 58°09′.4 N., 134°09′.6 W. Chart 8235:		
Direct	314	3.4
Reverse	*134*	*3.4*
148F. Marmion Island Light bearing 270°, distant 0.5 mile; 58°11′.9 N., 134°14′.4 W.:		
Direct	318	4.7
Reverse	*138*	*4.7*
Gastineau Channel		
149F. Sheep Creek Light bearing 090°, distant 0.3 mile; 58°15′.5 N., 134°20′.4 W.:		
Direct	312	2.7
Reverse	*132*	*2.7*
150F. Lawson Creek Bar Light bearing 270°, distant 200 yards; 58°17′.3 N., 134°24′.2 W.:		
Direct	337	0.6
Reverse	*157*	*0.6*
151F. Juneau, Government Wharf, 58°17′.9 N., 134°24′.7 W.		
Leaving Juneau		
151F. Juneau, Government Wharf, 58°17′.9 N., 134°24′.7 W. Chart 8235:		
Direct	157	0.6
Reverse	*337*	*0.6*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
152F. Lawson Creek Bar Light bearing 270°, distant 200 yards; 58°17′.3 N., 134°24′.2 W.:	*Degrees*	*Nautical miles*
Direct	132	2.7
Reverse	*312*	*2.7*
153F. Sheep Creek Light bearing 090°, distant 0.3 mile; 58°15′.5 N., 134°20′.4 W.:		
Direct	138	4.7
Reverse	*318*	*4.7*
154F. Marmion Island Light bearing 270°, distant 0.5 mile; 58°11′.9 N., 134°14′.4 W.:		
Direct	203	1.3
Reverse	*023*	*1.3*
155F. Marmion Island Light bearing 000°, distant 1.2 miles; 58°10′.8 N., 134°15′.3 W.:		
Direct	279	8.0
Reverse	*099*	*8.0*
149. Point Hilda Light bearing 000°, distant 1.0 mile; 58°12′.1 N., 134°30′.3 W.		
147. Point Arden Light bearing 270°, distant 0.5 mile; 58°09′.4 N., 134°09′.6 W. Chart 8235:		
Direct	303	1.7
Reverse	*123*	*1.7*
148. False Arden bearing 180°, distant 0.5 mile; 58°10′.5 N., 134°11′.3 W.:		
Direct	279	9.6
Reverse	*099*	*9.6*
149. Point Hilda Light bearing 000°, distant 1.0 mile; 58°12′.1 N., 134°30′.3 W.:		
Direct	297	2.9
Reverse	*117*	*2.9*
150. Inner Point Daybeacon bearing 000°, distant 0.5 mile; 58°13′.4 N., 134°35′.2 W.:		
Direct	306	2.4
Reverse	*126*	*2.4*
151. Middle Point lighted bell buoy 2 bearing 090°, distant 0.5 mile; 58°14′.8 N., 134°38′.8 W. Change to Chart 8302 (*8235*).		
To Skagway		
Saginaw Channel		
151. Middle Point Lighted bell buoy 2 bearing 090°, distant 0.5 mile; 58°14′.8 N., 134°38′.8 W. Chart 8302:		
Direct	325	7.3
Reverse	*145*	*7.3*
152G. Portland Island Light bearing 090°, distant 0.9 mile; 58°20′.8 N., 135°46′.8 W.:		
Direct	348	1.8
Reverse	*168*	*1.8*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
153G. Shelter Island Light bearing 270°, distant 0.5 mile; 58°22′.5 N., 135°47′.5 W.:		
Direct	336	11.2
Pass Poundstone Rock lighted bell buoy 1 bearing 270°, distant 0.5 mile.		
Reverse	*156*	*11.2*
154G. Sentinel Island Light bearing 090°, distant 0.4 mile; 58°32′.8 N., 135°56′.0 W.:		
Direct	333	3.0
Reverse	*153*	*3.0*
155G. Vanderbilt Reef Light bearing 270°, distant 1.3 miles; 58°35′.5 N., 135°58′.7 W.:		
Direct	336	17.0
Reverse	*156*	*17.0*
156G. Sherman Rock lighted whistle buoy 2 bearing 090°, distant 1.1 miles; 58°51′.1 N., 135°11′.9 W. Same as Position 9, Table 4. Chart 8303 (*8302*):		
Direct	359	7.2
Reverse	*179*	*7.2*
157G. Eldred Rock Light bearing 270°, distant 0.5 mile; 58°58′.3 N., 135°12′.1 W.:		
Direct	346	6.6
Reverse	*166*	*6.6*
158G. Talsani Island Daybeacon bearing 270°, distant 0.5 mile; 59°04′.7 N., 135°15′.2 W.:		
Direct	339	8.5
Reverse	*159*	*8.5*
Chilkoot Inlet		
159G. Battery Point Light bearing 270°, distant 0.3 mile; 59°12′.6 N., 135°21′.2 W.:		
Direct	342	3.4
Reverse	*162*	*3.4*
160G. Low Point Light bearing 090°, distant 0.5 mile; 59°15′.8 N., 135°23′.2 W.:		
Direct	006	10.3
Pass Indian Rock buoy bearing 270°, distant 0.4 mile.		
Reverse	*186*	*10.3*
Taiya Inlet		
161G. Skagway, cupola, bearing 042°, distant 1.6 mile; 59°26′.1 N., 135°21′.1 W.:		
Direct	050	1.1
Reverse	*230*	*1.1*
162G. Skagway, railroad wharf; 59°26′.8 N., 135°19′.3 W.		
151. Middle Point lighted bell buoy 2 bearing 090°, distant 0.5 mile; 58°14′.8 N., 134°38′.8 W. Change to Chart 8302 (*8235*):		
Direct	318	10.8
Reverse	*138*	*10.8*
152. Favorite Reef Light bearing 090°, distant 0.5 mile; 58°22′.7 N., 134°52′.5 W.:		
Direct	334	3.2
Reverse	*154*	*3.2*

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
153. Point Retreat Light bearing 225°, distant 1.5 miles; 58°25′.8 N., 134°55′.2 W.:	*Degrees*	*Nautical miles*
Direct	243	2.3
Reverse	*063*	*2.3*
Lynn Canal		
154. Point Retreat Light bearing 090°, distant 1.0 mile; 58°24′.7 N., 134°59′.1 W. Same as Position 7, Table 4:		
Direct	178	10.3
Pass False Point Retreat Daybeacon bearing 090°, distant 0.5 mile.		
Reverse	*358*	*10.3*
155. Naked Island Light bearing 045°, distant 1.4 miles; 58°14′.4 N., 134°58′.5 W. Same as Position 6, Table 4:		
Direct	196	4.9
Reverse	*016*	*4.9*
156. Rocky Island Light bearing 315°, distant 1.4 miles; 58°09′.7 N., 135°01′.1 W.:		
Direct	290	25.5
Pass **The Sisters Light** bearing 180°, distant 1.5 miles, and **Pleasant Island Reef lighted bell buoy 1** bearing 000°, distant 1.6 miles. Change to Chart 8304 (*8302*) at 58°15′.0 N., 135°30′.0 W.		
Reverse	*110*	*25.5*
Icy Strait		
157. Point Adolphus Light bearing 180°, distant 1.0 mile; 58°18′.2 N., 135°46′.9 W.:		
Direct	284	8.4
Reverse	*104*	*8.4*
158. Lemesurier Island Light bearing 180°, distant 1.0 mile; 58°20′.2 N., 136°02′.3 W. Strong currents will be encountered on this course. *See Pacific Coast Current Tables* for daily predicitions of times and velocities:		
Direct	254	11.9
Reverse	*074*	*11.9*
159. North Inian Pass Light bearing 180°, distant 0.5 mile; 58°16′.9 N., 136°24′.0 W. Same as Position 1, Table 6:		
Direct	228	10.2
Reverse	*048*	*10.2*
Cross Sound		
160. Cape Spencer Light bearing 000°, 2.0 miles distant; 58°10′.0 N., 136°38′.3 W. If bound to the westward continue with tables in *U. S. Coast Pilot, Alaska Part II*. Change to Chart 8410 (*8304*):		
Direct	306	22.0
Reverse	*126*	*22.0*

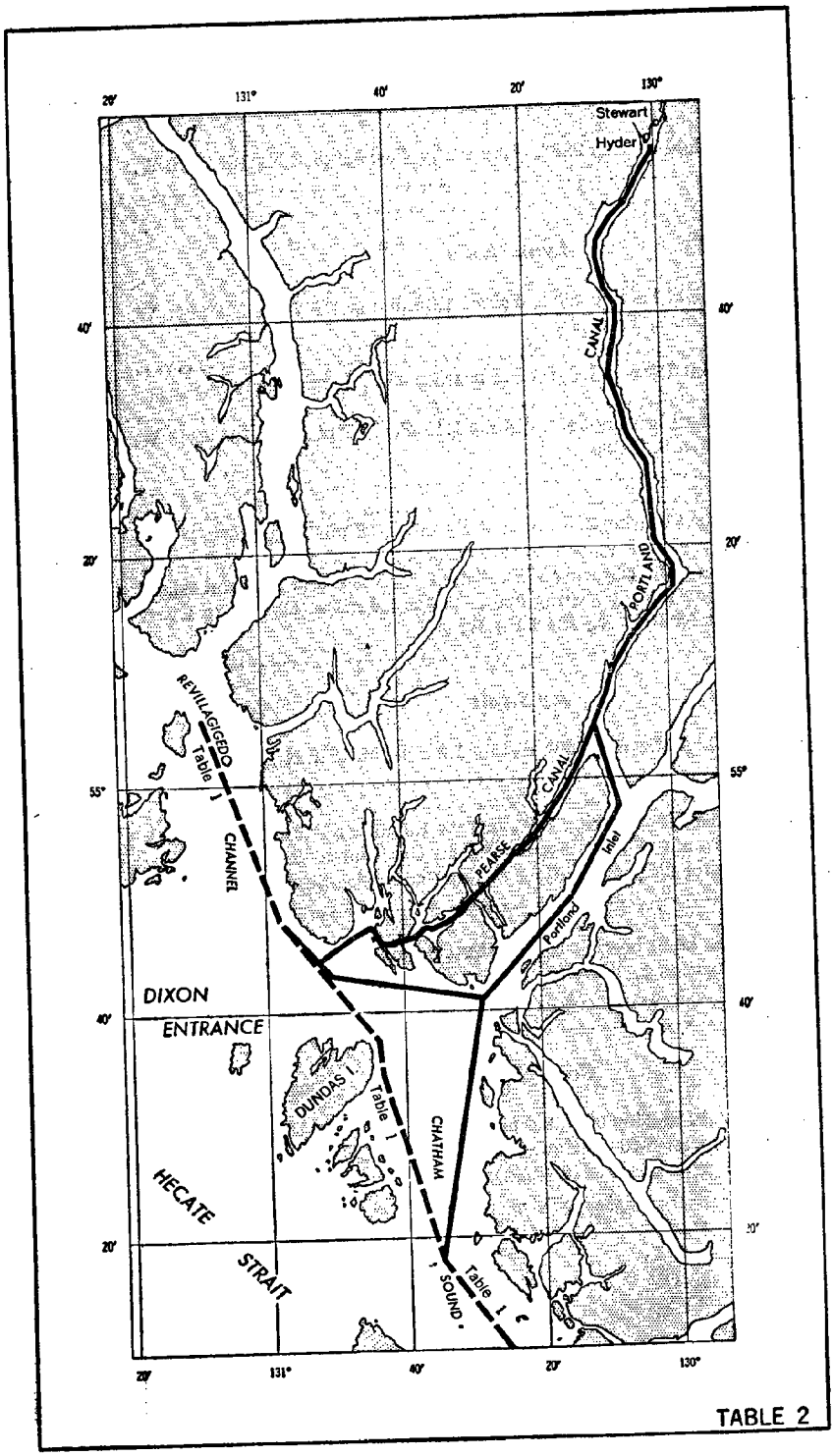

Stewart
Hyder
CANAL
PORTLAND
REVILLAGIGEDO
Table 1
CHANNEL
PEARSE
CANAL
Portland
Inlet
DIXON
ENTRANCE
DUNDAS I.
Table 1
CHATHAM
SOUND
Table 1
HECATE
STRAIT
131°
130°
55°

TABLE 2

Table 1.—Seattle to Yakutat—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Pacific Ocean		
161. Icy Point, south extremity, bearing 090°, distant 4.0 miles; 58°23′.0 N., 137°12′.0 W. Change to Chart 8402 (*8410*):	*Degrees*	*Nautical miles*
Direct	309	109.6
Pass Harbor Point, north extremity.		
Reverse	*129*	*109.6*
162. Yakutat Bay Entrance lighted whistle buoy 2 bearing 090°, close aboard; 59°31′.9 N., 139°57′.1 W. Change to Chart 8455 (*8402*):		
Direct	040	4.7
Reverse	*220*	*4.7*
Yakutat Bay		
163. Yakutat Bay lighted whistle buoy 4 bearing 000°, close aboard; 59°35′.6 N., 139°51′.1 W.:		
Direct	139	3.3
Reverse	*319*	*3.3*
164. Khantaak Island Light bearing 341°, distant 1.3 miles; **Turning Point lighted buoy** 1 bearing 346°, distant 0.5 mile; 59°33′.1 N., 139°47′.1 W.:		
Direct	091	1.5
Reverse	*271*	*1.5*
165. Yakutat wharf, 59°32′.9 N., 139°43′.9 W.		

Table 2.—Dixon Entrance to Hyder

Via Portland Inlet		
Chatham Sound		
1. Lucy Island Light bearing 270°, distant 0.9 mile; 54°17′.7 N., 130°35′.0 W. Same as Position 85 of Table 1. Chart H. O. 2828:		
Direct	009	23.3
Reverse	*189*	*23.3*
2. Wales Point bearing 000°, distant 1.5 miles; 54°40′.8 N., 130°28′.6 W.		
Dixon Entrance		
1A. Tree Point Light bearing 090°, distant 1.5 miles; 54°48′.2 N., 130°58′.5 W. Same as Position 87 of Table 1. If bound via Pearse Canal see alternate route at end of table. Chart 8075:		
Direct	136	7.1
Reverse	*316*	*7.1*

Table 2.—Dixon Entrance to Hyder—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
2A. Lord Rock Light bearing 045°, distant 0.7 mile; 54°43′.1 N., 130°50′.0 W. Chart 8053 (*8075*):	*Degrees*	*Nautical miles*
Direct	100	12.7
Reverse	*280*	*12.7*
2. Wales Point bearing 000°, distant 1.5 miles; 54°40′.8 N., 130°28′.6 W.		
Portland Inlet		
2. Wales Point bearing 000°, distant 1.5 miles; 54°40′.8 N., 130°28′.6 W. Chart 8053:		
Direct	041	12.2
Reverse	*221*	*12.2*
3. Lizard Point Light bearing 270°, distant 1.0 mile; 54°50′.0 N., 130°14′.8 W.:		
Direct	029	8.1
Reverse	*209*	*8.1*
4. Ramsden Point Light bearing 029°, distant 2.1 miles; 54°57′.1 N., 130°08′.0 W.:		
Direct	350	8.6
Reverse	*170*	*8.6*
5. Reef Island Light bearing 225°, distant 1.2 miles; 55°05′.6 N., 130°10′.7 W.:		
Direct	024	7.6
Reverse	*204*	*7.6*
Portland Canal		
6. Halibut Point bearing 270°, distant 0.4 mile; 55°12′.6 N., 130°05′.3 W.:		
Direct	042	5.5
Reverse	*222*	*5.5*
7. Hattie Island Light bearing 035°, distant 0.8 mile; 55°16′.7 N., 129°58′.9 W.:		
Direct	000	1.3
Reverse	*180*	*1.3*
8. Hattie Island Light bearing 149°, distant 0.8 mile; 55°18′.0 N., 129°58′.9 W.:		
Direct	329	2.8
Reverse	*149*	*2.8*
9. Car Point bearing 090°, distant 0.8 mile; 55°20′.4 N., 130°01′.5 W. Change to Chart 8054 (*8053*):		
Direct	354	6.7
Reverse	*174*	*6.7*
10. Turn Point Daybeacon bearing 225°, distant 0.5 mile; 55°27′.0 N., 130°02′.6 W.:		
Direct	337	5.1
Reverse	*157*	*5.1*
11. Steep Point bearing 225°, distant 0.4 mile; 55°31′.7 N., 130°06′.7 W.:		
Direct	349	3.8
Reverse	*169*	*3.8*
12. Slab Point bearing 000°, distant 3.2 miles; 55°35′.4 N., 130°07′.5 W.:		
Direct	005	5.6
Reverse	*185*	*5.6*
13. Cliff Point Light bearing 270°, distant 0.5 mile; 55°41′.0 N., 130°06′.6 W.:		
Direct	336	3.9
Reverse	*156*	*3.9*

Table 2.—Dixon Entrance to Hyder—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
14. Verdure Point bearing 336°, distant 0.6 mile; 55°44′.6 N., 130°09′.4 W.:		
Direct	016	3.6
Reverse	*196*	*3.6*
15. Engineers Point, north extremity, bearing 090°, distant 0.7 mile; 55°47′.9 N., 130°07′.6 W.:		
Direct	047	1.8
Reverse	*227*	*1.8*
16. Glacier Point, southeast extremity, bearing 270°, distant 0.7 mile; 55°49′.2 N., 130°05′.3 W.:		
Direct	027	5.7
Reverse	*207*	*5.7*
17. Hyder Wharf bearing 027°, distant 100 yards; 55°54′.2 N., 130°00′.6 W.		
Via Pearse Canal		
Small vessels usually pass through Tongass Passage and Pearse Canal as follows:		
Dixon Entrance		
1A. Tree Point Light bearing 090°, distant 1.5 miles; 54°48′.2 N., 130°58′.5 W. Same as Position 87, Table 1. Chart 8075:		
Direct	126	5.8
Reverse	*306*	*5.8*
2B. Fox Island, eastern end bearing 000°, distant 0.9 mile; **Lord Rock Light** bearing 150°, distant 1.5 miles; 54°44′.9 N., 130°50′.5 W.:		
Direct	046	2.8
Reverse	*226*	*2.8*
3B. Boat Rock Light bearing 270°, distant 0.5 mile; 54°46′.8 N., 130°47′.0 W. Change to Chart 8053 (*8075*).		
Note: Small craft usually pass through the western entrance to Sitklan Passage, south of Tongass Island. See description and directions in Chapter 5:		
Direct	067	1.6
Reverse	*247*	*1.6*
Nakat Bay		
4B. Tongass Reef Light bearing 180°, distant 0.2 mile; 54°47′.4 N., 130°44′.6 W.:		
Direct	153	1.9
Reverse	*333*	*1.9*
5B. Summit 345-foot hill bearing 019°, distant 0.5 mile; 54°45′.7 N., 130°43′.1 W.:		
Direct	080	1.6
Reverse	*260*	*1.6*

Table 2.—Dixon Entrance to Hyder—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Sitklan Passage		
6B. Point Mansfield bearing 180°, distant 300 yards; 54°46′.0 N., 130°40′.3 W.:	*Degrees*	*Nautical miles*
Direct	067	4.5
Reverse	*247*	*4.5*
7B. Pearse Canal Light bearing 250°, distant 2.0 miles; 54°47′.7 N., 130°33′.3 W.:		
Direct	047	4.5
Reverse	*227*	*4.5*
8B. Core, northern point, opposite Winter Harbor Entrance, bearing 270°, distant 0.3 mile; 54°50′.9 N., 130°27′.6 W.:		
Direct	042	7.5
Reverse	*222*	*7.5*
9B. Hidden Inlet buoy 1 bearing 270°, distant 0.5 mile; 54°56′.4 N., 130°18′.9 W.:		
Direct	032	6.9
Reverse	*212*	*6.9*
10B. Blaine Point bearing 270°, distant 0.6 mile; 55°02′.3 N., 130°12′.6 W.:		
Direct	018	3.5
Reverse	*198*	*3.5*
5. Reef Island Light bearing 225°, distant 1.2 miles; 55°05′.6 N., 130°10′.7 W.		

Table 3.—Ketchikan to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig

See diagram for Table 1, Section 4		
Tongass Narrows		
1. Ketchikan, water front, 55°20′.5 N., 131°38′.7 W. Same as Position 95, Table 1. Chart 8094:		
Direct	Various	2.1
Reverse	*Various*	*2.1*
2. Idaho Rock lighted buoy 2 bearing 090°, distant 50 yards; 55°19′.0 N., 131°36′.0 W. Same as Position 93, Table 1:		
Direct	142	1.1
Reverse	*322*	*1.1*
3. Potter Rock lighted bell buoy bearing 090°, distant 350 yards; 55°18′.2 N., 131°34′.9 W. Same as Position 92, Table 1:		
Direct	218	2.7
Reverse	*038*	*2.7*
Nichols Passage		
4. Blank Islands Light bearing 270°, distant 0.3 mile; 55°16′.0 N., 131°37′.8 W. Change to Chart 8075 (*8094*):		
Direct	178	6.5
Reverse	*358*	*6.5*

Table 3.—Ketchikan to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
5. Kelp Rocks buoy 1 bearing 270°, distant 0.3 mile; 55°09′.5 N., 131°37′.3 W.:		
Direct	183	1.6
Reverse	*003*	*1.6*
6. Warburton Island Light bearing 270°, distant 0.3 mile; 55°07′.9 N., 131°37′.4 W.:		
Direct	226	5.3
Reverse	*046*	*5.3*
7. Hid Reef lighted whistle buoy 2 bearing 090°, distant 2.0 miles; 55°04′.2 N., 131°44′.0 W.:		
Direct	201	25.3
Reverse	*021*	*25.3*
Clarence Strait		
8. Cape Chacon Light bearing 321°, distant 1.1 miles; 54°40′.6 N., 131°59′.7 W. Change to Chart 8145 (*8075*):		
Direct	270	6.0
Pass Point Nunez bearing 000°, distant 0.5 mile.		
Reverse	*090*	*6.0*
Dixon Entrance		
9. Surf Point, west extremity, bearing 000°, distant 1.1 miles; 54°40′.6 N., 132°10′.0 W.:		
Direct	282	4.5
Reverse	*102*	*4.5*
10. Point Marsh Light bearing 000°, distant 1.2 miles; 54°41′.5 N., 132°17′.6 W.:		
Direct	292	7.8
Pass Dewey Rocks bearing 000°, distant 0.6 mile.		
Reverse	*112*	*7.8*
11. Round Islands Light bearing 356°, distant 2.3 miles; 54°44′.5 N., 132°30′.1 W.:		
Direct	344	2.4
Reverse	*164*	*2.4*
12. Round Islands Light bearing 090°, distant 0.5 mile; 54°46′.7 N., 132°31′.2 W. If bound to Hydaburg see side route below. Change to Chart 8146 (*8145*):		
Direct	335	6.1
Reverse	*155*	*6.1*
13. Natoma Point bearing 270°, distant 1.0 mile; 54°52′.2 N., 132°35′.6 W. Change to Chart 8147 (*8146*):		
Direct	331	2.6
Reverse	*151*	*2.6*
14. Round Island, Elbow Bay, bearing 270°, distant 0.7 mile; 54°54′.5 N., 132°37′.9 W.:		
Direct	310	5.0
Reverse	*130*	*5.0*
Tlevak Strait		
15. Tlevak Strait Light bearing 180°, distant 0.6 mile; 54°57′.7 N., 132°44′.6 W.:		
Direct	304	4.0
Reverse	*124*	*4.0*

Table 3.—Ketchican to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
16. Kasook Inlet, southeast extremity, bearing 065°, distant 1.3 miles; 55°00′.0 N., 132°50′.3 W. Change to Chart 8148 (*8147*):		
Direct	310	5.0
Reverse	*130*	*5.0*
17. View Cove Entrance Light bearing 270°, distant 0.5 mile; 55°03′.2 N., 132°56′.9 W.:		
Direct	337	5.7
Reverse	*157*	*5.7*
18. Eolus Point bearing 270°, distant 0.5 mile; 55°08′.4 N., 133°00′.7 W. Change to Chart 8151 (*8148*):		
Direct	334	6.0
Pass Guide Island bearing 090°, distant 0.2 mile.		
Reverse	*154*	*6.0*
19. Lively Islands Light bearing 090°, distant 400 yards; 55°13′.7 N., 133°05′.2 W.		
To Hydaburg		
12. Round Islands Light bearing 090°, distant 0.5 mile; 54°46′.7 N., 132°31′.2 W. Chart 8146:		
Direct	335	6.1
Reverse	*155*	*6.1*
Cordova Bay		
13. Natoma Point bearing 270°, distant 1.0 mile; 54°52′.2 N., 132°35′.6 W. Change to Chart 8147 (*8146*):		
Direct	349	9.6
Pass Point Webster bearing 090°, distant 0.6 mile.		
Reverse	*169*	*9.6*
14A. Mellen Rock Light bearing 270°, distant 0.5 mile; 55°01′.6 N., 132°39′.0 W.:		
Direct	354	6.1
Reverse	*174*	*6.1*
Hetta Inlet		
15A. Round Point, north extremity bearing 270°, distant 0.7 mile:		
Direct	306	5.5
Reverse	*126*	*5.5*
Sukkwan Strait		
16A. Saltery Point, west extremity, bearing 000°, distant 300 yards:		
Direct	323	1.4
Pass Hydaburg buoy 2 bearing 000°, distant 300 yards.		
Reverse	*143*	*1.4*
17A. Hydaburg wharf bearing 000°, distant 400 yards:		
Direct	340	0.2
Reverse	*160*	*0.2*

Table 3.—Ketchikan to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
18A. Hydaburg Daybeacon bearing 000°, distant 150 yards. Change to Chart 8151 (*8147*):		
Direct	285	0.4
Reverse	*105*	*0.4*
19A. Sukkwan Narrows Light bearing 208°, distant 325 yards; 55°12′.2 N., 132°50′.3 W.:		
Direct	223	1.2
Pass South Pass buoy 3 bearing 090°, distant 50 yards.		
Reverse	*043*	*1.2*
20A. Scrag Islands Ledge buoy 5 bearing 090°, distant 175 yards:		
Direct	189	0.8
Reverse	*009*	*0.8*
21A. 240-foot island, southern extremity, bearing 232°, distant 0.6 mile:		
Direct	223	0.6
Reverse	*043*	*0.6*
22A. 240-foot island, southern extremity, bearing 000°, distant 200 yards:		
Direct	261	1.3
Pass Goat Island Light bearing 000°, distant 200 yards.		
Reverse	*081*	*1.3*
23A. Turn Rock Daybeacon bearing 000°, distant 225 yards; 55°10′.0 N., 132°54′.8 W.:		
Direct	297	5.8
Pass Fort Islet bearing 180°, distant 350 yards.		
Reverse	*117*	*5.8*
Tlevak Strait		
24A. Guide Island, western extremity bearing 340°, distant 0.5 mile:		
Direct	328	1.4
Reverse	*148*	*1.4*
19. Lively Islands Light bearing 090°, distant 400 yards; 55°13′.7 N., 133°05′.2 W.		
19. Lively Islands Light bearing 090°, distant 400 yards; 55°13′.7 N., 133°05′.2 W. Chart 8151:		
Direct	343	0.9
Reverse	*163*	*0.9*
20. Lively Islands, north extremity, bearing 090°, distant 0.3 mile; 55°14′.6 N., 133°05′.7 W.:		
Direct	327	1.7
Pass Block Island Light bearing 090°, distant 150 yards.		
Reverse	*147*	*1.7*
Tlevak Narrows		
21. Block Island Light bearing 135°, distant 650 yards; 55°16′.0 N., 133°07′.3 W.:		
Direct	270	0.8
Pass Tlevak Narrows buoy 4 bearing 180°, distant 50 yards.		
Reverse	*090*	*0.8*

Table 3.—Ketchikan to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig—Continued

Position (*Reverse directions in italics—read upward*)	True course	Distance
	Degrees	*Nautical miles*
22. Ulloa Island, west extremity, bearing 313°, distant 0.5 mile; 55°16′.0 N., 133°08′.7 W.:		
Direct	296	1.1
Reverse	*116*	*1.1*
23. Meares Island Light bearing 180°, distant 300 yards; 55°16′.5 N., 133°10′.5 W.:		
Direct	280	2.3
Reverse	*100*	*2.3*
24. Point San Antonio bearing 000°, distant 0.5 mile; 55°16′.9 N., 133° 14′.4 W.:		
Direct	325	5.0
Reverse	*145*	*5.0*
Ulloa Channel		
25. Cape Flores lighted buoy 4A bearing 090°, distant 0.3 mile; 55°21′.4 N., 133°18′.1 W. Change to Chart 8155 (*8151*):		
Direct	037	8.2
Reverse	*217*	*8.2*
Bucareli Bay		
26. Fish Egg Reef lighted buoy 1 bearing 000°, distant 0.5 mile; 55°28′.0 N., 133°09′.5 W. Pass eastward of the buoy close aboard:		
Direct	004	0.8
Reverse	*184*	*0.8*
27. Craig buoy 2 bearing 090°, distant 50 yards.		
To Craig		
27. Craig buoy 2 bearing 090°, distant 50 yards:		
Direct	Various	0.2
Reverse	*Various*	*0.2*
28B. Craig, cannery wharf; 55°28′.7 N., 133°09′.2 W.		
27. Craig buoy 2 bearing 090°, distant 50 yards:		
Direct	055	0.5
Reverse	*235*	*0.5*
28. Craig Shoal lighted buoy 2 bearing 350°, distant 400 yards:		
Direct	006	0.4
Reverse	*186*	*0.4*
29. Islet, northern extremity, bearing 090°, distant 275 yards; 55°29′.4 N., 133°08′.6 W.		

Table 3.—Ketchikan to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
To Klawak		
29. Islet, northern extremity, bearing 090°, distant 275 yards; 55°29′.4 N., 133°08′.6 W. Chart 8155:	*Degrees*	*Nautical miles*
Direct	014	3.4
Reverse	*194*	*3.4*
30C. Klawak Island shoal lighted bell buoy 2 bearing 090°, distant 200 yards; 55°32′.6 N., 133°07′.2 W.:		
Direct	025	0.9
Reverse	*205*	*0.9*
31C. Klawak Island Light bearing 090°, distant 400 yards; 55°33′.5 N., 133°06′.5 W.:		
Direct	076	0.3
Pass Highwater Rock Daybeacon bearing 000°, distant 100 yards.		
Reverse	*256*	*0.3*
32C. Klawak Island Light bearing 220°, distant 175 yards; 55°33′.5 N., 133°06′.1 W.:		
Direct	181	0.4
Pass Klawak Ledge Daybeacon 3 bearing 090° distant 75 yards.		
Reverse	*001*	*0.4*
33C. Klawak Ledge Daybeacon 5 bearing 090°, close aboard:		
Direct	Various	0.1
Reverse	*Various*	*0.1*
34C. Cannery wharf, 55°33′.1 N., 133°06′.2 W.		
29. Islet, northern extremity, bearing 090°, distant 275 yards; 55°29′.4 N., 133°08′.6 W. Chart 8155:		
Direct	345	1.1
Reverse	*165*	*1.1*
30. Clam Island, southeast extremity, bearing 345°, distant 0.6 mile; 55°30′.5 N., 133°09′.1 W.:		
Direct	270	0.8
Reverse	*090*	*0.8*
31. Klawak Reef Inner lighted buoy 3 bearing 000°, distant 100 yards; 55°30′.5 N., 133°10′.4 W.:		
Direct	283	0.4
Reverse	*103*	*0.4*
San Alberto Bay		
32. Klawak Reef buoy 1 bearing 000°, distant 100 yards; 55°30′.6 N., 133°11′.1 W.:		
Direct	310	4.9
Pass San Alberto lighted bell buoy 5 bearing 180° distant 300 yards.		
Reverse	*130*	*4.9*
33. Hermanos Islands Reef lighted bell buoy 6A bearing 000°, distant 100 yards; 55°33′.7 N., 133°17′.7 W. Change to Chart 8157 (*8155*):		
Direct	322	1.1
Pass Piedras Island Reef buoy 3A bearing 180°, distant 100 yards.		
Reverse	*142*	*1.1*

Table 3.—Ketchikan to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
34. San Christoval Three Fathom buoy bearing 270°, distant 150 yards; 55°34′.6 N., 133°18′.8 W.:		
Direct	327	0.8
Reverse	*147*	*0.8*
35. Larzatita Island Reef Light bearing 180°, distant 300 yards; 55°35′.2 N., 133°19′.7 W.:		
Direct	297	3.0
Reverse	*117*	*3.0*
36. Blanquizal Island, west extremity, bearing 000°, distant 0.4 mile; 55°36′.6 N., 133°24′.3 W.:		
Direct	315	3.9
Reverse	*135*	*3.9*
37. Curacao Reef Buoy 8 bearing 090°, distant 0.5 mile; 55°39′.3 N., 133°29′.1 W.		
Via Karkheen		
37. Curacao Reef Buoy 8 bearing 090°, distant 0.5 mile; 55°39′.3 N., 133°29′.1 W.:		
Direct	026	4.6
Reverse	*206*	*4.6*
Tonowek Bay		
38D. Harmony Islands, north extremity of largest island bearing 090°, distant 0.5 mile; 55°43′.5 N., 133°25′.6 W.:		
Direct	056	3.5
Reverse	*236*	*3.5*
39D. Northeast tangent, 160-foot island, bearing 129°, distant 400 yards; 55°45′.4 N., 133°20′.4 W.:		
Direct	044	1.3
Reverse	*224*	*1.3*
40D. Point Swift Shoal buoy 2 bearing 180°, distant 100 yards:		
Direct	086	1.0
Reverse	*266*	*1.0*
41D. Karkheen Passage buoy 1 bearing 286°, distant 0.5 mile:		
Direct	000	0.8
Reverse	*180*	*0.8*
42D. Karkheen Passage buoy 2A bearing 161°, distant 0.3 mile; 55°47′.1 N., 133°17′.1W.:		
Direct	308	0.9
Reverse	*128*	*0.9*
43D. Chapin Island, front daybeacon bearing 308°, distant 0.2 mile. Change to Chart 8171 (*8157*):		
Direct	340	0.7
Pass Cob Island Reef buoy 4 bearing 090°, distant 100 yards.		
Reverse	*160*	*0.7*
44D. Karkheen Reef buoy 6 bearing 321°, distant 300 yards:		
Direct	312	0.3
Reverse	*132*	*0.3*

Table 3.—Ketchikan to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
45D. Karkheen Reef buoy 6 bearing 118°, distant 300 yards:		
Direct	045	0.3
Reverse	*225*	*0.3*
46D. Karkheen, cannery wharf, 55°48′.7 N., 133°18′.7 W.:		
Direct	274	0.2
Reverse	*094*	*0.2*
47D. Islet off north shore bearing 355°, 200 yards:		
Direct	319	0.4
Reverse	*139*	*0.4*
48D. Peep Rock Light bearing 319°, distant 300 yards:		
Direct	345	0.2
Reverse	*165*	*0.2*
49D. Peep Rock Light bearing 223°, distant 200 yards:		
Direct	318	2.1
Reverse	*138*	*2.1*
Sea Otter Sound		
50D. Turn Point, north extremity, bearing 090°, distant 0.4 mile; 55°50′.8 N., 133°22′.2 W.		
Direct	273	6.5
Reverse	*093*	*6.5*
51D. Gas Rock, eastern end, bearing 180°, distant 0.4 mile;		
Direct	257	4.4
Pass Surf Point Light bearing 180°, distant 0.7 mile.		
Reverse	*077*	*4.4*
Davidson Inlet		
52D. Whale Rock bearing 000°, distant 0.5 mile. Change to Chart 8173 (*8171*):		
Direct	302	3.5
Reverse	*122*	*3.5*
53D. Black Rock bearing 045°, distant 0.7 mile; 55°51′.9 N., 133°46′.5 W.:		
Direct	331	5.1
Reverse	*151*	*5.1*
Warren Channel		
42. Warren Island, north extremity, bearing 270°, distant 1.0 mile; 55°56′.4 N., 133°50′.8 W.:		
Direct	292	9.4
Reverse	*112*	*9.4*
Sumner Strait		
43. Spanish Islands Light bearing 180°, distant 0.6 mile; 55°59′.8 N., 134°06′.2 W. Same as Position 114E, Table 1. Change to Chart 8253 (*8173*):		
Direct	248	1.1
Reverse	*068*	*1.1*

Table 3.—Ketchikan to Cape Decision Via Nichols Passage, Tlevak Narrows, Craig—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
44. Cape Decision Light bearing 000°, distant 0.7 mile; 55°59′.4 N., 134°08′.1 W. Same as Position 115E, Table 1.		
Via Bocas de Finas		
37. Curacao Reef buoy 8 bearing 090°, distant 0.5 mile; 55°39′.3 N., 133°29′.1 W. Chart 8157:	*Degrees*	*Nautical miles*
Direct	315	2.3
Reverse	*135*	*2.3*
38. Point Desconocida buoy 10 bearing 045°, distant 0.5 mile; 55°41′.0 N., 133°32′.0 W.:		
Direct	304	5.3
Reverse	*124*	*5.3*
Bocas de Finas		
39. White Cliff lighted bell buoy 12 bearing 045°, distant 150 yards; 55°43′.9 N., 133°39′.7 W.:		
Direct	345	0.9
Pass Emerald Island buoy 9 bearing 270°, distant 175 yards.		
Reverse	*165*	*0.9*
40. Emerald Island buoy 9 bearing 000°, distant 450 yards; 55°44′.7 N., 133°40′.0 W.:		
Direct	324	2.7
Reverse	*144*	*2.7*
41. Cape Lynch Light bearing 090°, distant 0.5 mile; 55°46′.8 N., 133°42′.8 W. Change to Chart 8173 (*8157*):		
Direct	335	10.5
Pass Black Rock bearing 090°, distant 1.0 mile.		
Reverse	*155*	*10.5*
Warren Channel		
42. Warren Island, north extremity, bearing 270°, distant 1.0 mile; 55°56′.4 N., 133°50′.8 W.:		
Direct	292	9.4
Reverse	*112*	*9.4*
Sanner Strait		
43. Spanish Islands Light bearing 180°, distant 0.6 mile; 55°59′.8 N., 134°06′.2 W. Same as Position 114E, Table 1. Change to Chart 8253 (*8173*):		
Direct	248	1.1
Reverse	*068*	*1.1*
44. Cape Decision Light bearing 000°, distant 0.7 mile; 55°59′.4 N., 134°08′.1 W. Same as Position 115E, Table 1.		

Table 4.—Kingsmill Point to Sherman Rock

Position (Reverse directions in *italics*—read upward)	True course	Distance
See diagram for Table 1, Section 5		
Chatham Strait		
1. Kingsmill Point Light bearing 135°, distant 3.0 miles; 56°52′.7 N., 134°28′.8 W. Same as Position 118E, Table 1. Chart 8252:	*Degrees*	*Nautical miles*
Direct	321	10.2
Reverse	*141*	*10.2*
2. Point Gardner Light bearing 090°, distant 2.0 miles; 57°00′.6 N., 134°40′.5 W.:		
Direct	354	27.0
Reverse	*174*	*27.0*
3. Morris Reef lighted bell buoy bearing 282°, distant 1.1 miles; 57°27′.5 N., 134°46′.2 W. Same as Position 1, Table 5. Local magnetic attraction in the vicinity of this buoy. See Chapter 13:		
Direct	354	18.5
Reverse	*174*	*18.5*
4. South Passage Point Light bearing 270°, distant 3.5 miles; 57°46′.0 N., 134°49′.5 W. Change to Chart 8202 (*8252*):		
Direct	354	16.5
Reverse	*174*	*16.5*
5. Point Augusta Light bearing 270°, distant 2.0 miles; 58°02′.1 N., 134°53′.0 W.:		
Direct	347	12.5
Reverse	*167*	*12.5*
Lynn Canal		
6. Naked Island Light bearing 045°, distant 1.4 miles; 58°14′.4 N., 134°58′.5 W. Same as Position 155, Table 1. Change to Chart 8302 (*8202*):		
Direct	358	10.3
Pass False Point Retreat Daybeacon bearing 090°, distant 0.5 mile.		
Reverse	*178*	*10.3*
7. Point Retreat Light bearing 090°, distant 1.0 mile; 58°24′.7 N., 134°59′.1 W. Same as Position 154, Table 1:		
Direct	339	8.2
Reverse	*159*	*8.2*
8. Little Island Light bearing 090°, distant 1.0 mile; 58°32′.4 N., 135°04′.6 W.		
Direct	348	19.0
Reverse	*168*	*19.0*
9. Sherman Rock Lighted whistle buoy 2 bearing 090°, distant 1.1 miles; 58°51′.1 N., 135°11′.9 W. Same as Position 156G, Table 1. Bound to Skagway continue by Table 1.		

Table 5.—Chatham Strait to Sitka

Position (Reverse directions in *italics*—read upward)	True course	Distance
See diagram for Table 1, Section 5		
1. Morris Reef lighted bell buoy bearing 282°, distant 1.1 miles; **Fairway Island Light** bearing 253°, distant 3.3 miles; 57°27′.5 N., 134°46′.2 W. Same as Position 3, Table 4. Local magnetic attraction in this vicinity, see Chapter 13. Chart 8283:	*Degrees*	*Nautical miles*
Direct	264	8.2
Pass Point Craven Light bearing 000°, distant 0. 6 mile.		
Reverse	*084*	*8.2*
Peril Strait		
2. McClellan Rock Light bearing 000°, distant 0.5 mile; 57°26′.7 N., 135°01′.5 W.:		
Direct	292	2.7
Reverse	*112*	*2.7*
3. False Lindenberg Head, southwestern extremity, bearing 045°, distant 0.5 mile; 57°27′.7 N., 135°06′.0 W.:		
Direct	308	11.4
Reverse	*128*	*11.4*
4. Broad Island, northeast extremity, bearing 335°, distant 0.6 mile; **Otstoia Island Light** bearing 246°, distant 2.5 miles; 57°34′.7 N., 135°22′.6 W.:		
Direct	244	2.6
Pass Cozian Shoal lighted bell buoy 1 bearing 000°, distant 250 yards.		
Reverse	*064*	*2.6*
5. Otstoia Island Light bearing 000°, distant 150 yards; **Otstoia lighted buoy 2** bearing 111°, distant 125 yards; 57°33′.6 N., 135°26′.8 W. Change to Chart 8248 (*8283*):		
Direct	234	4.3
Reverse	*054*	*4.3*
6. Povorotni Island Light bearing 180°, distant 0.3 mile; 57°31′.2 N., 135°33′.2 W.:		
Direct	Swing left	0.4
Reverse	*Swing right*	*0.4*
7. Povorotni Island Light bearing 090°, distant 500 yards; 57°30′.8 N., 135°33′.7 W.:		
Direct	155	1.0
Reverse	*335*	*1.0*
8. Point-on-western shore, northern extremity, bearing 213°, distant 0.3 mile; 57°30′.0 N., 135°33′.0 W. Avoid Nixon Shoal:		
Direct	170	2.8
Reverse	*350*	*2.8*
9. Rose Island Rock Light bearing 270°, distant 275 yards; 57°27′.2 N., 135°32′.1 W.:		
Direct	Various	0.6
Reverse	*Various*	*0.6*

Table 5.—Chatham Strait to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
10. Yellow Point Daybeacon bearing 180°, distant 125 yards; 57°27′.0 N., 135°33′.1 W.:	*Degrees*	*Nautical miles*
Direct	Various	0.3
Reverse	*Various*	*0.3*
11. Middle Point Light bearing 213°, distant 0.8 mile; 57°27′.0 N., 135°33′.6 W.:		
Direct	220	0.8
Reverse	*040*	*0.8*
12. Middle Point Light bearing 090°, distant 200 yards; 57°26′.4 N., 135°34′.8 W.:		
Direct	183	0.4
Reverse	*003*	*0.4*
13. Middle Point Light bearing 018°, distant 0.4 mile; **Little Island, south extremity** bearing 242°, distant 0.6 mile; 57°26′.0 N., 135°34′.8 W.:		
Direct	216	1.6
Reverse	*036*	*1.6*
14. Liesnoi Shoal lighted bell buoy 3 bearing 270°, distant 150 yards; 57°24′.8 N., 135°36′.4 W.:		
Note: Vessels should pass through Sergius Narrows only at or near slack water, especially with the large tides, and preferably at high-water slack. See Chapter 13.		
Direct	Various	1.2
Pass Wayanda Ledge buoy 4 bearing 180°, distant 50 yards, and Sergius Narrows Light bearing 000°, distant 100 yards.		
Reverse	*Various*	*1.2*
15. West Francis Rock lighted buoy bearing 090°, distant 250 yards; 57°24′.3 N., 135°38′.5 W.:		
Direct	180	1.5
Reverse	*000*	*1.5*
16. Kakul Narrows Light bearing 253°, distant 1.4 miles; **Struya Point, south extremity,** bearing 270°, distant 0.8 mile; 57°22′.8 N., 135°38′.5 W.:		
Direct	258	1.3
Reverse	*078*	*1.3*
17. Kakul Narrows Light bearing 180°, distant 275 yards; 57°22′.6 N., 135°40′.9 W.:		
Direct	216	1.0
Pass Broad Rock buoy 1 bearing 270°, distant 175 yards.		
Reverse	*036*	*1.0*
Salisbury Sound		
18. Kakul Rock buoy 2 bearing 090°, distant 250 yards; 57°21′.7 N., 135°42′.0 W. Vessels bound for Sitka via Neva Strait, see alternate route below. Change to Chart 8281 (*8248*):		
Direct	260	1.3
Reverse	*080*	*1.3*
19. Goloi Island, south extremity, bearing 000°, distant 400 yards; 57°21′.5 N., 135°44′.4 W. Same as Position 30A, Table 6:		
Direct	265	6.0
Reverse	*085*	*6.0*

Table 5.—Chatham Strait to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Pacific Ocean		
20. Klokachef Island Light bearing 012°, distant 3.2 miles; **Morskoi Rock buoy 2** bearing 113°, distant 1.1 miles; 57°21′.1 N., 135°55′.4 W.:	*Degrees*	*Nautical miles*
Direct	178	21.6
Change to Chart 8256 (*8281*) at 57°20′.0 N., 135°53′.3 W.		
Reverse	*358*	*21.6*
21. Cape Edgecumbe Light bearing 075°, distant 1.5 miles; 56°59′.5 N., 135°54′.0 W. Same as Position 11, Table 6:		
Direct	124	2.9
Reverse	*304*	*2.9*
22. Sitka Point Daybeacon bearing 000°, distant 1.5 miles; 56°57′.9 N., 135°49′.5 W.:		
Direct	087	4.2
Reverse	*267*	*4.2*
Sitka Sound		
23. St. Lazaria Island, east extremity, bearing 000°, distant 0.9 mile; 56°58′.2 N., 135°41′.8 W. Change to Chart 8255 (*8256*):		
Direct	075	5.2
Reverse	*255*	*5.2*
24. Vitskari Island Light bearing 000°, distant 0.5 mile; 56°59′.5 N., 135°32′.6 W.:		
Direct	076	6.0
Pass Kulichkof Rock lighted whistle buoy 2 bearing 180°, distant 0.3 mile.		
Reverse	*256*	*6.0*
25. The Eckholms Light bearing 135°, distant 0.5 mile; 57°00′.9 N., 135°22′.0 W. Change to Chart 8244 (*8255*):		
Direct	082	1.5
Pass Simpson Rock lighted bell buoy 1 bearing 000°, distant 150 yards.		
Reverse	*262*	*1.5*
26. Tsaritsa Rock lighted bell buoy 3 bearing 000°, distant 125 yards; 57°01′.2 N., 135°19′.4 W.:		
Direct	032	1.0
Pass Rocky Patch lighted bell buoy 2 bearing 090°, distant 0.3 mile.		
Reverse	*212*	*1.0*
27. The Twins Light bearing 270°, distant 350 yards; 57°02′.1 N., 135°18′.4 W.:		
Direct	308	1.3
Pass Turning Island Light bearing 270°, distant 450 yards.		
Reverse	*128*	*1.3*
28. Shoal Island Light bearing 270°, distant 125 yards; 57°02′.9 N., 135°20′.3 W.:		
Direct	Various	0.3
Reverse	*Various*	*0.3*
29. Sitka wharf, 57°03′.1 N., 135°20′.5 W.		

Table 5.—Chatham Strait to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Via Neva Strait		
Salisbury Sound		
18. Kakul Rock buoy 2 bearing 090°, distant 250 yards; 57°21′.7 N., 135°42′.0 W. Chart 8281:	*Degrees*	*Nautical miles*
Direct	166	1.4
Reverse	*346*	*1.4*
19A. Scraggy Island, south extremity, bearing 270°, distant 0.5 mile; 57°20′.3 N., 135°42′.3 W. Same as Position 31A, Table 6:		
Direct	129	1.6
Reverse	*309*	*1.6*
Neva Strait		
20A. Kane Island, south extremity, bearing 270°, distant 700 yards; 57°19′.3 N., 135°39′.1 W. Same as Position 32A, Table 6:		
Direct	141	2.3
Reverse	*321*	*2.3*
21A. Entrance Island Light bearing 090°, distant 200 yards; 57°17′.5 N., 135°36′.4 W.:		
Direct	Various	0.7
Reverse	*Various*	*0.7*
22A. Highwater Island Shoal buoy 11 bearing 270°, close aboard; 57°16′.9 N., 135°36′.0 W.:		
Direct	Various	2.1
Pass Wyvill Reef lighted buoy 10 bearing 090°, close aboard.		
Reverse	*Various*	*2.1*
23A. Whitestone Sandspit buoy 6 bearing 090°, distant 125 yards; 57°15′.1 N., 135°34′.1 W.:		
Direct	Various	0.6
Pass Whitestone Point Light bearing 090°, distant 100 yards. Pass east of black buoys and west of red buoys. Deep draft vessels should use East Channel but only at slack water because of sharp turns.		
Reverse	*Various*	*0.6*
24A. Whitestone Narrows Rock lighted buoy 1 bearing 270°, close aboard; 57°14′.5 N., 135°33′.7 W.:		
Direct	158	0.5
Reverse	*338*	*0.5*
25A. Neva Point Reef Light bearing 090°, distant 300 yards; 57°14′.0 N., 135°33′.3 W.:		
Direct	104	1.1
Reverse	*284*	*1.1*
26A. Neva Point Reef Light bearing 287°, distant 1.1 miles; 57°13′.8 N., 135°31′.4 W.:		
Direct	146	1.0
Reverse	*326*	*1.0*

Table 5.—Chatham Strait to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Olga Strait		
27A. Creek Point, south extremity, bearing 090°, distant 300 yards; 57°13′.0 N., 135°30′.4 W.:	*Degrees*	*Nautical miles*
Direct	126	0.6
Reverse	*306*	*0.6*
28A. Middle Shoal lighted buoy 5 bearing 270°, distant 75 yards; 57°12′.6 N., 135°29′.5 W.:		
Direct	142	1.6
Pass Middle Shoal buoy 3 bearing 270°, distant 100 yards.		
Reverse	*322*	*1.6*
29A. Olga Strait buoy 1 bearing 270°, distant 100 yards; 57°11′.4 N., 135°27′.8 W.:		
Direct	138	1.7
Reverse	*318*	*1.7*
30A. Dog Point, north extremity, bearing 075°, distant 500 yards; **Siginaka Island, east extremity,** bearing 189°, distant 0.8 mile; 57°10′.1 N., 135°25′.8 W.:		
Direct	157	1.7
Reverse	*337*	*1.7*
31A. Lisianski Point, south extremtiy, bearing 090°, distant 0.6 mile; **Old Sitka Rocks Light** bearing 180°, distant 1.7 miles; 57°08′.6 N., 135°24′.6 W.:		
Direct	185	1.7
Reverse	*005*	*1.7*
32A. Old Sitka Rocks Light bearing 090°, distant 300 yards; 57°06′.9 N., 135°24′.9 W.:		
Direct	160	1.6
Reverse	*340*	*1.6*
33A. Kasiana Island Shoal buoy 1 bearing 270°, distant 450 yards; 57°05′.4 N., 135°23′.9 W.:		
Direct	147	2.1
Pass Channel Rock lighted bell buoy 1 bearing 090°, distant 100 yards.		
Reverse	*327*	*2.1*
34A. Channel Rock Light bearing 270°, distant 300 yards; 57°03′.6 N., 135°21′.8 W. Change to Chart 8244 (*8281*):		
Direct	131	0.6
Reverse	*311*	*0.6*
35A. Harbor Rock Light bearing 090°, distant 100 yards; 57°03′.2 N., 135°20′.9 W.:		
Direct	127	0.2
Reverse	*307*	*0.2*
29. Sitka wharf, 57°03′.1 N., 135°20′.5 W.		

Table 6.—Cross Sound to Sitka

Position (Reverse directions in *italics*—read upward)	True course	Distance
See diagram for Table 1, Section 5		
Cross Sound		
1. North Inian Pass Light bearing 180°, distant 0.5 mile; 58°16′.9 N., 136°24′.0 W. Same as Position 159, Table 1. Chart 8304:	*Degrees*	*Nautical miles*
Direct	228	0.7
Reverse	*048*	*0.7*
2. North Inian Pass Light bearing 090°, distant 0.5 mile; 58°16′.3 N., 136°25′.0 W.:		
Direct	191	9.5
Reverse	*011*	*9.5*
3. Lisianski Inlet Light bearing 160°, distant 1.3 miles; 58°07′.1 N., 136°28′.7 W. Chart 8260:		
Direct	145	1.4
Reverse	*325*	*1.4*
4. Lisianski Inlet Light bearing 270°, distant 900 yards; 58°05′.9 N., 136°27′.1 W.:		
Direct	150	6.2
Reverse	*330*	*6.2*
Lisianski Inlet		
5. Mite Head Light bearing 270°, distant 0.3 mile; 58°04′.2 N., 136°25′.2 W.:		
Direct	134	2.0
Reverse	*314*	*2.0*
6. Nose Head Light bearing 122°, distant 0.8 mile; 58°02′.2 N., 136°21′.2 W.		
6. Nose Head Light bearing 122°, distant 0.8 mile; 58°02′.2 N., 136°21′.2 W.:		
Direct	142	5.4
Reverse	*322*	*5.4*
7A. Pelican Entrance Daybeacon bearing 130°, distant 0.9 mile; 57°58′.0 N., 136°15′.0 W.:		
Direct	120	0.7
Reverse	*300*	*0.7*
8A. Pelican, wharf, 57°57′.6 N., 136°13′.8 W.		
8A. Pelican, wharf, 57°57′.6 N., 136°13′.8 W.		
Direct	300	0.7
Reverse	*120*	*0.7*
9A. Pelican Entrance Daybeacon bearing 130°, distant 0.9 mile; 57°58′.0 N., 136°15′.0 W.:		
Direct	309	2.8
Reverse	*129*	*2.8*

Table 6.—Cross Sound to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
10A. Junction Island, west tangent, bearing 000°, distant 0.2 mile; 57°59′.7 N., 136°19′.1 W.:	*Degrees*	*Nautical miles*
Direct	320	0.8
Reverse	*140*	*0.8*
8. Miner Island, east tangent, bearing 000°, distant 0.3 mile; 58°00′.3 N., 136°20′.1 W.		
6. Nose Head Light bearing 122°, distant 0.8 mile; 58°02′.2 N., 136°21′.2 W.:		
Direct	149	1.7
Reverse	*329*	*1.7*
7. Nose Head Light bearing 350°, distant 1.0 mile; 58°00′.7 N., 136°19′.5 W.:		
Direct	212	0.5
Reverse	*032*	*0.5*
8. Miner Island, east tangent, bearing 000°, distant 0.3 mile; 58°00′.3 N., 136°20′.1 W.:		
Direct	270	0.6
Reverse	*090*	*0.6*
Lisianski Strait		
9. Rock Point Light bearing 180°, distant 200 yards; 58°00′.3 N., 136°21′.1 W.:		
Direct	229	0.8
Reverse	*049*	*0.8*
10. Rock Point Light bearing 056°, distant 0.7 mile; 57°59′.8 N., 136°22′.2 W.:		
Direct	189	1.9
Reverse	*009*	*1.9*
11. Position on east shore, center of rounding point, bearing 090°, distant 300 yards; 57°58′.0 N., 136°22′.8 W.:		
Direct	167	2.1
Reverse	*347*	*2.1*
12. South tangent, north entrance point Stag Bay, bearing 090°, distant 0.3 mile; 57°56′.0 N., 136°21′.8 W.:		
Direct	206	6.3
Reverse	*026*	*6.3*
13. Rock 10 feet above high water bearing 346°, distant 400 yards; 57°50′.3 N., 136°26′.9 W.:		
Direct	225	0.7
Reverse	*045*	*0.7*
Pacific Ocean		
14. Star Rock bell buoy bearing 270°, distant 300 yards; 57°49′.8 N., 136°27′.8 W. Chart 8258 (*8260*):		
Direct	204	1.6
Reverse	*024*	*1.6*

Table 6.—Cross Sound to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
	Degrees	*Nautical miles*
15. Greentop Island Light bearing 000°, distant 3.0 miles; 57°48′.4 N., 136°29′.0 W.:		
Direct	159	52.4
Change to Chart 8280 (*8258*) at 57°41′.0 N., 136°23′.6 W.		
Change to Chart 8252 (*8280*) at 57°28′.0 N., 136°14′.3 W.		
Change to Chart 8256 (*8252*) at 57°08′.0 N., 136°00′.0 W.		
Reverse	*339*	*52.4*
16. Cape Edgecumbe Light bearing 075°, distant 1.5 miles; 56°59′.5 N., 135°54′.0 W. Same as Position 21, Table 5. Proceed to Sitka by Table 5.		
Via Ogden Passage		
14. Star Rock buoy bearing 270°, distant 300 yards; 57°49′.8 N., 136°27′.8 W. Chart 8258:		
Direct	178	1.9
Reverse	*358*	*1.9*
15B. Porcupine Rock bearing 083°, distant 0.8 mile; 57°47′.8 N., 136°27′.6 W.:		
Direct	130	6.5
Pass north of breakers.		
Reverse	*310*	*6.5*
16B. Hill Island Light bearing 090°, distant 1.0 mile; 57°43′.7 N., 136°18′.4 W.:		
Direct	101	1.3
Reverse	*281*	*1.3*
Imperial Passage		
17B. Hill Island Light bearing 815°, distant 700 yards; 57°43′.4 N., 136°16′.0 W.:		
Direct	040	0.5
Reverse	*220*	*0.5*
18B. Sholin Island, north extremity, bearing 120°, distant 500 yards; 57°43′.8 N., 136°15′.4 W.:		
Direct	076	0.2
Reverse	*256*	*0.2*
Portlock Harbor		
24B. Port Island, north extremity, bearing 270°, distant 250 yards; 57°41′.7 N., 136°07′.6 W.:		
Direct	132	0.3
Reverse	*312*	*0.3*
25B. Dippy Island Rock Daybeacon bearing 258°, distant 350 yards; **Wharf, Kimsham Cove,** bearing 126°, distant 0.5 mile; 57°41′.5 N., 136°07′.2 W. Change to Chart 8280 (*8258*):		
Direct	237	0.5
Reverse	*057*	*0.5*
26B. Dippy Island Rock Daybeacon bearing 046°, distant 650 yards; 57°41′.2 N., 136°08′.0 W.:		
Direct	202	0.9
Reverse	*022*	*0.9*

Table 6.—Cross Sound to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Ogden Passage		
27B. Steep Island bearing 279°, distant 700 yards; 57°40′.4 N., 136°08′.6 W.:	*Degrees*	*Nautical miles*
Direct	267	0.5
Reverse	*087*	*0.5*
28B. Steep Island bearing 069°, distant 0.2 mile; **Duck Island west extremity,** bearing 358°, distant 300 yards; 57°40′.4 N., 136°09′.7 W.:		
Direct	Various	1.0
Reverse	*Various*	*1.0*
19B. Sholin Island, north extremity, bearing 187°, distant 350 yards; **Hill Island Light** bearing 257°, distant 0.8 mile; 57°43′.9 N., 136°15′.0 W.:		
Direct	128	1.1
Reverse	*308*	*1.1*
20B. Triplet Islands, southeast extremity, bearing 000°, distant 0.3 mile; 57°43′.2 N., 136°13′.5 W.:		
Direct	090	1.8
Reverse	*270*	*1.8*
21B. Minnie Reef Light bearing 225°, distant 100 yards; 57°43′.2 N., 136°10′.1 W.:		
Direct	150	0.7
Reverse	*330*	*0.7*
22B. Lydonia Island, southeast extremity, bearing 254°, distant 200 yards; 57°42′.6 N., 136°09′.5 W.:		
Direct	160	0.4
Reverse	*340*	*0.4*
Surveyor Passage		
23B. Black Bay Rocks Daybeacon bearing 007°, distant 200 yards; 57°42′.2 N., 136°09′.3 W.:		
Direct	122	1.1
Reverse	*302*	*1.1*
29B. Drip Point, west tangent, bearing 090°, distant 100 yards; 57°39′.4 N., 136°10′.0 W.:		
Direct	176	0.8
Reverse	*356*	*0.8*
30B. Frog Rock bearing 090°, distant 300 yards; 57°38′.6 N., 136°09′.9 W.:		
Direct	155	1.2
Reverse	*335*	*1.2*
31B. Vein Point bearing 090°, distant 300 yards; 57°37′.5 N., 136°09′.0 W.:		
Direct	137	2.7
Pass Shale Island, north extremity, bearing 270°, distant 175 yards.		
Reverse	*317*	*2.7*
Smooth Channel		
32B. Guide Rock bearing 270°, distant 450 yards; 57°35′.5 N., 136°05′.5 W.		

Table 6.—Cross Sound to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
Khaz Bay		
32B. Guide Rock bearing 270°, distant 450 yards; 57°35′.5 N., 136°05′.5 W.:	*Degrees*	*Nautical miles*
Direct	206	0.8
Reverse	*026*	*0.8*
33C. Ninefoot Shoal buoy 4 bearing 090°, distant 500 yards; 57°34′.8 N., 136°06′.2 W.:		
Direct	183	3.6
Reverse	*003*	*3.6*
34C. Khaz Breakers buoy 2 bearing 270°, distant 0.6 mile; 57°31′.2 N., 136°06′.5 W.:		
Direct	140	5.5
Reverse	*320*	*5.5*
35C. Point Slocum, 30-foot rock, bearing 053°, distant 1.3 miles; 57°27′.0 N., 136°00′.0 W. Chart 8248 (*8280*):		
Direct	114	3.2
Reverse	*294*	*3.2*
Fortuna Strait		
36C. Klokachef Point on range with Eagle Rock bearing 172°, distant 1.4 mile; 57°25′.6 N., 135°54′.8 W.:		
Direct	122	2.0
Reverse	*302*	*2.0*
37C. Fortuna Point, north extremity, bearing 292°, distant 1.3 miles; **Point Vincent, east extremity,** bearing 212°, distant 700 yards; 57°24′.6 N., 135°51′.6 W.:		
Direct	180	1.2
Reverse	*000*	*1.2*
38C. Point Leo, west extremity, bearing 075°, distant 0.5 mile; **Point Vincent, east extremity,** bearing 350°, distant 1.0 mile; 57°23′.4 N., 135°51′.6 W.:		
Direct	115	4.3
Reverse	*295*	*4.3*
35B. Goloi Island, south extremity, bearing 000°, distant 400 yards; 57°21′.5 N., 135°44′.4 W. Same as Position 19, Table 5.		
Smooth Channel		
32B. Guide Rock bearing 270°, distant 450 yards; 57°35′.5 N., 136°05′.5 W.:		
Direct	206	4.8
Reverse	*026*	*4.8*
Khaz Bay		
Pass Ninefoot Shoal buoy 4 bearing 090°, distant 500 yards. Pass Outer Rocks bearing 270°, distant 1.1 mile.		

Table 6.—Cross Sound to Sitka—Continued

Position (Reverse directions in *italics*—read upward)	True course	Distance
33B. Khaz Breakers buoy 2 bearing 090°, distant 1.0 mile; 57°31′.2 N., 136°09′.5 W.:	*Degrees*	*Nautical miles*
Direct	137	9.5
Change to Chart 8252 (*8280*) at 57°28′.6 N., 136°05′.0 W.		
Change to Chart 8248 (*8252*) at 57°25′.8 N., 136°00′.0 W.		
Reverse	*317*	*9.5*
Pacific Ocean		
34B. Klokachef Island Light bearing 090°, distant 1.7 miles; 57°24′.3 N., 135°57′.4 W.:		
Direct	110	7.5
Reverse	*290*	*7.5*
Salisbury Sound		
35B. Goloi Island, south extremity, bearing 000°, distant 400 yards; 57°21′.5 N., 135°44′.4 W. Same as Position 19, Table 5:		
Direct	127	2.0
Reverse	*307*	*2.0*
36B. Scraggy Island, south extremity, bearing 270°, distant 0.5 mile; 57°20′.3 N., 135°42′.3 W. Same as position 19A, Table 5. Change to Chart 8281 (*8248*):		
Direct	129	1.6
Reverse	*309*	*1.6*
Neva Strait		
37B. Kane Islands, south extremity, bearing 270°, distant 700 yards; 57°19′.3 N., 135°39′.1 W. Same as Position 20A, Table 5.		
Continue to Sitka by inside passage as in Table 5.		

CHAPTER 4

Inside Passage Through British Columbia

BRITISH COLUMBIA is a Province of the Dominion of Canada with its capital at Victoria on Vancouver Island. The coast is formed by a series of mountainous islands, the largest of which is Vancouver Island. The many deep-water passages between the islands and between them and the mainland afford a protected inside passage between Puget Sound and Alaska. The larger islands and the mainland are deeply indented with bays and arms, forming numerous deep-water harbors, providing good shipping facilities for the various industries, and numerous streams afford access to the interior.

Rules of the Road.—The attention of all mariners is called to the fact that the International Rules govern in Canadian waters.

Standard time of British Columbia is that of the meridian of 120° west of Greenwich.

Pilotage is not compulsory. Pilotage dues must be paid if a pilot is employed but only licensed pilots must be employed.

Pilots may be procured on application to the Superintendent of Pilots at Vancouver or the Pilotage office at Victoria, by giving ample notice, by telegram or wireless, to allow a pilot to proceed from either Vancouver or Victoria to the port specified. Telegraph address is *Pilots*, Vancouver, or *Pilots*, Victoria.

Quarantine.—Coastwise vessels are exempt from quarantine inspection except when coming from an infected port.

For quarantine regulations for British Columbia, other than those termed "coastwise" refer to Canadian Edition of *British Columbia Pilot, Vol. 1*, or *Sailing Directions, British Columbia, Part I, H. O. 175.*

Canadian uniform system of buoyage.—Throughout the ports of British Columbia all buoys on the starboard side of the channel, entering from seaward, are conical, painted red, and if numbered, marked with even numbers, and must be left on the starboard hand when passing in. Top marks for these when used are conical.

All buoys on the port side, entering from seaward, are flat-topped (can), painted black, with odd numbers if any, and must be left on the port hand when passing in. Top marks for these when used are cylindrical.

The term *starboard hand* denotes the side on the right of the mariner when going with the main stream of the flood, or in entering a river, harbor, or estuary from seaward. The term *port hand* denotes the left of the mariner under the same circumstances.

Buoys painted with red and black horizontal bands will be found on obstructions or middle grounds, and may be left on either hand.

Buoys painted with white and black vertical stripes will be found in mid-channel, and must be passed close-to to avoid danger.

All other distinguishing marks of buoys are in addition to the foregoing and indicate particular spots. A detailed description of the marks is given when the mark is first established.

Perches, with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on which side they are to be passed.

Starboard hand spar buoys are red, with pointed tops, and will in some cases be surmounted by a red ball, and must be left on the starboard or right hand when entering a channel or harbor; port hand spar buoys are black, with flat tops.

The rule for coloring buoys is equally applicable to beacons, spindles, and other daymarks, so far as it may be practicable to carry it out.

In British Columbian waters spindles are painted white, and beacons which are lighted and showing against a dark background are also painted white so that if the light is out the searchlight of a steam vessel will find it. The buoys are not withdrawn in winter.

When bushes are used for marking channels the following rules have been adopted:

Hardwood bushes shall be used on the starboard side of channels.

Evergreen bushes shall be used on the port side of channel.

Note.—The coastal channels of British Columbia are marked as if the ebb current set to the southward, disregarding the point of the turn of the tidal current, so that vessels proceeding northward up the coast or into an inlet toward the head will have red buoys and beacons on the starboard hand.

Uniform system of lighting.—A uniform system of characteristics for light buoys and light beacons has been adopted by the Canadian Government, making buoy or beacon lights that are to be left on the starboard side in going upstream flashing or occulting red lights and port-hand lights flashing or occulting white lights; that is, red buoys will carry red lights and black buoys, white lights.

For special position such as middle grounds, fairways, etc., special arrangements will be made. White lights will, however, be favored when possible.

Note.—In certain cases in this volume a white light has been installed where, according to the regulation, a red light should be. In cases of this nature reference has been made to it in the text.

Wrecks.—All buoys and the topsides of vessels used for the marking of wrecks shall be painted a green color, with a suitable white inscription, and shall be moored when possible near the side of the wreck next to midchannel. Where it is practicable, by day one ball shall be exposed on the side of the vessel next to the wreck, and two placed vertically on the other side. Three fixed white lights, similarly arranged, but not the ordinary riding light, should be shown from sunset to sunrise.

Anchorages.—The following are the more important anchorages along the line of the Inland Passage through British Columbia. The descriptions are given to supplement the charts. Anchorage can be made in many other places with the aid of the charts. Vessels should plan for a suitable anchorage in the area ahead so as not to get caught in a fog or snowstorm without an opportunity to anchor in reasonable depths. Some vessels are provided with long wire cable for anchoring temporarily during a fog in deep water.

Note.—For more complete descriptions of anchorages, consult *Sailing Directions for British Columbia, Volumes I and II (H. O. 175 and 176)* and the Canadian editions of *British Columbia Pilots.*

Caution.—When navigating the inner waters of British Columbia, it should be constantly borne in mind that many of the minor passages have been only roughly examined; pinnacle rocks and shoals dangerous to navigation are still frequently found. Whenever, therefore, a broad and clear channel is known to exist, there is no justification in using without necessity one of more doubtful character, even if there be some saving in distance, and a vessel should always be maintained in the safest possible position in a channel, as well as when going in or out of port.

ACTIVE PASS TO SEYMOUR NARROWS.—**Departure Bay** (H. O. Chart 1278, lat. 49°12′ N., long. 123°57′ W.), northward of **Nanaimo Harbor,** is large and easy of access. **Rainbow Channel** offers the best approach to the bay. The bay is open northeastward and it is rarely used, although vessels drawing 30 feet have obtained secure anchorage in it. Anchorage in 15 to 20 fathoms is indicated on the chart southward of the western end of **Brandon Island.**

Tribune Bay (H. O. Chart 1394, lat. 49°31′ N., long. 124°38′ W.), on the southeastern side of **Hornby Island,** about 7 miles westward of The Sisters Light, affords anchorage about 0.8 mile from its head in 8 to 10 fathoms. The anchorage is good in all winds except southeasterly.

Baynes Sound (H. O. Chart 2058, lat. 49°28′ N., long. 124°44′ W.) has several good anchorages, but its principal importance is derived from the coal shipping port at **Union Bay.** The southern entrance and the principal dangers in the sound are well marked and the navigation is not difficult with the aid of the chart. **Deep Bay,** westward of **Maple (Maplegard) Point,** affords anchorage and is available for all classes of vessels. Large vessels should anchor with the light mast on the western extremity of the tongue extending from Maple Point bearing 030°, distant about 700 yards, in 15 fathoms, mud bottom. Small vessels with local knowledge may anchor in the eastern part of the bay southward of the tongue extending from Maple Point. Union Bay has telephone and telegraph connections and is connected to the railroad system of Vancouver Island. Anchorage in Union Bay may be had in 12 to 14 fathoms, about 350 yards eastward of the heads of the wharves.

Oyster Bay (H. O. Chart 1454, lat. 49°55′ N., long. 125°10′ W.), on the west side of Georgia Strait, can be used as a temporary anchorage but is exposed to northerly and easterly winds. A good position which is indicated on the chart, in depths of 7 to 9 fathoms, is about a mile offshore. A reef affording some protection from northwest winds extends 0.5 mile eastward from **Shelter Point,** the northwest point of the bay.

Duncan Bay (H. O. Chart 2092, lat. 50°05′ N., long. 125°17′ W.), on the west side of Discovery Passage, is easy of access and affords a good anchorage between **Orange Point** and **Middle Point** in 15 or 16 fathoms, sand bottom, well out of the current and sheltered from all but northwesterly winds; small craft could anchor closer up the head of the bay. Shoals make off about 200 yards from the shores of the bay. The mouth of the creek on the south side of the bay is filled by a flat.

SEYMOUR NARROWS TO QUEEN CHARLOTTE SOUND.—**Menzies Bay** (H. O. Chart 2091, lat. 50°07′ N., long. 125°22′ W.), indents the western shore of Discovery Passage

at the southern approach to Seymour Narrows. The bay affords secure temporary anchorage in 6 or 7 fathoms with no inconvenience from tidal streams and eddies in its southern part. Vessels should exercise caution, however, to avoid the 3-fathom patch off the pier and should on no account get into depths less than 5 fathoms. Secure anchorage can be had in the northwestern part of the bay, where indicated on the chart, in 6 or 7 fathoms. This anchorage is entirely out of the tidal currents. A channel with a least depth of 5 fathoms and a navigable width of 200 yards leads to this inner anchorage.

Plumper Bay (H. O. Chart 2091, lat. 50°10′ N., long. 125°20′ W.), on the eastern side of Discovery Passage, 2 miles northward of **Maud Island Light,** affords good anchorage in 8 to 15 fathoms, mud and sand bottom, near the middle of the bay. The eastern and southern shores of the bay should be given a berth of 200 yards, and a rocky patch with 6 fathoms lying 400 yards from the southern and 600 yards from the eastern side of the bay should be avoided when anchoring. If anchored far out the eddies sometimes cause a vessel to surge on her cable. In the position indicated on the chart, however, vessels will obtain good anchorage in 8 to 10 fathoms, mud and sand; is easy of access, well sheltered, and out of the tidal current.

Deep Water Bay (H. O. Chart 2091, lat. 50°11′ N., long. 125°20′ W.), 3 miles northward of Seymour Narrows, affords anchorage for a small vessel at its southern end in 10 to 12 fathoms, mud bottom. The bay is too deep to afford anchorage for any but very small vessels.

Elk Bay (H. O. Chart 2092, lat. 50°17′ N., long. 125°26′ W.), on the western side of Discovery Passage, about 9.5 miles northwestward of Maud Island Light, is a broad indentation affording anchorage in 15 fathoms, mud and sand bottom, about 0.3 mile from its head. A flat extends 400 yards from the head of the bay. The anchorage is open to the northward and eastward, but is out of the strength of the tidal current.

Otter Cove (H. O. Chart 2092, lat. 50°20′ N., long. 125°27′ W.), close southward of **Chatham Point,** Discovery Passage, is a small but snug anchorage for small craft; it is sheltered from all winds. To enter pass midway between **Limestone Island** and **Rocky Islets** and anchor midway between the former and the head of the cove in about 9 or 10 fathoms, mud and sand.

Vere Cove (H. O. Chart 2168, lat. 50°23′ N., long. 125°46′ W.), indenting the west end of **Thurlow Island,** has anchorage for a small vessel in 10 to 17 fathoms, mud bottom, well out of the tidal current. **Dorothy Rock,** which dries 12 feet, lies close to the south shore of the entrance.

Blinkinsop Bay (H. O. Chart 1416, lat. 50°29′ N., long. 126°00′ W.), on the north side of the west entrance to **Sunderland Channel,** indents the northern side of Johnstone Strait and affords good and convenient anchorage in depths of 6 to 10 fathoms, mud bottom. Foul ground extends about 150 yards off **Tuna Point,** the eastern point of the entrance. Foul ground extends about 250 yards eastward from **George Point,** the western point of the entrance, and irregular bottom with less than 5-fathom depths, marked by kelp, extends about 300 yards from the same point. **Blink Rock,** with a least depth of 10 feet, is within the entrance, about 600 yards northward of Tuna Point. **Elf Shoal,** a rocky ledge with a least depth of 3¼ fathoms, is about 300 yards northward of Blink Rock. Enter in mid-channel between Tuna and George Points, pass westward of Blink Rock and Elf Shoal, and anchor as convenient. A good berth is with the western point at the entrance in line with the south end of **Jesse Island** and Tuna Point Light in line with the summit of **York Island.**

Port Neville (H. O. Chart 1416, lat. 50°29′ N., long. 126°05′ W.), 3 miles westward of Blinkinsop Bay, affords secure anchorage for small craft, but the entrance channel is narrow and shallow with a least depth of 2 fathoms on the western side of Channel Rock. To those without local knowledge its use is not recommended. Kelp grows across the entrance in the summer.

Port Harvey (H. O. Chart 2169, lat. 50°32′ N., long. 126°17′ W.), on the north side of Johnstone Strait, the entrance to which lies 9 miles westward of Port Neville, furnishes anchorage in 7 to 8 fathoms, muddy bottom, just above the **Mist Islands** in the position indicated on the chart. A detached steep-to rock with a depth of 1¼ fathoms lies about 0.2 mile off the western shore in a position about 1,400 yards westward of **Domville Point;** this rock is not marked by kelp.

Forward Bay (H. O. Chart 2185, lat. 50°31′ N., long. 126°23′ W.), on the north side of Johnstone Strait, 3 miles westward of Port Harvey, is a broad but slight indentation affording fair anchorage in 15 to 16 fathoms, sand and stone bottom, sheltered from all except southeasterly winds. A flat extends 400 yards from the stream at the head of the bay; the best anchorage is off the edge of this flat in the position indicated on the chart. There is an islet close to the shore about 0.2 mile eastward of the anchorage, and Bush Islet, highest of three, is on a reef close to shore 0.8 mile westward of the anchorage. Approaching from eastward care should be taken to avoid **Escape Reef.**

Alert Bay (H. O. Chart 1431, lat. 50°35′ N., long. 126°56′ W.), on the south side of **Cormorant Island,** is easy of access and affords a good and well-sheltered anchorage in 5 to 8 fathoms, mud and sand. **Alert Bay,** a village on the shores of the bay, is a port of entry. It has a post office and commercial radio station. Supplies are available.

Rough Bay (H. O. Chart 2161, lat. 50°38′ N., long. 127°02′ W.), on the southern side of **Malcolm Island,** affords good anchorage in 6 to 8 fathoms, mud and sand bottom, about 0.2 mile from the flat which extends 0.3 mile from the head of the bay.

Port McNeill (H. O. Chart 2161, lat. 50°36′ N., long. 127°05′ W.), on the southern shore of Broughton Strait, affords anchorage in depths of 4 to 9 fathoms, mud bottom, in the position indicated on the chart. **Neill Ledge** extends about 1.3 miles eastward of **Ledge Point.** Depths of 9 to 18 fathoms, sand and shell bottom, may be found to the southward of Neill Ledge, not so well protected from the northward. **Eel Reef** lies about 0.2 mile off the southern shore, about 0.4 mile to the westward of **Deer Point.** The tidal currents are not felt in the port.

QUEEN CHARLOTTE SOUND TO MILBANKE SOUND.—**Beaver Harbor** (H. O. Chart 1431, lat. 50°43′ N., long. 127°24′ W.) indents the southern side of Queen Charlotte Strait close westward of **Thomas Point.** The harbor, which is formed by several islands and islets lying across the mouth of a bay, affords a well-protected anchorage in depths of 8 to 13 fathoms and is easy of access. The best anchorages in the harbor are in 8 or 9 fathoms, mud bottom, between the **Cattle Islands** and **Cormorant Rock,** and in 12 or 13 fathoms about 0.3 mile northward of the rock. Entering from eastward pass about 200 yards southward of the rocks off the southern side of **Eagle Island,** then pass about 200 yards southward of the reef on which is **Shell Islet** and having rounded this islet at a prudent distance, pass on either side of the 3½-fathom patch eastward of Cormorant Rock; deep-draft vessels, however, should pass about 100 yards eastward of this patch. Entering from the northward or westward, vessels may use **Daedalus Passage;** steer a mid-channel course, taking care to avoid **Herald Rock.**

Port Alexander (H. O. Chart 1442, lat. 50°51′ N., long. 127°40′ W.), at the eastern end of **Nigei Island,** affords anchorage in 12 to 13 fathoms, sheltered except from southeasterly winds, about 0.5 mile from the head of the bay. An islet is close to **Boxer Point,** the southern point of the entrance, and **Fraser Islet** is in the fairway, 0.5 mile within the entrance. In anchoring care should be taken, as there are no objects on which to take bearings, the hills on either side being high and densely wooded.

Bull Harbor (H. O. Chart 1442, lat. 50°55′ N., long. 127°56′ W.), on the northern side of **Goletas Channel,** affords secure anchorage for small boats above **Norman (Indian) Island,** which is about 145 feet high to the tree tops and lies about 0.8 mile within the entrance. Foul ground extends about 0.1 mile off the western point of the entrance. Enter in mid-channel, pass eastward of Norman Island, and anchor northward of it in about 4 fathoms mud and sand bottom. Bull Harbor has a radio station.

Cascade Harbor (H. O. Chart 1442, lat. 50°55′ N., long. 127°44′ W.) is on the northern side of Nigei Island west of **Greeting Point,** in latitude 50°54′ N., longitude 127°45′ W., and affords protected anchorage for small craft in 4 to 8 fathoms, mud bottom. In the harbor is a store and an oil station.

Safety Cove (H. O. Chart 1758, lat. 51°32′ N., long. 127°56′ W.), on the western shore of Fitzhugh Sound, 6.5 miles northward of **Cape Calvert,** is about 1 mile long and 0.2 to 0.4 mile wide. The cove affords a safe and convenient anchorage for vessels having to wait to cross Queen Charlotte Sound, and is easily entered. The north point at the entrance is marked by two small islets; on the south side just within the entrance is a conspicuous white landslide. The shores are high and steep-to except at the head, where there is a flat 600 yards wide with 7 fathoms close to its edge. Good anchorage will be obtained in 15 fathoms, muddy bottom, in the middle of the cove, abreast a small waterfall on the north shore. Entering at night, a vessel should keep in the middle of the cove, keep the lead going, and anchor as soon as 17 fathoms is reached.

McLoughlin Bay (Bellabella) (H. O. Chart 5373, lat. 52°08′ N., long. 128°08′ W.), is a small cove indenting the west side of **Lama Passage,** about 800 yards northward of **Napier Point.** The shores are rocky, except at the southwest corner of the bay, where a small stream comes in. Within the bay the soundings vary from 6½ to 15 fathoms. The best anchorage is in 11 fathoms, about 200 yards off the middle of the beach; in this position **Saunders Island** bears 021° and is just open of **Story Point,** the western extremity of **Denny Island.**

Ormidale Harbor (H. O. Chart 5373, lat. 52°12′ N., long. 128°09′ W.), on the south side of Seaforth Channel, has its navigable entrance westward of **Nevay Island.** The entrance to the harbor is 300 yards wide, with a least depth of 12 fathoms in mid-channel. A mid-channel course is free from dangers, and anchorage may be had about 300 yards southward of Nevay Island in 17 fathoms, sand and mud bottom, in the position indicated on the chart. **Wellington Rock** has 2¾ fathoms over it and lies in Seaforth Channel off the middle of the entrance to Ormidale Harbor, 450 yards from the points at the entrance.

MILBANKE SOUND TO GRENVILLE CHANNEL.—**Nowish Cove** (H. O. Chart 1762, lat. 52°31′ N., long. 128°26′ W.) has its entrance on the east side of Finlayson Channel 0.5 mile northward of **Sister Islets.** It is about 300 yards wide at its entrance, contracting to 150 yards, and then expands at 600 yards from its entrance, forming a cove which affords an anchorage for small vessels with a clear width of 200 yards in 10 to 14 fathoms, sandy bottom. A mid-channel course leads in safely.

Klemtu Passage (H. O. Chart 1762, lat. 52°34′ N., long. 128°31′ W.), affords anchorage with a clear width of about 300 yards in the channel abreast **Clothes Bay** about 1.4 miles above the southeast end of **Cone Island** in 12 fathoms, sand and shell bottom. Small craft can obtain better anchorage in Clothes Bay in a depth of about 5 fathoms.

Carter Bay (H. O. Chart 1762, lat. 52°50′ N., long. 128°23′ W.), at the head of Finlayson Channel, furnishes anchorage in 14 to 15 fathoms, mud bottom, at about 300 yards from the sand flat at the head of the bay. The bay is about 0.4 mile wide at the anchorage and has a large stream at its head.

Caution.—Shell fish caught in Carter Bay, of whatever kind, should not be eaten.

Swanson Bay (H. O. Chart 1762, lat. 53°01′ N., long. 128°31′ W.) is on the eastern shore of Graham Reach, 7 miles above **Sarah Island;** abreast this bay on the opposite shore is a conspicuous waterfall. Anchorage may be had in the northern part of Swanson Bay in 19 fathoms, sandy bottom, with the waterfall shut in with the northwest point at the entrance, and the western shore of Graham Reach shut in by the southeast point at the entrance. A ruined wharf is in the northeast corner of Swanson Bay.

Home Bay (H. O. Chart 1763, lat. 53°07′ N., long. 129°06′ W.), at the eastern end of Wright Sound, 1 mile southward of **Nelly Point,** is about 0.4 mile in extent, with a flat nearly 300 yards wide at its head; a small islet lies off the south point at the entrance. Anchorage will be found in 14 fathoms, sandy bottom, close to the flat and 200 yards northeastward of an islet on the south side, with the southern entrance point of the bay in range with **Mount Gil** (3,000 feet).

Coghlan Anchorage (H. O. Chart 1763, lat. 53°22′ N., long. 129°16′ W.), on the north side of the western end of Wright Sound between **Promise Island** and **Camp Point,** is 2 miles long in a north-northwesterly direction, with an average width of about 0.4 mile, and is a good anchorage. **Observation Point** is on the southwest side 1 mile inside Camp Point. **Harbor Rock,** which bares 6 feet and is of small extent, is in the middle of Coghlan Anchorage 0.5 mile northward of Observation Point. The anchorage for small vessels is 0.2 to 0.5 mile above Harbor Rock, slightly favoring the eastern shore in 6 to 7 fathoms, sandy bottom; or, for a large vessel or those not wishing to go beyond Harbor Rock, anchor in mid-channel about halfway from Observation Point to Harbor Rock, with the point bearing about south, in 18 to 19 fathoms, sandy bottom. In entering keep in mid-channel to avoid shore ledges which extend about 100 yards from **Thom Point** and Observation Point. Mount Gil, in line with Thom Point will lead northeast, and Camp Point, open from Observation Point, will lead westward of Harbor Rock.

GRENVILLE CHANNEL TO REVILLAGIGEDO CHANNEL.—**Lowe Inlet** (H. O. Chart 1763, lat. 53°32′ N., long. 129°35′ W.), has its entrance on the northeastern side of Grenville Channel 13.5 miles from Wright Sound, and affords a good anchorage. **Tom Islet,** marked by a daybeacon, is small and wooded and lies close to the northeastern side 400 yards northwestward of Lowe Inlet. The inlet is 1.8 miles long in a northeasterly direction, widening from 400 yards at its entrance to over 600 yards inside. Two rocks, awash at high water, are nearly 200 yards from the western side at a point 800 yards within the entrance. The currents in Grenville Channel have considerable velocity past the entrance to Lowe Inlet, and allowance must be made for them in entering so as not to be set on to the points at the entrance. This is the case, especially at night when coming from westward against a strong flood current; under such conditions it is recommended to favor the southern side of Grenville Channel until the west point at the entrance to the inlet is well abaft the

beam, and then haul sharply into the entrance, favoring the eastern side. Abreast Lowe Inlet strong eddies occur on the ebb. Favor the eastern side somewhat in passing the rocks on the western side, and anchor in mid-channel nearly 1 mile within the entrance and about 0.3 mile below the entrance to Nettle Basin, in 19 to 20 fathoms, muddy bottom. Anchorage may be had in 16 fathoms, muddy bottom, in the middle of **Nettle Basin,** which forms the head of the inlet. A daybeacon marks the rock off **David Point,** on the east side of the entrance to Nettle Basin. A wharf, in ruins in 1949, is on the northwestern shore of Nettle Basin. Small vessels may obtain anchorage on **Whiting Bank,** in mid-channel, in depths of 8 to 10 fathoms, sand and shells, with **Anchor Cone Mountain** bearing 104°.

Klewnuggit Inlet (H. O. Chart 1763, lat. 53°40′ N., long. 129°44′ W.), on the east side of Grenville Channel, 0.8 mile northward of Klewnuggit Light, is 0.5 mile wide at its entrance south of **Leading Island.** The anchorage is in **Ship Anchorage,** the north arm of the inlet, on the northeast side of Leading Island in 15 to 20 fathoms, mudbottom, and is 0.2 mile wide.

Stuart Anchorage (H. O. Chart 2830, lat. 53°52′ N., long. 130°05′ W.) is on the southwest side of Grenville Channel, 5 miles eastward of **Watson Rock Light.** The anchorage is sheltered on its southeast side by **Bonwick Point,** low, wooded, and prominent. **Stag Rock,** which bares 18 feet, is 800 yards northwestward of Bonwick Point. Foul ground marked by kelp, extends 600 yards northwestward from Stag Rock, and a small patch, bare at low water, is nearly 200 yards southwestward of the rock. Anchorage will be found in 10 to 15 fathoms, rocky bottom, about 500 yards northwestward of Stag Rock, with the western extremity of **Gibson Island** in range with **Calvert Point** on **Pitt Island,** bearing 322°. In proceeding for this anchorage, especially at high water, care is necessary. It is safer in coming from eastward to pass northward of Stag Rock and approach from westward, keeping the Pitt Island shore aboard at a distance of 0.3 mile.

Note.—It is reported that the anchorage is difficult of access, offers indifferent shelter, and that the only good holding ground dries at low water.

Cardena Bay (H. O. Chart 2829, lat. 53°59′ N., long. 130°10′ W.) is an open bay on the southeast end of Kennedy Island, and is fronted by a mud bank which extends nearly 0.8 mile from shore with depths of 4 to 7 fathoms. A convenient and easily accessible anchorage in case of fog, for vessels approaching Chatham Sound from southward, may be made on this bank from 0.2 to 0.5 mile from shore. Ordinarily, southeasters do not blow home.

Chalmers Anchorage (H. O. Chart 2829, lat. 54°03′ N., long. 130°16′ W.) is on the west side of Arthur Passage at the northwest end of **Elliott Island.** Anchorage may be obtained in 13 to 14 fathoms, mud bottom, midway between the entrance points.

Prince Rupert Harbor (H. O. Chart 2605, lat. 54°19′ N., long. 130°19′ W.) is entered between **Lima Point** and **Kaien Island,** 1.5 miles eastward. The City of Prince Rupert is about 5 miles within the entrance on the northwestern side of Kaien Island. The approaches to Prince Rupert Harbor are deep and available for the largest vessels at all times.

Anchorage may be obtained off Prince Rupert, in depths from 7 to 23 fathoms, and in **Casey Cove,** in depths from 8 to 10 fathoms, mud bottom. Vessels should not anchor in the vicinity of the submarine cable crossing Casey Cove as charted. Owing to the depth of water and to the poor holding ground, anchorage is poor, especially during the autumn and winter months when, during southeast gales, furious gusts of wind sweep down from the mountain sides.

Metlakatla Bay (H. O. Chart 2827, lat. 54°20′ N., long. 130°19′ W.) is between **Tsimpsean Peninsula** and the northwestern side of **Digby Island.** Anchorage may be obtained in Metlakatla Bay in 11 fathoms, mud bottom, about 600 yards northward of **Devastation Island,** with the southwestern extremity of Devastation Island in range with **Little Cridge Island,** bearing 174°, and the southern extremity of **Carr Island** in range with the flagstaff on **Mission Point,** bearing 071°. Protection is afforded from the seas but not from the southeasterly to southwesterly winds. Small craft can obtain anchorage about 800 yards eastward of Metlakatla Village, in depths of 9 fathoms. The channel leading to this anchorage is only about 180 feet wide at low water at which time the dangers on either side can be seen.

Duncan Bay (H. O. Chart 2827, lat. 54°21′ N., long. 130°29′ W.), on the northern side of **Tugwell Island,** affords anchorage in depths of 8 to 10 fathoms, mud bottom, with **Observation Point** in range with **Mount Hayes** on Kaien Island bearing 121°. Vessels should approach this anchorage with these two objects in range.

Big Bay or **Lak Hou** (H. O. Chart 2513, lat. 54°28′ N., long. 130°28′ W.) is entered between **Trenham Point** and **South Island,** about 2.8 miles northward of it. The bay affords good protection, with little swell, with winds from any direction. Anchorage may be had in 12 fathoms, mud bottom, with **Haycock Island** in range with the northeastern extremity of **South Island,** bearing 324°, and **White Cliff Island** in range with **Mount Griffin,** bearing 013°. Farther in, a good position in a depth of 9 fathoms, mud bottom, is with **Shattock Point** in range with Mount Griffin, bearing 006°, and **One-foot Rock** in range with a distant sharp peak bearing 107°.

Pearl Harbor (H. O. Chart 2513, lat. 54°30′ N., long. 130°27′ W.), about 4.5 miles southward of Port Simpson, affords good anchorage in 11 fathoms, mud bottom, near the middle of the harbor, with the northeastern extremity of the larger **Flat-top Island** bearing 017° and the northern extremity of **Mist Island** bearing 274°.

Port Simpson (H. O. Chart 2514, lat. 54°34′ N., long. 130°26′ W.), near the International Boundary and the northernmost port of British Columbia, has one of the most spacious harbors on this part of the coast. It is easy of access, has no strong tidal currents, and is well sheltered from all but westerly winds, which seldom blow. Northwesterly and southwesterly winds prevail. Port Simpson has depths of 10 to 28 fathoms, mud bottom, good holding ground, with no dangers outside the 10-fathom curve. Large vessels may obtain anchorage off Port Simpson in 14 fathoms, with **Gordon Point, Finlayson Island,** bearing 270° and the pier head in range 190° with the Methodist Church Spire. Smaller vessels may anchor closer inshore.

Refuge Bay (H. O. Chart 2830, lat. 54°03′ N., long. 130°32′ W.), entered between **Pearce Point** and **Table Point,** affords anchorage and shelter during southerly gales. Both sides of the bay and both entrance points are foul 100 to 250 yards offshore. Anchorage can be had in the middle of the bay in 14 to 16 fathoms, sand bottom, about 550 yards northeastward of **Knox Island.** During southeasterly gales heavy squalls are experienced at this anchorage, and with northerly winds a heavy swell sets in.

Qlawdzeet Anchorage (H. O. Chart 2830, lat. 54°13′ N., long. 130°46′ W.), on the northern end of **Stephens Island,** is useful for vessels seeking shelter from the strong southeasterly winds prevalent in this region; it is open to winds from the northwestward but these are usually light. Anchorage can be obtained in 12 fathoms, mud and sand bottom, with the northwestern extremity of **Avery Island** bearing 062° and **Hooper Point** bearing 306° and just open northeastward of **Trunk Island,** which is 400 yards southeastward of it.

Tidal Currents, Inside Passage through British Columbia.—*Current Tables, Pacific Coast, North America,* published annually in advance by the Coast and Geodetic Survey give the predicted times of slack water and the predicted times and velocities of strength of current—maximum velocities of flood and ebb—for each day of the year for Haro Strait (Turn Point), Active Pass, Burrard Inlet (First Narrows), and Seymour Narrows. A table of differences is given by means of which the mariner is enabled to obtain the current data at other important points along the coast. For general information regarding tidal currents see Chapter 2.

The current floods eastward through the Strait of Juan de Fuca, southeastward into Admiralty Inlet and northward through the channels into Georgia Strait. In Georgia Strait the flood from the south meets the flood from the north in the area southward of Cape Mudge. From this area the ebb sets in the reverse direction.

In the **Strait of Juan de Fuca,** the flood sets eastward and the ebb westward. From Cape Flattery to Race Rocks the tidal currents attain velocities of 2 to 4 knots, varying with the range of tide and influenced by strong winds; eastward of Race Rocks in the wider portion of the strait the velocity is considerably less. At Race Rocks and Discovery Island the velocity is 3 to 6 knots or more. Along the Vancouver Island shore the currents turn about 1½ hours earlier than on the Washington shore of the strait, and advantage is frequently taken of this by vessels having an adverse current in the strait. The current movement is complicated by a large daily inequality, and the current tables should be consulted for times and velocities. Daily predictions of the times of slack water and the times and velocities of maximum flood and ebb in the Strait of Juan de Fuca entrance are given in the *Pacific Coast Current Tables.*

In **Haro Strait** and **Boundary Pass** the flood current sets northward and the ebb in the opposite direction. The ebb current is ordinarily stronger than the flood. There is a large daily inequality in the current and for times and velocities the *Current Tables, Pacific Coast,* should be consulted. Off Discovery Island the strength of ebb may be as much as 3 to 5 knots, the strength of flood being considerably less. Off Turn Point the average strength of current is about 2½ knots but with large tides the maximum velocity is about 5 knots. In Boundary Pass, off East Point, it is about 4 knots.

In **Swanson Channel** the flood currents set westward and the ebb flows eastward through the channel with a velocity of 1 to 3 knots.

In **Active Pass** the flood current sets from Swanson Channel into Georgia Strait, and the ebb in the opposite direction. The velocity during large tides is sometimes 7 knots, and with ordinary tides it is from 3 to 5 knots. In the northern entrance there are sometimes heavy tide rips caused by a shoal of 5 to 9 fathoms and the meeting of the current with that in Georgia Strait.

In **Porlier Pass** the flood current sets northward and the ebb southward. The velocity at strength is from 4 to 9 knots.

In **Gabriola Pass** the flood sets eastward and the ebb westward. The velocity at times is from 6 to 8 knots.

In **Georgia Strait** the flood current sets northwestward until it meets the flood current from Discovery Passage between Cape Mudge and Cape Lazo at a distance from 5 to 20 miles from Cape Mudge, depending on the range of the tide and the winds. The ebb current from the meeting point sets in the reverse direction and has a greater velocity than the flood. From the southeastern end of the strait as far as Fraser River entrance, the velocity is about 2 to 3 knots; from Fraser River entrance to Sisters Rocks about 1 to 3

knots; and farther westward rarely exceeds 1 to 2 knots, except at the entrance to Discovery Passage. For times of slack and strength the *Current Tables, Pacific Coast* should be consulted.

In **Baynes Sound** the currents turn at practically the times of high and low waters. In the entrance velocities of 2 to 3 knots occur.

In **Discovery Passage** the flood current sets southeastward into Georgia Strait, and the ebb in the opposite direction. Southward of Seymour Narrows the velocity is 3 to 6 knots. Northward of Seymour Narrows the velocity is 1 to 3 knots. Between Cape Mudge and Willow Point dangerous tide rips occur during the flood (south flowing) current with a southeast wind. A number of small vessels have been lost in the tide rips at this point, and larger vessels have been endangered at such times.

The flood current sets southward through **Seymour Narrows** and Discovery Passage into Georgia Strait, and the ebb current sets in the opposite direction. The current is very strong, attaining a flood or ebb velocity of 15 knots at some of the highest tides.

At the turn of the current (slack water) there is a period of about 12 minutes when the current has little or no velocity. The predicted times of slack water and the times and velocities of strength of current for every day in the year for Seymour Narrows are included in the *Pacific Coast Current Tables.* Mariners are advised to be on hand at least ½ hour before the predicted times of slack water in case abnormal conditions cause slack water to occur early.

Caution.—With a strong flood current (south flowing) dangerous swirls and overfalls form along the south shore of Maud Island, and to a lesser degree between Maud Island and Race Point. With a strong ebb current (north flowing) more dangerous swirls and overfalls occur just northward of Ripple Rock; the danger here is increased by the narrowness of the channel.

Vessels should pass through the Narrows at or near the middle of the slack-water period, especially with the large tides and bound northward, and preferably at high-water slack, so as to take full advantage of the favorable current through Discovery Passage and Johnstone Strait.

High-powered vessels with local knowledge sometimes pass through the Narrows as much as 1½ hours before or after slack water on the large tides, and at all stages of the current at weakest neap tides. The practice, however, is dangerous, particularly on the large tides, when there is always the possibility that the actual time of slack water may differ from the predicted time, and the current may have attained a velocity much greater than had been anticipated, resulting in damage to or loss of the vessel. Such disasters have occurred, and the United States Coast Guard has ruled in such cases that a master attempting to navigate a vessel through the Narrows at other times than slack water, or nearly slack water, is guilty of unskillfulness.

Directions.—The following comments and directions are from the *Tide Tables, Pacific Coast of Canada,* issued by the Canadian Hydrographic and Map Service. The directions are given for all classes of vessels through Seymour Narrows:

North bound, with the ebb current.—Pass Race Point at a distance of 200 yards, heading directly for broken water over Ripple Rock. Pass Maud Island Light at a distance of about 100 yards, or just outside the swirl off the point steering for the northern edge of the broken water caused by Ripple Rock; then with this broken water abaft the beam on the port side, alter course gradually to starboard until in mid-channel off Puget Bluff. This bluff is about 600 yards south of the southern entrance to Plumper Bay.

Warning.—If Maud Island Light is given too wide a berth and a course is set to clear Ripple Rock, the current is on the starboard quarter, and the ship is set toward the rock; when altering the course to starboard to avoid this there is danger of being forced into the eddy near the eastern shore.

In the opinion of the Masters of the Canadian National Steamships' vessels, the rate of the tidal current has increased since Canoe Pass has been blocked; the south-going current apparently being affected more than the north-going current.

They observe that when southward bound against the current there is a decided set toward the Vancouver Island shore after the vessel has just passed Ripple Rock and is about in mid-channel between that rock and Maud Island.

When northward bound with the current, when in the vicinity of Maud Island Light, the main part of the tidal current runs diagonally across the channel in about a 316° direction toward Ripple Rock, and that although there may be a back eddy from the light by Canoe Pass, there is no decided out-shoot of current as there was formerly.

Northward bound against the flood current.—After passing Gowlland Harbour, keep to the eastward of mid-channel to avoid the heavy swirls off Race Point; round this point at a distance of about 800 yards and head for Stephenson Point, Menzies Bay, bearing 285°. As Seymour Narrows opens, course should be altered gradually to starboard until the vessel is heading up mid-channel between Maud Island and Ripple Rock, care being taken to avoid being set over toward the island. When Maud Island Light is abaft the beam, the eastern shore may be favored, as the tidal current here sets fairly through this part of the channel.

When Canoe Pass, northern side of Maud Island, opens, work into mid-channel to avoid eddying and broken water off the point 1,400 yards southward of Puget Bluff.

The tidal current is strongest off the western extreme of Maud Island. The overfall here is quite distinct. A 13-knot vessel may work up as far as Ripple Rock on any tide, but a speed of at least 17 knots is required to drive through at full strength of spring tides. It is advisable to make the turn, so as to be stemming the tidal current when the vessel is not less than 400 yards southward of Maud Island Light, where the current has least width.

The passage eastward of Ripple Rock against the south-going current is safe and easy if a vessel has sufficient power.

Southward bound with the flood current.—Vessels should keep in midchannel until Puget Bluff is abeam, then steer to pass between Ripple Rock and Maud Island, keeping this general southerly course until the northern entrance point of Gowlland Harbour, bearing about 119°, is closing with Race Point, when course should be altered to about 105°. This course should be kept until Cape Mudge is well open of Orange Point, the latter bearing about 153°, then alter course gradually southward to obtain the full benefit of the current.

The line of straight stream during the south-going current can be clearly distinguished on a calm night.

Both northward bound against the flood current, or southward bound with the flood current, vessels may use the passage westward of Ripple Rock on the weaker tides, but when the tidal currents are running with strength this passage should be avoided on account of the violent swirls and eddies extending across the fairway eastward of Stephenson Point.

Southward bound against the ebb current.—Great care is necessary when using this passage. On the big tides the area from Puget Bluff to Ripple Rock is decidedly more turbulent on the ebb than on the flood currents making steering difficult, and requiring a vessel particularly quick to answer her helm for safe passage during the second and third hours of the northgoing current.

Vessels should keep in mid-channel until abreast the point 1,400 yards southward of Puget Bluff when course should be altered to pass about 100 yards westward of Maud Island Light. This course should be strictly maintained; otherwise should the light be given too wide a berth, there is danger of being set toward Ripple Rock. There is a weak back eddy extending 300 yards from the mainland shore into the channel abreast Canoe Pass, but it is not dangerous.

The strongest current is off the light and the overfall can be clearly distinguished during the second, third, and fourth hours of the north-going current.

Warning.—Strangers are advised to wait for slack water rather than attempt passage against the ebb or north-going current. At night extreme caution is necessary even by those of intimate local knowledge.

In **Johnstone Strait** the flood current sets eastward and the ebb westward. From Chatham Point to the western end of Thurlow Islands the velocity is 2 to 4 knots, and in the vicinity of Helmcken Island the velocity is 3 to 6 knots; but in other parts of Johnstone Strait the velocity seldom exceeds 3 knots. Tide rips occur near Chatham Point and between Ripple Point and Knox Bay. Heavy tide rips occur from Ripple Shoal nearly to York Island, which, with an ebb current and westerly wind, are worst westward of Helmcken Island about abreast Salmon Bay, and at times are dangerous to boats and small craft.

Caution.—Dangerous counter-currents are said to set eastward along the south side of Helmcken Island and between Helmcken Island and Ripple Shoal near the time of ebb strength.

Predicted currents for various places in Johnstone Strait can be obtained from the differences included in the *Pacific Coast Current Tables.*

In **Broughton Strait** the flood current sets eastward and the ebb westward. The velocity is from 1 to 3 knots in the navigable channel.

In **Goletas Channel** the tidal currents have a velocity of 1 to 3 knots, but near the west entrance, in the vicinity of Nahwitti Bar, they have a velocity of 3 to 5½ knots. The flood current sets eastward.

In **Christie Passage** the tidal currents have a velocity of 1 to 3 knots; the flood sets southward.

In **Gordon (New) Channel** the tidal currents have a velocity of 2 to 4 knots; the flood sets eastward.

In **Queen Charlotte Sound,** between Pine Island and Cape Caution, the flood current is said to set eastward, with a maximum velocity of 3 knots. At Egg Island the flood current sets northward into Smith and Fitz Hugh Sounds.

In **Fitz Hugh Sound** the tidal currents have little velocity. The flood current sets northward and meets the flood current from Lama Passage near Pointer Island.

In **Lama Passage** the tidal currents have little velocity between Camp Island and Seaforth Channel, but increase somewhat as Fitz Hugh Sound is approached.

In **Seaforth Channel** the tidal currents are variable in direction and of small velocity.

In **Milbanke Sound** the flood current sets to the northward and divides near the middle of the sound, setting toward Finlayson, Mathieson, and Seaforth Channels. Its velocity is variable and seldom exceeds 1 knot in Milbanke Sound; the velocity is, however, increased within the narrower channels to a maximum of 2 or 3 knots.

In **Finlayson Channel** the flood current sets northward and has greater velocity than in Tolmie Channel. The ebb, however, has greater velocity in Tolmie Channel, and continues to run 1½ hours after slack water in Finlayson Channel. In the narrow parts of these channels both flood and ebb currents attain a velocity of 3 knots at times. In Hiekish Narrows and in the narrowest part of Tolmie Channel, 2½ miles above the south end of Sarah Island, the tidal currents have a velocity of 4 to 5 knots at times, and swirls occur.

In **Klemtu Passage** the tidal currents are reported as comparatively weak. The flood or north-going stream is but little felt, and the ebb seldom exceeds the rate of 1 knot.

In **Graham Reach** the flood current from southward meets that from Wright Sound at the entrance to Aaltanhash Inlet. The estimated maximum velocity in the channel is about 3 knots.

In **Wright Sound** the main flood current enters through Lewis Passage and sets across the sound and impinges against Camp Point, causing eddies at that point, and is then deflected toward Grenville Channel. A portion of the flood current from Whale Channel sets into McKay Reach and into Douglas Channel. On the ebb the main body of water from Wright Sound obtains an exit by Whale Channel. In the channels the estimated maximum velocity is about 3 knots.

In **Grenville Channel** the flood current from Wright Sound meets that from Chatham Sound in the vicinity of Evening Point. In the wider parts of the channel the velocity of the current is not great, in most places not exceeding 1 knot. In the narrow part of the channel from Lowe Inlet to Evening Point the flood current has an estimated maximum velocity of 2 knots and the ebb 4 knots.

In **Arthur** and **Malacca Passages** currents are greatly influenced by the discharge of the **Skeena River,** and their directions and velocities are said to be unpredictable.

The current floods with considerable velocity into **Chatham Sound** through the passages connecting it with Dixon Entrance and Hecate Strait. The combined floods set northward with small velocity in the main channel of the sound. Heavy tide rips occur at times off the entrance to Work Channel, with a strong ebb current setting from the channel.

CHAPTER 5

Dixon Entrance to Sumner Strait

Chart 8002

DIXON ENTRANCE is the southern approach from the Pacific Ocean to the inner channels of Southeastern Alaska and the northern seaward approach to those of British Columbia. It is entered between Queen Charlotte Islands on the south and Dall and Prince of Wales Islands on the north. It extends from Cape Muzon and Langara Island in a general easterly direction to the Dundas Islands, a distance of about 60 miles, with an average width of more than 30 miles; it then contracts to a width of about 8 miles between Cape Fox and Dundas Islands, and continues with this width to the mouth of Portland Inlet, a distance of 17 miles. The boundary line between Alaska and British Columbia runs through Dixon Entrance.

A depth of 37 fathoms has been found on a sharp pinnacle on **Hodgkins Seamount** in latitude 53°19′ N., longitude 135°40′ W. The seamount rises from a depth of 1,800 fathoms southwestward of the pinnacle.

Learmonth Bank lies in the fairway of the western entrance of Dixon Entrance between 8 and 18 miles northward of Langara Island and within the 100-fathom curve. The bank is about 12 miles long, northwest and southeast, and has a width of about 5 miles. The least depth is 20 fathoms, over a bottom of sand, rock, and gravel.

Winds.—In winter, northerly gales occur at times and draw down Portland Inlet and across the northeastern end of Chatham Sound, and when heaviest, render the crossing from Dundas Island to Cape Fox hazardous for all except good-powered vessels. With southwesterly gales a heavy beam sea is encountered in making the crossing.

Currents, Dixon Entrance.—The flood current, coming from westward around Langara Island, sets along the north shore of Graham Island. In the area about midway between Rose Spit and Dundas Island it divides, one part sets northward past Dundas Island and the other southward into Hecate Strait.

At Cape Muzon the flood current sets around the cape northeastward and the ebb southwestward, with a velocity of about 2½ knots at strength.

South of Cordova Bay the flood current sets eastward with a velocity of 1¼ knots, and the ebb westward at the rate of 1¾ knots at strength.

At Nunez Rocks and Cape Chacon the currents are irregular and are affected by storms. The flood generally sets eastward or northeastward. From the cape to Nichols Bay is apparently an eddy with a westerly set close to the shores. Between the cape and the rock off the cape, the current apparently always runs westerly, although not strong during the last half of the flood. North of Cape Chacon an eddy runs to the southward, close to the shore. Off the cape a current of between 2 and 3 knots has been experienced.

On the ebb the general direction of the current is to the westward. From Cape Chacon it runs in the direction of Nunez Rocks, probably forced to the southward by the current from Nichols Bay; the latter sets eastward as far as the cape and then turns southward. The current from the southern entrance of Nichols Bay runs southeastward until it meets the main current when it turns westward around Point Nunez. Westward of Nunez Rocks the ebb current is westward, but is affected by currents from inlets; there are small eddies along shore.

Between Cape Chacon and Zayas Island on the south, and Duke Island and Cape Fox on the north, the tidal currents are much confused. In bad weather the heavy and confused sea sometimes has the appearance of breakers.

The turn of the current in the neighborhood of Rose Spit coincides approximately with the times of high and low water. At times the streams run as high as 4 knots in the neighborhood of Rose Spit, which causes heavy overfalls having the appearance of shallow water in depths of 10 fathoms and upward. This vicinity should be navigated with great care; Rose Spit should be given a wide berth.

For predicted times and velocities of the current the *Current Tables, Pacific Coast,* should be consulted.

Between Dundas Island and Cape Fox the flood current sets eastward with an estimated maximum velocity at strength of about 2 knots and the ebb westward about 3 knots, and in crossing from Dundas Island to Cape Fox these currents should be kept in mind.

Directions.—Because of the numerous dangers and uncertain currents, the navigation of Dixon Entrance at night or in thick or foggy weather, is attended with some risk. In approaching from southward, the light, fog signal, and radiobeacon on Langara Island is a sufficient guide to the entrance. In approaching from westward or northwestward Forrester Island is a good landmark. The light on Cape Muzon and the light on Cape Chacon are good guides when in their vicinity, but Nunez Rocks, about 3.2 miles southwestward from Cape Chacon, should be kept in mind, as they are not marked. The unattended light on Barren Island is also a good guide when going to the eastern part of Dixon Entrance; it is advisable to set a course southeastward of the island in passing.

From 1 mile south-southeastward of Cape Muzon Light an **086°** course made good for 23.5 miles leads inside of Nunez Rocks to a position 1 mile off Cape Chacon; or, in thick weather, from 2 to 3 miles outside of Cape Muzon, a **091°** course made good for 24 miles leads 2 to 3 miles outside of Nunez Rocks to a position 4 to 5 miles south-southeastward of Cape Chacon.

Chart 8152.—Graham Island forms the southeastern side of Dixon Entrance for a distance of 50 miles from Langara Island to Hecate Strait. Its northwestern end is mountainous with **Mount Pivot,** 1,922 feet high, the most conspicuous. This mountain is 2.5 miles back from the shore and is of rounded form, somewhat detached from others; it can be seen for about 50 miles in clear weather. **Tow Hill,** about 500 feet high to the tree tops, serves as a conspicuous landmark on the northeast end of the island, rising above the low and featureless land in its vicinity. It is on the coast, and is fronted by a perpendicular cliff nearly 400 feet high, composed of columnar volcanic rocks facing the sea and sloping gradually to the southward.

Langara Island, on the south side of the western end of Dixon Entrance, is a small, irregularly shaped, densely wooded island, close off **Cape Knox,** the northwesternmost

point of Graham Island. Near the middle of the island is a succession of rounded hills of nearly uniform height, extending in an easterly direction, and attaining an elevation of 525 feet at the highest point.

Langara Light is on the northwestern point of the island. The structure is a white hexagonal concrete tower surmounted by a red circular lantern. The light is 160 feet above water and visible 19 miles, between 055° and 265°. The fog signal building is a white square building standing in front of the lighthouse. The fog signal is an air diaphone; the horn is 100 feet above the water and points 329°. A white rectangular double dwelling stands 135 yards eastward of the lighthouse. A radiobeacon is at the light.

Forrester Island, lying about 14.5 miles off the Dall Island shore, is a prominent landmark for the approach to Dixon Entrance from northwestward. The island is wooded and mountainous, the highest peak, 1,408 feet high, being located in about the center of the island. See Chapter 6 for a complete description.

Chart 8102.—Cape Muzon, the southern extremity of Dall Island, forms the northwestern headland of Dixon Entrance. It is heavily wooded and attains an elevation of 1,520 feet in a rounded peak 2 miles to the northwestward of the extremity of the cape. Off the eastern end of the cape is a group of small islands and rocks and a breaker lies 0.3 mile off the south shore of the cape. Vessels in passing should give the cape a berth of at least 1 mile.

Cape Muzon Light, shown from a small white house, is 75 feet above water and visible 8 miles. The light is obscured from 090½° to 285½°.

Chart 8145.—Point Marsh, about 13 miles northeastward of Cape Muzon, is a group of rocky islets, all of which are comparatively low and wooded, lying close to the main shore of Prince of Wales Island. Between 1 and 2 miles back of Point Marsh, the ground rises evenly to an elevation of about 1,000 feet, with several irregular knobs showing along the slope. At 3 miles northeastward of Point Marsh is a prominent, 1,100-foot, nearly bare hill, with rounded top.

Point Marsh Light, shown from a small white house 66 feet above water, is on a small islet southeastward of Point Marsh. The light is obscured on its northern side between 127½° and 265°. The area between Point Marsh and Cape Chacon is described in Chapter 6.

Cape Chacon, the southeastern point of Prince of Wales Island, is about 23 miles northeastward of Cape Muzon and is marked by Cape Chacon Light on a white wooden house, 10 feet high. The light is 50 feet above water and visible 11 miles; it is obscured from 098° to 223°.

From northeast and southwest quadrants the cape is easily recognized by three hills; the outer appears as a perfect cone; the second is slightly higher and somewhat rounded; the third has a flat top. The land to the northwestward is high and broken.

A rock, awash at extreme low tide and usually showing as a breaker, is 260 yards eastward from the cape. The pass between the rock and the cape has depths of 5 fathoms and is used by small craft. For a distance of about 0.5 mile from the cape tide rips are severe for small craft at times.

Point Nunez, the southeastern extremity of Bean Island, is about 2.7 miles south-southwestward of Cape Chacon. It has several rocky ridges, with bare bluffs 150 to 200 feet high, on the seaward face.

Nunez Rocks, about 1.4 miles 175° from Point Nunez and about 3 miles 235° from Cape Chacon, are bare at half tide and usually show as a breaker. Shoal water extends 550 yards southeastward to a 1½-fathom spot which frequently shows as a separate breaker. A 1½-fathom spot is about 400 yards northward of the rocks. The channel between Nunez Rocks and Point Nunez is clear. The rocks when passed to the southward should be given a berth of 0.8 mile.

Clarence Strait, lying eastward of Cape Chacon, is described later in this chapter.

Chart 8075.—Duke Island, on the north side of Dixon Entrance between Clarence Strait and Revillagigedo Channel, is low and heavily wooded, and shows numerous round-topped hills from 250 to 650 feet high. **Mount Lazaro** at its south end, is a solitary broad-topped mountain, 1,778 feet high, and the only part of the island visible at a distance of over 25 miles. The south and southwest sides of the island should be avoided, as rocks and reefs extend about 7 miles offshore. Dangers are marked by kelp during the summer months, but it is probable that this safeguard is lacking during the fall and winter periods. The farthest outlying dangers are Hassler Reef, West Rock, Club Rocks, Yellow Rocks, and Barren Island.

Judd Harbor, on the south shore of Duke Island, lies northward of the east end of **Kelp Island.** It offers excellent shelter with swinging room for vessels up to 175 feet in length (short scope). When entering this harbor the compass should not be relied upon due to local attraction.

The best entrance is northward of East Island since all dangers in that entrance are exposed except the 3-fathom shoal lying 1.2 miles 276° from the north point of East Island. The reef immediately south of the 3-fathom shoal bares 10 feet at low water and is generally exposed. When covered at extreme high tide it is well marked by kelp. Vessels passing not more than 500 yards north of the reef will clear the 3-fathom shoal. After passing the reef continue toward Kelp Island for at least 0.3 mile; then head for the passage between Kelp Island and Duke Island favoring the Kelp Island side. When abreast of the northeast point of Kelp Island, steer mid-channel toward the prominent point marking the west side of the entrance to Judd Harbor. When about to round into the bay give the point to eastward a fair berth due to a sunken rock 130 yards off that point. Anchor in the center of the bay in 4 fathoms, sticky mud bottom.

This anchorage may also be approached from the southward provided vessels use ranges or sextant fixes to avoid the charted dangers between Kelp and East Islands. This anchorage is used extensively by fishing vessels during fishing season and may be found congested during that period.

Anchorage on the north side of Kelp Island, while good, is not recommended for use except for those with local knowledge, due to the shallowness of the eastern entrance and the numerous reefs in the western entrance. Currents through this passage are very strong at times.

Kelp Island Anchorage, a bight in the eastern end of Kelp Island, offers fair shelter for small boats. Anchorage is in from 2 fathoms to 7 fathoms, rock and sand bottom. Piles have been driven along the south shore. For entering, see directions above for approaching Judd Harbor.

Magnetic disturbance.—Violent magnetic disturbances have been observed on **East Island,** the small island which lies 2.5 miles southward from **Duke Point,** the easternmost point of Duke Island. However, variations in excess of 8° from the normal do not extend

over 1 mile from the island on the south and east sides. Between East Island and Duke Island, the variation changes rapidly and the compass should not be relied upon. In rounding East Island great care should be used because of the off-lying rocks to the westward and the uncertain currents.

Hassler Reef is an extensive shoal area with depths of 3½ to 6 fathoms lying about 7.8 miles 260° from Mount Lazaro. The reef is covered by heavy kelp during the summer months and has deep water close-to. Very irregular bottom extends 3 miles to the southward of Hassler Reef and passage over that section is not recommended.

West Rock, 12 feet high, is 6.2 miles 227° from Mount Lazaro. A rock awash is about 100 yards west-southwestward of West Rock. A rock with 2 fathoms over it and marked by kelp is about 0.6 mile southward of West Rock.

Club Rocks, two in number, bare, 35 and 40 feet high, and surrounded by reefs and kelp, lie about 4.4 miles 173° from Mount Lazaro.

Yellow Rocks, two in number one much smaller than the other, of a yellowish color, the larger rock 25 feet high, showing some vegetation, lie about 7.3 miles 141° from Mount Lazaro. They are surrounded by kelp.

Caution.—Vessels should not go inside the line of Hassler Reef, and West Rock and Club Rocks. These waters should be navigated with great caution and every appearance of kelp should be avoided. It is quite possible that isolated pinnacle rocks may exist that show no kelp. There is deep water close to Yellow Rocks and Barren Island.

Barren Island is a bare rock 30 feet high which lies about 8.5 miles 177° from Mount Lazaro. There are other small rocks and some kelp quite near to it, but there is deep water within about 0.2 mile in all directions. The island is marked by Barren Island Light, shown from the top of a 59-foot steel tower; the light is 85 feet above the water and visible 9 miles.

West Devil Rock is a dangerous ledge in the northeastern part of Dixon Entrance, about 14.5 miles 097° from Cape Chacon, 10 miles 240° from Barren Island, and 15.5 miles 212° from Mount Lazaro. The highest part of the rock bares 10 feet at low water, and foul ground, on which the sea breaks, extends 0.3 mile southeastward from it. A 2½-fathom shoal, on which the sea breaks almost continuously in moderate weather, lies 0.5 mile 356° from the rock, and a shoal of small extent with 6 fathoms over it, lies 2.2 miles 142° from it.

East Devil Rock which bares 2 feet, is about 3.5 miles northwestward from the northeastern end of Zayas Island. The channel between this rock and **Zayas Island Reef** is apparently clear.

Chart 8102.—Celestial Reef is about 10 miles 153° from West Devil Rock. It is about 1 mile long and has three heads with 1 fathom over them, one near its north end and two near its south end. The depths over the remainder of the shoal are 10 to 20 fathoms.

Zayas Island, in the northeastern part of Dixon Entrance and about 11.5 miles southeastward of Barren Island, is wooded, flat-topped, and 298 feet high near the southern end.

McCulloch Rock is a pinnacle rock with a depth of 1 fathom over it, about 0.8 mile 274° from **Jacinto Point,** the southwestern extremity of Zayas Island. Depths of 3 to 20 fathoms are found within 1.2 miles northward and eastward of the rock.

Dundas Islands, in the northeastern part of Dixon Entrance, comprise four large islands, namely, **Dundas,** the northwesternmost and largest, **Baron, Dunira,** and **Melville.** The coasts of all of these are much indented by small creeks and bays. Dundas Island has a number of conspicuous mountains, of which **Mount Henry,** 1,523 feet high, toward

the southern end, is the highest. In the northwestern part are two conspicuous hills, the higher one having an elevation of 795 feet. **Table Hill,** flat-topped, and having a knob 680 feet high, is a conspicuous summit near the north end of the island.

Chart 8141.—Cape Fox, on the northern side of Dixon Entrance, forms the western side of Nakat Bay and the eastern point of the entrance to Revillagigedo Channel. The cape is mountainous and wooded, and wooded islets are close off its southern shore. The cape terminates in remarkable high white cliffs, with a conspicuous saddle-shaped mountain, **Harry Saddle,** 2,067 feet high, about 2 miles back. A small boat channel between Fox Island and the cape is narrow and crooked, and should not be attempted without local knowledge. A rock which bares is 400 yards 070° from the eastern tip of Fox Island.

Tree Point Light is on the northeast side of the lower end of Revillagigedo Channel, about 3.7 miles northwestward of Cape Fox. It is described later in this chapter.

Lord Islands, lying about 2.5 miles southeastward from Cape Fox, are in two groups, separated about 0.7 mile, and have a number of islands in each group, with a clear channel between and eastward of the groups. The larger islands are wooded and 100 to 200 feet high. About the Lord Islands are several bold, bare rocks. Sunken rocks and kelp fringe these islands and shoal water extends about 0.5 mile northward and northwestward of the northerly group. A reef lies 800 yards 006° from Fleece Rock. The recommended channel into Nakat Bay is to the westward of the islands and Thistle Rock, favoring the Cape Fox shore.

Lord Rock, about 10 feet high, lies about 0.7 mile southwestward from the south group of the Lord Islands. Lord Rock Light, shown from a steel tower on the rock, is 42 feet above water and visible 9 miles. A shoal of 4¾ fathoms is 0.4 mile 136° from Lord Rock Light.

Fleece Rock, about 11 feet high, is about 0.4 mile southeastward of the southern group of the Lord Islands. A pinnacle rock with a depth of 3¼ fathoms is 0.4 mile 054° from Fleece Rock.

Thistle Rock, 7 feet high, is about 0.5 mile west-northwestward of the northern group of the Lord Islands. A shoal of 5 feet is 0.4 mile from the rock. The area between this shoal and the northerly group of Lord Islands is foul. A small shoal, 100 yards in extent in a northwesterly direction, with a least depth of 3½ fathoms, is 660 yards, 063° from Thistle Rock. A ¾-fathom rocky patch is about 700 yards 238° from Thistle Rock.

Nakat Bay makes northward between Cape Fox and Tongass Island, a distance of 3 miles, with an average width of 2 miles; at its northeast end is the entrance to Nakat Inlet. The bay does not afford anchorage, but is the western approach to Port Tongass.

Boat Rock, 5 feet high and marked by a light, is close to the western shore at the entrance to Nakat Bay. Boat Rock Light, shown from a white wooden house on skeleton tower, is 46 feet above water, visible 9 miles, and is obscured from 049° to 210°.

Craig Rock, near the middle of the bay and about 0.7 mile from the west point of Tongass Island, is awash at extreme low water, with deep water all around. It breaks in a heavy sea and is not marked by kelp.

Tongass Reef, marked on the northern side by Tongass Reef Light, is on the northeast side of the bay, about 0.5 mile northwestward of Tongass Island. The light, shown from a white house on skeleton steel tower, is 40 feet above water and visible 9 miles.

Passage and **Track Rocks**, between Tongass Reef and the north point of Tongass Island, cover at three-quarters flood.

Harry Bay extends about 2 miles to the northwestward from the northwest side of Nakat Bay. It is deep and is exposed to the southeastward. **Slim Island** is close to the western shore at the entrance. A boat passage is between Slim Island and the mainland, but the island shore must be kept close aboard as the western half of the passage is foul. A shoal of 6¾ fathoms is 0.4 mile 116° from the south end of Slim Island. **Ledge Point** should be passed at 0.5 mile distance to clear rocks off the point.

Nakat Inlet extends in a northerly direction about 8 miles. The shores are steep and heavily wooded to the water's edge. The main inlet is deep and affords no anchorage except near its head. The group of small, wooded islands near the head of the inlet provides shelter for small craft. Anchorage may be had in from 8 to 13 fathoms. The inlet is clear of obstructions except near its head or close to shore. A small shoal of 4¼ fathoms is about 200 yards off the west shore and about 5.5 miles from **Surprise Point**, on the eastern side of the entrance. A rock baring 5 feet is 0.2 mile from the northern end of the largest wooded island at the head of the inlet.

Local magnetic attraction.—On the western shore of Nakat Inlet, 1.2 miles above Surprise Point, the variation was observed to be about 5° west of normal.

Nakat Harbor makes off from the southeastern part of Nakat Inlet and is separated from it by a chain of wooded islands. A **V**-shaped flume is maintained by the Nakat Packing Company for watering small boats at the ruins of the abandoned cannery on the eastern shore of the harbor eastward of Observation Rock. In the southern part of the harbor, about halfway up the arm, off a small bight having a gravel beach, anchorage and shelter may be found for vessels of moderate size in 18 fathoms. There is also anchorage in the northern arm of Nakat Harbor, but the shelter is not so good. A reef with two pinnacles which bare 3 feet is 200 yards from the western shore about 0.3 mile northward from **Simonton Point. Observation Rock**, in the middle of Nakat Harbor, is about 6 feet high, with sunken rocks extending about 250 yards southeastward and northwestward from it. A deep channel is between the rocks and the shore, but the shore must be given a berth of over 100 yards.

The best channel for entering Nakat Harbor is southeastward of the southeasternmost islet of the chain separating it from Nakat Inlet.

Excellent anchorage may be had in the southwest arm of Nakat Harbor in 18 fathoms, mud bottom, about 0.6 mile southeastward of Surprise Point. Passage to the head of this arm is obstructed by a rock baring 3 feet. The rock is in the middle of the constricted part of the arm. Small vessels should favor the west shore to avoid the rock and the extensive flats along the eastern shore. The head of the arm is used for storing fish traps. At high tide this bay is connected with the small bight about 0.7 mile northward of Tongass Reef Light by means of a narrow passage. This passage, however, is obstructed by trees and can only be navigated by small boats.

Port Tongass is a small harbor about 400 yards wide formed by the passage between Tongass Island and the mainland. **Tongass Island** is low and, except on the northeast side, has ledges and sunken rocks extending well out on all sides. There is a launch passage immediately northward of Tongass Island but this channel is tortuous and obstructed and should be used only with local knowledge. Port Tongass is sometimes used as an anchorage, but the bottom is hard, and with wind and changing tidal currents a vessel is liable to foul and drag her anchor.

The anchorage is 200 yards from the northeast shore of the harbor in about 20 fathoms, hard bottom. The flood tidal current sets northwestward through the anchorage with a velocity of about 1 knot. The anchorage may be entered by three channels, the southeastern and western entrances being described under Sitklan Passage.

The northern entrance between Tongass Reef and the mainland is the one recommended and is the best entrance for vessels approaching from westward. In approaching from westward keep the Cape Fox shore aboard at a distance of 0.4 mile on a 034° course, and pass northward of Craig Rock, and in mid-channel west and north of Tongass Reef Light which is at the northwestern entrance. A daybeacon is on the northeastern shore about 0.3 mile to the northward of Tongass Reef and 0.2 mile to the southward of **High Point.**

Sitklan Passage is a deep, narrow passage, with steep, wooded shores extending in an east-northeasterly direction between the mainland and the northwestern shores of Kanagunut and **Sitklan Islands** from Nakat Bay to Tongass Passage. It forms the southeastern and western approaches to Port Tongass. The eastern entrance of the passage from Tongass Passage is northward of **Point Mansfield.** This channel is fairly straight and is about 300 yards wide; it has depths of 16 to 36 fathoms. **Dark Point,** the turning point from Sitklan Passage into Port Tongass, has a bare rock about 5 feet high close-to. In rounding Dark Point, keep the northeast shore close aboard.

The western entrance, on the south side of Tongass Island, is obstructed by rocks and kelp, but is much used by small vessels with local knowledge. A crooked course will have to be steered in order to avoid kelp patches. Strangers should use this entrance only with small craft at one-quarter flood or better. Rocks, awash at or near low water, lie in the west entrance and local knowledge is required to enter the passage. All dangers in the passage are marked by kelp. A circular shoal with a least depth of 2¼ fathoms is about 0.4 mile westward of the west entrance. When rounding the point on the eastern end of Tongass Island, care should be exercised to clear the sunken rock of ½ fathom, 400 yards 145° from that point. Favor the eastern shore of Port Tongass which is steep-to and clear of dangers.

Lincoln Channel is the narrow passage between Kanagunut and Sitklan Islands. It is very narrow at the north entrance with a controlling depth of 8 feet in mid-channel. In the southern part of the channel about 0.2 mile northward of the island in the bight is a rock in mid-channel with a depth of ½ fathom. A shoal with a depth of 4¾ fathoms is about 0.6 mile 003° from Garnet Point. Another shoal with a depth of 1½ fathoms is about 0.5 mile 006° from **Garnet Point,** the southern extremity of Kanagunut Island.

Port Tongass village is located on the northeastern side of the channel, about 0.8 mile from the northwestern entrance. There is no post office, but mail boats stop and pick up mail.

Kanagunut Island is low and heavily wooded and is fringed along its southwest shore by rocky ledges extending 200 to 300 yards from the island. A reef about 200 yards in extent, which bares 7 feet, is about 700 yards off the southwest shore of Kanagunut Island, about 2.2 miles northwestward from Garnet Point.

Chart 8102.—Portland Channel embraces Portland Canal, Pearse Canal, and Tongass Passage. The **International Boundary** between British Columbia and Alaska, shown by a broken line on the chart, runs down the middle of Portland Channel. These waters are generally very deep from shore to shore, except at the lower end of Pearse Canal, where

there are numerous islets and rocks, sunken and awash, at varying distances off the shore. The sides of the canals are bold, mountainous, and heavily wooded. Numerous small streams empty into them on both sides, and toward the head of Portland Canal the water is nearly fresh.

There are two principal dangers in addition to the islets and rocks near the lower end of Pearse Canal. The first is a rock, bare at half tide, which lies off a bight on the east side of Pearse Canal, south of the entrance to Winter Harbor and a little eastward of mid-channel. The other danger is a rock, bare at low water, which lies about 0.2 mile off the west (Alaska) shore of Portland Canal, 2.3 miles above **River Point.**

Chart 8141.—Tongass Passage is a deep passage with steep shores between Sitklan and Wales Islands, extending from Dixon Entrance in a northwesterly direction. Off the entrance to Sitklan Passage it bends to the northeastward and, separating Wales Island from the mainland, forms the western entrance to Pearse Canal. Tongass Passage is entered between **Haystack Island,** a steep wooded islet 450 feet high, and **Island Point,** the southeastern extremity of Sitklan Island. From **Bartlett Point,** the western extremity of Wales Island, to **Point Phipp,** on the north shore of Wales Island about 1 mile northeastward of Bartlett Point, a mid-channel course will lead through deep water. A rock which covers at half tide is about 220 yards off Point Phipp.

The following shoals are in the vicinity of the small wooded islands northward of Point Phipp: A kelp patch with a least depth of 2 feet is 0.8 mile, 311° from Point Phipp; a kelp patch with a least depth of 15 feet, 0.85 mile, 305° from Point Phipp; a kelp patch with a least depth of 10 feet, 0.9 mile, 318½° from Point Phipp.

Fillmore Inlet joins Pearse Canal on the Alaska side at the southwest end of Fillmore Island, and separates that island from the mainland; it extends about 2 miles northeastward of the northern extremity of that island. The inlet is comparatively free to navigation, but there are numerous rocks and reefs close inshore. The narrow entrance beyond the group of islets at the head of this inlet leads into two consecutive basins, each of considerable size. The inlet has no value as an anchorage. A small group of islets and reefs lies on the northwestern side at its entrance.

Willard Inlet, entered from the northwestern side of Fillmore Inlet about 1.5 miles northward of **Male Point,** the southwestern extremity of Fillmore Island, is a narrow inlet extending into the mainland about 12 miles in a northwesterly direction. It is very narrow at the entrance and the tidal currents have great velocity, forming swirls that extend well out from its mouth. The times of high and low water inside the inlet are about 1 hour later than at other places in the vicinity, and the rise and fall about 2 feet less. This inlet can only be entered at slack water and has no value as an anchorage.

Edward Passage separates Fillmore Island from the mainland northward and connects Fillmore Inlet with Pearse Canal. This passage is narrow, foul, and only navigable by small craft with local knowledge.

Pearse Canal has a length of about 25 miles from Tongass Passage to its junction with Portland Canal west of Tree Point, the northern extremity of Pearse Island. The British Columbia shore is formed by **Wales** and **Pearse Islands,** and the Alaskan shore by Fillmore Island and the mainland.

The western entrance to Pearse Canal is to the southward of a group of heavily wooded islets which lie about 0.8 mile southwestward of Male Point. Deep water extends to within 100 yards of the shores of these islands. To enter from the westward, pass midway between the southernmost wooded islet which lies about 0.2 mile southeastward of Male Point, and the wooded island, 150 feet high, which lies to the southward in mid-channel, about 0.5 mile northward of the Safa Islands. **Pearse Canal Light**, shown from a white wooden house on the south point of the 150-foot island, is 16 feet above the water and visible 6 miles. The light is obscured from 148° to 236°. A rock which bares 10 feet is 1.2 miles eastward of Male Point and foul ground extends off the northern shore for 0.6 mile northeastward of this rock.

The **Safa Islands**, which are mostly wooded, lie on the southern side of the channel off the entrance to Wales Harbor.

Fillmore Island, forming the northwestern shore of Pearse Canal and separated from the mainland by Fillmore Inlet and Edward Passage, is about 5 miles in length, extending in a northeasterly direction. Off its south shore are several wooded islets; passage behind the islets is not recommended except for small craft with local knowledge.

Regina Cove indents the south shore of Fillmore Island about 2 miles from Male Point. Anchorage is available in the center of the bay in 14 fathoms, mud bottom. A small shoal of 1¾ fathoms, with deep water surrounding it, lies about 0.2 mile off the entrance to the cove, close northward of a mid-channel course through Pearse Canal.

Wales Harbor, on the British Columbia side of Pearse Canal, about 1.5 miles from Tongass Passage, affords good anchorage in 15 to 18 fathoms, soft bottom; its entrance is somewhat obstructed by islets and rocks. The usual anchorage is northward of the larger island near the head of the harbor. In entering, follow the southerly shore at a distance of about 300 yards until past the shoal in the entrance to the harbor. A rock on this shoal is reported to bare 6 feet at low water.

At the head of the harbor are three arms, the middle and largest one opening out into a basin. An island with an islet close southeastward of it nearly closes the entrances to the western and middle arms; the channel for entering them is westward of the islands, but the chart is the best guide for navigating these waters.

A large cannery is on the shore of Wales Island about 2 miles northward of Wales Harbor. Diesel oil and gasoline can be obtained by fishing vessels at this cannery. Two groups of grass-covered rocks, about 10 feet high, are about 0.5 and 0.8 mile southwestward of the cannery.

Wales Passage, on the British Columbia side of Pearse Canal opposite Edward Passage, is free from mid-channel dangers.

Winter Harbor, the entrance to which is about 1.3 miles northeastward of the northern entrance to Wales Passage, indents the northwestern shore of Pearse Island. It affords secure anchorage for small craft; the holding ground is good and there is ample swinging room in the wider part. The northern shore is bold, except where small sandspits make out at the mouths of streams. In entering, favor slightly the southern shore until past the first spit on the northern side, and then keep the northern shore close aboard when passing the bight on the south side to avoid a rock awash at high water lying about 75 yards off a small wooded islet. Ice forms in the harbor during winter, making it unsafe for small craft shelter.

Hidden Inlet, a narrow arm about 5 miles in length, extends into the mainland in a northerly direction from Pearse Canal, about 8 miles southward of its junction with Port-

land Canal. The entrance to this inlet is less than 150 yards wide, and through it the tidal currents set with a velocity of 8 to 10 knots, forming swirls that extend well into Pearse Canal. The main body of the inlet is about 3.5 miles long, varying in depth from 30 to 70 fathoms, but there is only 2½ fathoms at the entrance. It can be entered only at slack water, and is of no value as an anchorage.

The cannery on the south side of the entrance to Hidden Inlet is operated by the Nakat Packing Corporation. The cannery wharf has a face 210 feet in length at which the depths range from 27 feet at the northeastern end to 11 feet, rock bottom, at the other end. Large vessels must keep well to the eastern end of the wharf at low water to avoid grounding. A starboard landing should be made as the stern will then be in deep water. The tidal currents running out of Hidden Inlet must be guarded against on approaching the wharf. On the flood, the current sets toward the wharf, and on the ebb, it sets away from the wharf. This latter current is felt most strongly about 100 yards off and decreases toward the wharf face. There is a float inside the wharf at the northeastern end and a larger float with an airplane ramp is secured to the southwestern end.

To the northward of the main pier is a small oil wharf with a controlling depth of 8 feet at the end. Gasoline and fuel oil are available through a pipeline; lubricating oil can also be secured.

The cannery operates a general store and limited supplies can be obtained. Except during the winter months, fresh water is piped to the main wharf. A radio station is operated during the canning season. Mail boats stop at the cannery but there is no post office.

A rock with 10 feet over it, marked by a buoy, is about 0.2 mile nearly straight out from the cannery wharf and about 150 yards northeastward of the point southward of the cannery. Vessels are recommended to keep at least 300 yards off the point. Small vessels pass on either side of this rock. **Yelnu Islets** are two prominent islets on the western side of Pearse Canal, about 0.6 mile southward of the cannery. The southern islet is wooded and the northern one is grass-covered.

Chart 8053.—Portland Canal extends from its junction with Pearse Canal and **Portland Inlet** at **Tree Point** for about 57 miles in a generally northerly direction to the towns of Hyder in Alaska and Stewart in British Columbia. The channel is deep and clear and there are no dangers with the exception of a rock, bare at low water, which lies about 0.2 mile off the west (Alaska) shore, 2.3 miles above River Point.

Reef Island, close off the western shore abreast **Spit Point,** is about 9 miles above Hidden Inlet. The south end of the island is marked by a light shown from a white house. The light is 19 feet above water and visible 9 miles. It is obscured from 020½° to 197½°.

Harrison Point, high and bold, is 2.5 miles northward of Reef Island. **Dickens Point,** on the eastern shore, is 4 miles northward of Spit Point. A black rock 8 feet high is close southward of Dickens Point and a drying ledge extends a short distance from it.

Sandfly Bay, on the Alaska shore abreast Dickens Point, 14.5 miles above Hidden Inlet, is of no value as an anchorage.

Stopford Point, bold and conspicuous, is on the eastern shore about 3 miles above Dickens Point.

Halibut Bay, on the western (Alaska) shore of Portland Canal about 4 miles above Sandfly Bay, is about 1.2 miles long and 0.5 mile wide at its entrance, narrowing to 700 yards. The bay is free from hidden dangers. Its shores are generally bold, but on each side near the entrance are sandy beaches about 0.2 mile in length, with shoals extending 80

yards offshore and low, grassy land running 100 yards back. Near the head of the bay extensive flats, bare at low water, make out from the western shore nearly all the way across, leaving a narrow channel close to the east side, through which 5 feet can be carried at low water to a narrow basin with 4 to 7 fathoms, and which is suitable only for small craft.

Halibut Bay affords anchorage for vessels in the middle of the bay in 10 fathoms, a little over 0.2 mile above **Astronomical Point**, the northeast point at the entrance, and abreast a rocky point at the north end of the sand beach on the west side, where the anchorage is 450 yards wide; also 700 yards farther up abreast the north end of the sand beach on the east side, in 10 fathoms, where the anchorage is 300 yards wide.

Logan Point, on the eastern shore, is 4.5 miles northeastward of Stopford Point. **Mount Dent**, 5,057 feet high, is 3.3 miles southeastward of Logan Point.

Camp Point, on the western shore about 4.5 miles northeastward of the entrance to Halibut Bay, is wooded and precipitous.

Hattie Island is in mid-channel about 6 miles above Halibut Bay; it is about 700 yards long and has some stunted brush growing on it. Hattie Island Light, shown from a red lantern on white slatted ball on staff on the western side of the island, is 21 feet above water and visible 9 miles between 336° and 171°. **Belle Bay**, the bight eastward of Hattie Island, does not afford anchorage.

Car Point is on the eastern shore about 3 miles northwestward of Belle Bay. About midway between is **Landslip Point**, just southward of which are three conspicuous landslides.

Chart 8054.—Breezy Point, about 5 miles northward of Camp Point on the western shore, is conspicuous. **Bluff Point**, on the eastern shore 2.5 miles northward of Car Point, terminates in a high, bold cliff.

Tombstone Bay, on the west side of Portland Canal about 7.5 miles above Hattie Island, affords a temporary anchorage for small craft in 8 fathoms near the head of the bight at either end. There is a native village on the shore of the southern bight.

Maple Bay, on the east (British Columbia) side of Portland Canal 8 miles above Hattie Island, affords fair anchorage for small craft, 300 yards from the southern side, in 8 to 9 fathoms.

Turn Point, about 9.5 miles above Hattie Island, is 0.5 mile wide. The northern end is marked by a daybeacon.

Green Islets, two small, wooded islets on the eastern side about 21.5 miles above Hattie Island, are connected with the shore by a short spit which bares at low water.

Fords Cove, on the eastern shore just northward of Green Islets, is a bight in the shore affording fair shelter from southerly, but none from northerly winds. A rocky ledge extends northward from Green Islets about 75 yards, partly showing at low water. The southern part of the cove is shoal for about 175 yards from shore. A fair anchorage with sufficient swinging room may be obtained in 16 fathoms 400 yards from Green Islets and the same distance from the eastern shore. Small craft can anchor closer inshore.

Cliff Point, on the western shore about 3.3 miles above Green Islets, is marked by Cliff Point Light, shown from a small white house. The light is 36 feet above water, visible 9 miles, and is obscured from 160° to 345°.

Verdure Point, about 4.5 miles northward of Cliff Point, is conspicuous by the maple trees, when in bloom, standing on it.

Lion Point, on the east shore about 3 miles below the head of the canal, is low and wooded and has a grassy flat in front. The bight in the shore just southward of Lion Point is filled by a flat, bare at low water. The **Marmot River** flows through a valley which trends to the eastward.

There is a government landing float at **Marmot Bay,** just northward of Lion Point, with a depth of 10 feet alongside.

The Bear and Salmon Rivers at the head of Portland Canal are separated by the **Reverdy Mountains,** a bare range of from 4,000 to 5,000 feet high.

Salmon River empties on the western shore about 1.5 miles below Bear River. Extensive flats make out in a fan shape from the mouth of Salmon River, the northern portion of which extends about halfway across the canal; these flats are covered at high water and are steep-to. **Stewart Light,** 16 feet above the water, is shown from a white wooden slatted pyramid on the foreshore eastward of **Eagle Point,** the northern entrance point of Salmon River.

Bear River flows through an extensive wooded flat at the head of Portland Canal. The channels are subject to changes during freshets. The flats at the mouth uncover for 800 yards and are steep-to; it is reported that they are slowly extending.

Hyder, on the Alaskan side of the boundary, is a town and post office occupying the flats off the mouth of the Salmon River and extending up the valley. There is only a small wharf with 4 feet of water at its face. There is no fresh water on the wharf. A road along the shore connects with Stewart. There is also communication by small craft with Ketchikan and radio and telegraph facilities are available. Most of the town is practically deserted.

Stewart is a settlement and post office on the British Columbia side at the head of the canal. The Government wharf is on the western side of the canal about 0.5 mile above Hyder. It is 300 feet long and 50 feet wide; the eastern side has a depth of 30 feet at its outer end, gradually decreasing to 17 feet at its inner end; the western side is available for small boats only. There is a mooring buoy for vessels waiting to berth at the wharf. Regular passenger communication is maintained by Canadian ships with Prince Rupert and Vancouver. Stewart has a hospital. Telegraph and radio facilities are available. A seaplane float is 500 feet northward of the Government wharf. Fresh water, fuel and lubricating oil are obtainable.

Anchorage can be had in 25 to 30 fathoms near the head of the canal, 0.2 mile from the east side, 0.3 mile below Bear River Flat, and with Eagle Point, the north point at the entrance to Salmon River bearing 246°. Vessels should not go above the latter bearing, as the flat is uncovered only at low water and is very steep-to. The holding ground is good (soft mud), but the anchorage is unprotected, being exposed to northerly and southerly winds that draw through the canal.

Currents.—In the narrowest part of Pearse Canal the current has a maximum velocity of 3 to 5 knots. Elsewhere the estimated maximum velocity is 2 knots on the flood and 3 knots on the ebb, diminishing toward the head of Portland Canal. See *Current Tables, Pacific Coast* for predicted times and velocities of current.

Directions for Pearse and Portland Canals are given in Chapter 3.

Chart 8102.—Revillagigedo Channel and Tongass Narrows are connecting bodies of water which have a combined length of about 53 miles from their junction with Dixon Entrance at Tree Point Light to their junction with Clarence Strait at Guard Islands

Light. On their southern side they connect with Clarence Strait through Felice Strait and Nichols Passage. **Revillagigedo Island,** which is separated from the mainland by Behm Canal, forms the greater part of the northern shore of the passages.

Revillagigedo Channel extends in a general northwesterly direction from Dixon Entrance for a distance of 40 miles to Tongass Narrows (Chart 8094), the latter being a continuation of the channel, for a distance of 13 miles to Guard Islands. The greater part of these waters has been examined by means of a wire drag, and the dangers are shown on the charts. From its entrance to Bold Island, Revillagigedo Channel is broad and comparatively free from dangers; the rocks lying nearest the tracks of vessels show out of water and are readily distinguished. Above Bold Island, the channel is narrow in places, but the principal dangers are marked by buoys or lights so that in clear weather no difficulty should be experienced in passing through.

Weather.—See the climatological table for Ketchikan in the Appendix.

Currents, Revillagigedo Channel.—Eastward of Duke Island the average velocity of the tidal current at strength of flood or ebb is about ½ knot. A set across the channel is sometimes experienced in the vicinity of Twin Island. Observations taken in mid-channel between Bold Island and Reef Point indicate that the current at that location sets northwestward most of the time with a velocity varying from 0 to 1 knot.

Currents, Tongass Narrows.—The tidal current is weak. There is evidence of a weak northwesterly nontidal drift. Currents of any appreciable velocity are due to winds.

For predicted times and velocities consult the *Current Tables, Pacific Coast.*

Chart 8075.—Boat Harbor, about 2.5 miles northwest of Cape Fox, is a small cove forming a poor shelter for boats. It is badly exposed to southwestward. There are two small wooded islets at the entrance and the best passage for small boats is between these islets. There is a rock which bares 5 feet at low water near the middle of the north entrance.

Tree Point is low and timbered. The shore is rocky and steep-to. From Cape Fox to Tree Point, the shoreline is very irregular and is studded with many wooded islets and bare rocks. Because of the irregular bottom and inshore dangers this section of the coast should be given a berth of not less than 0.5 mile. The small bight at Tree Point is used by the Coast Guard tenders in landing supplies in smooth weather, but affords no shelter from southerly seas. **Humpy Point** is 1 mile northward of Tree Point.

Tree Point Light, shown from a white square tower on a white octagonal building with a brown roof, is 86 feet above water and visible 15 miles. The light is obscured from 158° to 318°. The fog signal is sounded on a two-tone air diaphone. A radiobeacon of intermediate power is at the light. The fog signal and radiobeacon are synchronized for distance finding.

Foggy Point, about 7.5 miles northward of Tree Point, is a low, rocky, wooded peninsula.

From Tree Point to Foggy Point the coast is clear of dangers except close to the shore. A reef, awash at low water, is about 1,200 yards northwestward of Foggy Point. Other kelp-marked rocks with 1½ to 2 fathoms over them are southeastward of this rock.

Local magnetic disturbance.—There is a slight westerly deviation of the magnetic needle along this portion of the coast due to the local field at East Island. No variation in excess of 4° from the normal has been observed in this locality.

De Long Islands are a group of several low, wooded islets lying between 2 and 3 miles northwestward of Foggy Point. Between them and the mainland the bottom is exceedingly foul. Foul ground extends 0.7 mile southeastward of these islands.

Kirk Point, about 4.5 miles north-northwestward of Foggy Point, is a low, wooded peninsula. A kelp-marked reef, bare at low water, is about 550 yards westward of the point. Heavy tide rips have been experienced during a southwest blow in the vicinity of Kirk Point.

Foggy Bay is a wide indentation in the shore between Foggy Point and Kirk Point. It is nearly divided into two parts by the De Long Islands and the foul ground extending inshore from them. The northwestern part of the bay is foul and seldom used.

The southern part of the bay is used considerably by fishing boats and, in its southeast and eastern ends, affords safe anchorage for small craft. Large vessels can obtain temporary shelter from southerly storms in the southeastern part of the bay but the water is deep and the bottom lumpy. Great caution must be exercised in entering in order to clear the dangers which extend 0.6 mile northward from Foggy Point, and also to give sufficient clearance to the sunken rocks and reefs which extend 0.6 mile southward from the De Long Islands. As practically all of the dangers are covered at high tide, it is recommended that this bay be entered at low tide when the reefs are visible. Fresh water may be obtained from a pipeline at the head of the bight at the southeast corner of the bay.

Excellent anchorage for small craft can be had in the eastern head of Foggy Bay behind a large wooded island close to shore, about 1 mile southward of the entrance to Very Inlet. The northern entrance should be used as the southern opening bares at half tide.

Very Inlet, the entrance to which is on the eastern side of Foggy Bay 2 miles northward of Foggy Point, is a narrow arm extending about 3 miles in a northeasterly direction. About 1.5 miles within the entrance a branch extends about 2.5 miles in a southeasterly direction. This branch is very narrow for about 1 mile and then expands into a basin in which there is considerable foul ground and a number of small islets. The ebb current flows over the rapids in the narrowest part of this branch for about 2 hours after low water. The passage has been made by a small vessel drawing 8 feet, but it should only be attempted at high-water slack. In entering, pass eastward of the ledge just within the opening.

At the head of Very Inlet is a small basin about 0.8 mile in diameter much used by fishing boats. A branch, which can only be entered safely at high-water slack, extends in a southeasterly direction for 1.5 miles from the head of Very Inlet. The entrance is very narrow and in the narrows bares at low water.

The entrance to Very Inlet is between a reef awash at high tide and a low wooded island. It is usually discernible during the ebb by a strong current running out of the inlet. Favor the island shore in entering and keep in mid-channel as far as the entrance to the first arm. Then pass midway between a large, wooded, round islet and a small, grass-covered one westward of it. Just before entering the narrows, pass westward of all islets, favoring the main shore slightly; then keep in mid-channel. Tide rips have been experienced about 0.5 mile southwestward from the entrance to Very Inlet.

House Rock, 0.3 mile 330° from Kirk Point, is a small, bare rock 16 feet high.

Black Rock, 2.1 miles 312° from Kirk Point, is a small, bare rock 26 feet high, surrounded by kelp. It is marked on its highest point by Black Rock Light on a white cylindrical house on a pyramidal skeleton tower. The light is 55 feet above water and visible 9 miles.

Snail Rock, about 0.6 mile north-northeastward of Black Rock, is a grass-topped rock 28 feet high.

Between Black and Snail Rocks are numerous rocks, sunken and awash, and the area should be avoided. A kelp patch having a least depth of 1½ fathoms is 0.5 mile 106° from Snail Rock.

White Reef is an extensive white, shell-covered reef, mostly covered at high water, which lies between 2 and 3 miles north-northeastward of Black Rock on the southeastern side of the entrance to Boca de Quadra.

Kah Shakes Cove, a bight about 1.5 miles southeastward of the entrance to Boca de Quadra, is a good anchorage for small craft. A rocky shoal of only 1 fathom lies 175 yards from the easterly shore eastward of the center of the cove. Care must be exercised in entering the bight leading to Kah Shakes Cove. The southern entrance to this bight is marked by the most westerly wooded island lying on the east side of the channel eastward of White Reef and Snail Rock. On the north side of the northern entrance to the bight is a 2-fathom shoal, marked by kelp and lying 0.5 mile 011° from the western point of the wooded island. A rock which bares at low water lies 250 yards 035° from the eastern end of the wooded island.

To enter the bight and approach its head, pass to northward of the above mentioned wooded island, keeping the island at a distance of from 400 to 600 yards. The entrance to Kah Shakes Cove lies between rocky islets and is about 100 feet wide. There is about 12 feet of water through the entrance at low water. There is excellent holding bottom (sticky mud) and there are mooring piles in the cove.

Bullhead Cove, about 0.5 mile northward of Kah Shakes Cove, affords anchorage. When entering, favor the south shore to avoid the ¾-fathom spot just outside the entrance. There is good holding bottom (sand and mud) and moring piles have been driven in the cove. The inner portion is nearly all bare at low water and is used principally for storing floating salmon traps.

Fair protection for vessels too large to enter either Kah Shakes Cove or Bullhead Cove may be secured in the bight between those coves. The outer portion of this bight is rough in heavy southerly weather so that vessels should anchor as near the head as their drafts permit. The bottom is sandy.

Kah Shakes Point, on the south side of the entrance to Boca de Quadra, is the termination of a low, broad, wooded peninsula extending northeastward for about 1.5 miles, whence the ground rises abruptly to an elevation of 1,745 feet. This elevation is the western point of a distinctive ridge running parallel to Boca de Quadra. The ridge has five distinct small peaks when viewed from the southward along the coast; from other directions it shows from one to four tops. The highest point on the ridge, **South Quadra Mountain,** is 2,005 feet.

Boca de Quadra is described later in this chapter.

Duke Island and the rocks to southward have been previously described.

Ray Anchorage, a bight in the northeast side of Duke Island, affords shelter from southerly winds, but the bottom is hard and the anchorage is open northward. Anchor about midway between the rocky islet in the entrance to Morse Cove and the point about 0.6 mile eastward, with the islet bearing 277° in 10 to 15 fathoms, rocky and hard sandy bottom. There is deeper water nearer the islet.

A shoal of 3¼ fathoms is in the southern part of the anchorage about 1 mile 343° from **Duke Hill.** Another shoal of 2¼ fathoms in the northern part of the anchorage is

about 1.6 miles 161° from **Flag Point,** which is the point about 3 miles north-northwestward of Duke Point, the eastern extremity of Duke Island.

Morse Cove has its entrance at the southwest end of Ray Anchorage. It is a landlocked harbor with depths varying from 20 fathoms at its northeast end to 5 fathoms at its southwest end, mud bottom, but its entrance is very narrow and has a rock which bares 10 feet in the narrowest part, on the southeast side of mid-channel. The channel on the northwest side of the rock is about 75 feet wide. Small craft with local knowledge can enter, but preferably at low tide. The entrance channel from Ray Anchorage is on the southeast side of the rocky islet in its entrance. A rock, bare at low water, is midway between the islet and the western shore.

Reef Harbor is the indentation between **Duck Islands** and associated reefs on the east, and the shore of Duke Island southward of **Grave Point,** the northern extremity of the island. It is about 0.8 mile long and about 0.2 mile wide, has prevailing depths of 23 to 25 fathoms, rock and sand, but the swinging room is scant for the scope of chain required by this depth. Small craft may secure some protection from southerly weather by anchoring as close as size permits in the lee of Flag Point. Very small craft may use the wide portion of the passage between the two longest of the Duck Island group, but this anchorage is not secure in southerly weather.

Pond Bay is described with Felice Strait later in this chapter.

Little Rock and **Whale Rock** are the extremities of a chain of rocks about 1 mile in length which lie 2 miles northeastward of Grave Point. Their elevations above high water are 7 and 25 feet, respectively.

Bird Island, about 1.5 miles west-northwestward of Whale Rock, is about 20 feet high and bare.

Cat, Fripo, and **Lane Islands** are low and densely wooded. The greatest elevation of Cat Island is 190 feet. All of the islands are surrounded by ledges extending from 100 to 200 yards from shore. Small craft sometimes anchor off the middle of the west side of Cat Island, but there is little shelter.

Danger Passage, between Cat and Mary Islands, has a least width of about 350 yards between the 3-fathom curves and is suitable only for small craft.

Mary Island is about 4 miles long, 2.2 miles wide, comparatively low, and densely wooded near the shores.

Mary Island Light is on the northeast side of the island. The structure is a white square tower with black lantern on a white building. The light is 76 feet above the water and visible 14 miles. A narrow red sector covers Twin Islands northwestward. The light is not visible over the land between the bearings 344° and 149°. The fog signal is an air diaphone. The radiobeacon has been synchronized with the sound signal for distance finding.

Mary Island Anchorage is a bight in the north end of Mary Island between **Point Winslow** and Giant Point. It is a contracted anchorage with fair shelter from southeast and southwest winds, but more room and better protection can be had in Custom House Cove (see Felice Strait). Ledges with kelp extend about 150 yards northward of Point Winslow and Giant Point, and the entire south side of the anchorage is shoal for 150 yards beyond the projections of the shore. The approach is clear. Anchor in 12 to 15 fathoms, hard sandy bottom, with Point Winslow bearing 108°, distant 350 yards.

Twin Islands, 1.8 miles northwestward of Mary Island, are low and wooded, with deep water close-to in all directions, except a rock with 4 feet over it which lies 250 yards northwestward of the northwest island.

Felice Strait is described later in this chapter.

Boca de Quadra, having its entrance on the east side of Revillagigedo Channel between Kah Shakes Point and **Quadra Point,** eastward of Slate Islands and about 6 miles eastward of Mary Island Light, extends northward for 32 miles, with a uniform width of about 0.8 mile, and general depths of 60 to 200 fathoms, to the flat which extends 0.8 mile from its head. The sides are steep-to and densely wooded, and there are no outlying dangers.

Tidal currents have an estimated maximum velocity of about 1½ knots at the entrance to Boca de Quadra, diminishing toward the head.

Directions.—Enter Boca de Quadra between White Reef and Slate Islands, heading about midway between Kah Shakes Point and Quadra Point, on any course between **086°** and **097°**. Thence follow mid-channel courses, passing on either side of Kite Island, but preferably northward of it.

Orca Point is on the eastern side of the inlet about 6 miles from the entrance.

Weasel Cove indents the northern shore about 7 miles from Kah Shakes Point. It affords anchorage about 0.5 mile above the eastern point at the entrance in 17 to 19 fathoms. The entrance and anchorage are clear, but vessels must keep clear of the flat which extends 700 yards from its head.

Badger Bay, separated from Weasel Cove by a promontory 0.3 mile wide, has 25 to 30 fathoms throughout its length, and there is a small flat at its head. It extends in a northerly direction for 3 miles with a uniform width of about 275 yards.

Kestrel Island, a small rocky islet close to shore, is about 0.6 mile southward of Orca Point.

Kite Island, low and wooded, is in the middle of the inlet about 2.5 miles southeastward of Orca Point. A shoal with a least depth of 4¼ fathoms is 270 yards, 189° from the south end of Kite Island.

Vixen Bay, having its entrance south of Kite Island, affords anchorage at its head about 2 miles from its entrance. The main channel in entering is west of **Gannet Island. Raven Island** is close to the east shore, 1.3 miles from Gannet Island. There is a rock which bares 2 feet 270 yards, 283° from the north end of Raven Island. Southward of and near Raven Island are three rocks, visible at half tide, the outer one 250 yards from the island. About 650 yards, 195° from the south end of Raven Island, which is about 350 yards from the outer half-tide rock, is a rock with 2 feet over it and 7 to 20 fathoms close-to, and deep channels 200 yards wide, between it and the half-tide rock and between it and the western shore. A 3¼-fathom shoal, not marked by kelp, is 530 yards 209° from the south end of Raven Island.

The anchorage is between the rocks off Raven Island and **Gosling Island,** which is at the head of the bay. A ledge extends 175 yards northwestward from the north end of Gosling Island.

A mid-channel course leads clear until approaching Raven Island; then favor the western shore, and if the half-tide rocks are visible leave them 100 yards on the port hand on a **142°** course, and then keep the eastern shore aboard distant 250 yards. Anchor with the north end of Gosling Island bearing 171°, distant 0.2 mile, in 15 fathoms, bottom sand and broken shells. If the half-tide rocks are covered, after passing Raven Island keep

the western shore aboard distant 140 yards, until the north end of Gosling Island bears 142°, when the sunken rock will be passed and the course can be changed eastward to the anchorage as above. The latter course is recommended as the west shore is free of danger.

Chart 8053.—Mink Bay enters the south side of Boca de Quadra about 2 miles eastward of Kite Island, and has depths of 75 to 30 fathoms until near its head. **Cygnet Island,** low and wooded, is on the western side of the entrance. There is a 16-foot shoal about 100 yards 205° from the south end of Cygnet Island. A shoal spot of 5½ fathoms is located about 230 yards 000° from Grouse Rock; and another shoal with 2¾ fathoms over it about 100 yards, 205° from the south end of Cygnet Island. The narrow passage on the western side of the island is frequently used by small craft. **Grouse Rock,** bare at all stages of the tide, is 0.2 mile southeastward of Cygnet Island; deep water surrounds the rock. On the western side of Mink Bay anchorage may be found off the old cannery location between Grouse Rock and Cygnet Island in 8 fathoms.

Humpback Creek enters from eastward about 0.5 mile from the head of Mink Bay and carries a flat halfway across the channel. Above the flat is a secure anchorage, 0.3 mile wide, in 10 to 15 fathoms. A flat extends 700 yards from the head of the bay.

Hugh Smith Lake empties through **Sockeye Creek** into the inlet about 0.5 mile northward of the entrance to Mink Bay. A trail leads from the inlet along Sockeye Creek to Hugh Smith Lake.

Marten Arm has its entrance about 1.5 miles northward of the entrance to Mink Bay. It is 0.5 mile wide and 6 miles long, with depths of 70 to 100 fathoms until near the flat which extends 0.7 mile from the head. The arm is clear but has no anchorage.

Chart 8075.—Slate Islands, on the northwest side of the entrance to Boca de Quadra, are a group of four low, wooded islands with numerous intervening rocks. The three northwestern islands are nearly connected at low water. Slate Islands Light, on the south end of the southernmost island of the group, is shown from a white, wooden house, 33 feet above water, visible 9 miles. The light is obscured from 124½° to 252°.

From Slate Islands on the northwest side of the entrance to Boca de Quadra, the coast extends northward for about 6.5 miles to Point Sykes. This shore is fringed by a number of islets and rocks. A cove about 1.2 miles southward of Point Sykes offers some protection to small craft in moderate weather but is not sufficiently sheltered for use in heavy weather. The best anchorage is in the lee of the point on the south side of the cove in 8 to 10 fathoms, rock and sand bottom.

Behm Canal is described later in this chapter.

Twin Islands have been previously described.

Lucky Cove is a small indentation in the southwestern shore of Revillagigedo Island midway between Point Alava and Cone Island.

Hog Rocks are the easternmost of a chain of islands, rocks, and reefs which extend nearly 4 miles in an easterly direction from the shore of Annette Island. There are two principal groups of rocks about 1 mile apart, showing about 6 feet at high water, the easternmost of which is marked by Hog Rocks Light, shown from a white, square, truncated, concrete pyramid; the light is 23 feet above water and visible 9 miles. A ledge with 14 feet near its end extends 600 yards eastward from the light. There is good water between the two groups of rocks, and between the inner group and **Walker Island.** Small craft

can pass between Walker Island and **Lewis Island**, or between Lewis Island and Ham Island, by avoiding the rocks shown on the chart.

Ham Island, about 5.5 miles northwestward of the north end of Mary Island, is low, and densely wooded. There is a deep channel along the entire northeastern side of the island at an average distance from shore of 225 yards.

Cascade Inlet is a deep and narrow body of water about 2.5 miles long, lying between Ham and Annette Islands. A rock, bare 1 foot at low water, is off the entrance 0.8 mile southward of the northern entrance point. A narrow, crooked boat passage connects the inlet at its head with Revillagigedo Channel; small craft can find fair anchorage in mid-channel in the broadest part of this passage close to the west end of Ham Island.

Hassler Harbor is a bight on the north side of Annette Island, lying southward of Bold Island. It affords excellent shelter with good holding ground for small craft in southeasterly gales. **Pow Island**, 400 yards in diameter, and 100 feet high to the tops of the trees, lies in the bight; 400 yards westward of Pow Island is a small grass-topped rock 10 feet high. The safest anchorage for vessels is 300 yards from this rock, with it and the middle of Pow Island in range. Small craft, with care, can go to the inner anchorage southward of Pow Island.

Bold Island, about 5.5 miles northwestward of Hog Rocks Light, is in mid-channel off the northeastern shore of Annette Island, between **Reef Point** and **Harbor Point.** It is about 2.5 miles long, about 350 feet high, and wooded, and has several knolls somewhat above the general level of the island. The south shore of Bold Island is steep-to and there are no off-lying rocks. Shelter for small craft may be found in the cove on the northeast side of the island offshore from the abandoned buildings of a fox farm.

Angle Point, on the southern side of Bold Island, is marked by Angle Point Light shown from a red house; an automatic bell signal is in operation continuously. The light is 24 feet above water and visible 9 miles. The light is obscured from 132° to 298°.

The passage northward of Bold Island is seldom used by large vessels; its examination by means of a wire drag has not been completed. **Mastic Rock**, which bares 2 feet and is marked by a daybeacon, is near the eastern end of this passage.

Round Island, about 150 feet high and wooded, is about 0.5 mile northeastward of the eastern end of Bold Island, with two wooded islets between them.

Thorne Arm, having its entrance eastward of Bold Island and westward of Cone Island, is about 11 miles long and 1 mile wide at the entrance, opening out at the head to a width of 3 miles. Its general direction is north-northeast, curving gradually to north. The arm is free from outlying dangers. **Cone Island** is dome-shaped and 435 feet high off **Cone Point.** A rock, with 2¾ fathoms over it and surrounded by much deeper water, is 0.5 mile southwestward of Cone Island. There are a number of small wooded islands off the western shore of Thorne Arm near the head. At the head of the cove eastward of **Mop Point** is a somewhat contracted anchorage in 18 to 20 fathoms, hard bottom. Anchorage can also be selected in the bight on the west side at the head between **Snipe Island** and Mop Point in 25 to 30 fathoms, soft bottom. Small craft may find shelter in the small cove northwest of Snipe Island, between it and the adjoining small island. A mid-channel course leads safely through the arm and to the anchorage. **Sealevel** is an abandoned mine on the east side at the head of Thorne Arm.

Moth Bay is a narrow indentation about 1.5 miles long on the western side of Thorne Arm just inside the entrance. In the middle of the entrance to the bay is a small wooded islet and 300 yards above it is a rock. The channel leads on either side of the islet and

north-northeastward of the rock. Small craft can find good anchorage about 0.8 mile above the rock.

Coho Cove, about 1.2 miles westward of Moth Bay and opposite the east end of Bold Island, affords fair anchorage for small craft, although the depths are great. The best channel for entering is on the east side of the islet in the entrance.

Spire Island is small, wooded, and about 150 feet high; there is a small islet to the eastward close-to. **Spire Island Reef Light,** shown from a white square, truncated, concrete pyramid, is on the north end of the reef lying about 0.2 mile northward of the island. The light is 30 feet above water and visible 8 miles. The reef covers several feet at high water.

Nichols Passage is described later in this chapter.

Chart 8102.—Carroll Inlet, having its entrance about 2 miles northwestward of Bold Island between **Mountain** and **Carroll Points,** extends northward 23 miles, with a width varying from 0.2 to 1 mile. **California Head** separates it from George Inlet.

Cutter Rocks (Chart 8075), two in number, close together and covering at ¾ flood, are on the west side of the entrance to Carroll Inlet about 0.6 mile 110° from Mountain Point; they are marked by a daybeacon. Except for foul ground, which extends 200 yards northward from the beacon, there is a clear passage between Cutter Rocks and Mountain Point. A light, shown from a steel tower on the western end of Mountain Point, is 29 feet above the water and visible 9 miles. It is obscured from 117° to 282°.

California Cove (Chart 8075), to the eastward of California Head, is a small open bight exposed to the southeastward. Depths of 40 to 53 fathoms were obtained in the middle of the cove and 27 fathoms close to the northern shore. Two small wooded islets and a rock awash are close to the western shore.

Gnat Cove is on the east side of Carroll Inlet about 6.5 miles above California Head and abreast **Hume Island.** A fair anchorage can be had in the middle of the entrance to the cove in 17 to 18 fathoms, soft bottom. Foul ground extends 250 yards from the south point at the entrance to the cove. Small craft can stand into the cove for about 0.4 mile and find a contracted anchorage near its head in 7 to 8 fathoms, hard bottom.

In the main inlet between Gnat Cove and **Island Point,** a distance of 4 miles, there are depths of 20 to 50 fathoms, and anchorage in suitable depth can be selected with the aid of the chart. At its head the inlet narrows to 0.2 mile, with depths of 27 to 35 fathoms, shoaling abruptly to the flat which extends nearly 1 mile from the head.

A mid-channel course carries safely to the flat at the head of the inlet, and also into Gnat Cove. The only place requiring more than usual caution is at a point about 2.5 miles above Gnat Cove, abreast of **Shoal Cove,** where there is a wooded islet 95 feet high in the middle of the inlet, with a spur extending 300 yards from its northeast side, and a flat extending 0.2 mile toward the islet from the mouth of a stream on the eastern side, eastward of the islet. There is a clear channel on the south and west sides of the islet.

George Inlet, joining Carroll Inlet from westward at California Head, has a length of 14 miles, a width of 0.5 to 0.8 mile, and deep water throughout. A fair anchorage can be made near the head of the inlet in the cove westward of **Bat Point** in 18 to 20 fathoms, hard bottom. A rock with a depth of about 2 feet has been reported about 75 yards west of Bat Point in the entrance to the cove. Anchorage can be made in **Tsa Cove,** northeastward of **Bull Island,** but its entrance, between Bull and **Granite Islands,** is narrow and obstructed by ledges.

A cannery of the Libby, McNeil & Libby Company is on the west side of George Inlet, about 3.5 miles above California Head. The cannery wharf has a length of 160 feet and a least depth alongside of 32 feet. Either a port or starboard landing can be made. The ebb current runs fair with the face of the wharf; the flood current sets off the wharf due to the creek which empties close-to, southward of the wharf. At times the flow from the creek is very strong. Fresh water can be obtained on the wharf. The oil wharf has a 50-foot face with a depth of 20 feet alongside.

Mahoney Bight, on the western shore of the inlet, 6 miles north of California Head, is excellent shelter for small craft. Its entrance is narrow but clear of dangers, with 10 fathoms leading into the inner bight which has depths from 5 to 20 fathoms, soft bottom. The territory maintains a mooring float in the bight.

Mid-channel courses lead safely through the inlet passing westward of **Coon Island** and Bull Island, two wooded islands lying off the western shore of the inlet. Coon Island is identified by a large white quartz outcrop showing on its southern shoreline.

Coon Cove, in the eastern shore of the inlet opposite the southern end of Coon Island, offers good anchorage in 7 fathoms, gravel bottom and the best shelter in the inlet in southeast weather. It is entered on a mid-channel course passing south of Coon Island.

Less secure anchorage can be found in **Leask Cove** and Tsa Cove near the head of the inlet. Small boats with local knowledge pass into **Salt Lagoon** at the head of the inlet but only on or near high slack water.

Mid-channel courses lead safely through George Inlet and to the anchorage westward of Bat Point. Tsa Cove is not recommended except with local knowledge. The entrance is between Bull Island on the east and south and Bat Point and Granite Island on the west and north. The channel between Bull and Granite Islands is obstructed by a long, narrow ledge in the mouth of the cove in the north end of Bull Island and which nearly closes the channel, and by another ledge in mid-channel northward of the northeast end of Bull Island. In passing these ledges Granite Island must be kept close aboard and caution is needed.

Chart 8094.—Tongass Narrows is a continuation of Revillagigedo Channel and extends for 13 miles in a northwesterly direction from that channel to Guard Islands, Clarence Strait. The main channel has been examined by means of a wire drag, and the principal dangers are marked by buoys or lights, so that in clear weather no difficulty should be experienced in passing through.

The narrows is divided at its lower end by Pennock Island, the channel to northeastward of the island being called **East Channel** locally, and the channel to the southwestward of the island **West Channel.** Both channels are good for vessels of any draft. Large vessels approaching Ketchikan from southward usually pass through West Channel, since this gives them more turning room in making a port landing at the wharves. A buoy marks the edge of a shoal making out from the south side of West Channel.

Chart 8095.—Potter Rock, nearly 0.7 mile east-southeastward of the east end of Pennock Island and 600 yards from the northern shore, is small in extent, has 2½ fathoms over it, and is marked by a lighted bell buoy on its northeast side.

Pennock Island is about 3 miles long, 0.8 mile wide, and divides the southeastern end of Tongass Narrows into two channels. It is generally wooded and has a greatest elevation of 350 feet. Several rocky patches are 250 to 400 yards from shore around the south-

east end of the island. Otherwise the south shore of the island is steep-to, and the channel is clear if the island side is favored in the narrowest part of the channel. **Tongass Narrows West Channel Light** on a small white house is on the western side of the island; it is 16 feet above water and visible 2 miles. The light is obscured from 134½° to 306°.

Radenbaugh Cove is on the east side of Pennock Island directly across the channel from Thomas Basin. Marine storage with grids and sheds is available for the purpose of storing and repairing cannery equipment with flat bottoms. There is also a small ways which will handle boats up to 40 feet in length.

Whiskey Cove is on the east side of Pennock Island directly opposite the U. S. Coast Guard station. A small marine ways in this cove will handle boats up to 50 feet in length, 12 feet beam, and 20 tons. There is also a machine shop where minor repairs can be obtained.

Pennock Reef, 600 yards westward of the west end of Pennock Island, is of small extent and bare at low water. A buoy marks its western side. Another ledge extends 200 yards westward from the northwestern extremity of Pennock Island.

California Rock is nearly in mid-channel in the passage northeastward of Pennock Island and 0.5 mile from its southeastern end. The rock is small in extent, has 1½ fathoms over it, and is marked by a lighted buoy. There is a channel on either side of the rock, but large vessels usually pass on the north side, between it and Idaho Rock.

Idaho Rock is 250 yards northward of California Rock near the north side of the passage. It has 2 fathoms over it and is marked by a lighted buoy.

Saxman is a small native settlement in the bight northward of Idaho Rock and 2 miles eastward of Ketchikan. On the point 0.4 mile westward of the settlement are the ruins of a sawmill.

Ketchikan is one of the most important cities in Alaska. It is the distributing point and center of the commercial and fishing industries of this part of Southeast Alaska. Ketchikan has oil stations, sawmills, canneries, and cold-storage plants.

The radio tower at Ketchikan is the most prominent object on approaching from the south, particularly at night. The top of the tower is marked by a red light; vertically below it are two groups of additional red lights.

A convenient anchorage will be found near the north end of the water front. Follow the wharves at a distance of 300 yards until the flashing red buoy and East Clump Light are nearly in range. Select anchorage here according to draft. There is mud bottom and good holding ground. Anchorage may be had 200 to 300 yards off the steamer wharves and off the sawmill in 8 to 20 fathoms, sandy and rocky bottom, care being exercised not to foul the cables. This anchorage is secure for all but the heaviest winter gales; the confined channel admits no sea, and the tidal currents do not exceed 1½ to 2 knots. Temporary anchorage in about 5 fathoms can be had on a rocky patch about 250 yards off the easternmost steamer dock. Before anchoring at Ketchikan, the chart should be consulted to avoid cable areas.

Thomas Basin is a small-boat harbor off the mouth of **Ketchikan Creek.** The basin has been dredged to a depth of 10 feet at mean lower low water and is protected by a breakwater 940 feet long. The entrance to the basin is 75 feet wide and is marked by two lights on pile dolphins. A buoy marks the shoal point at the end of the breakwater. Publicly-owned floats are maintained for the accommodation of small craft. The controlling depth in Thomas Basin was 10 feet in June 1951.

A flat, mostly bare at low tide, begins about 0.8 mile westward of the wharves at Ketchikan and extends along the north shore for 1.5 miles. Off **Bar Point** the flat is marked by a lighted buoy.

Daily tide predictions for Ketchikan are given in the *Tide Tables*. There is usually a direct current or eddy setting westward along the face of the wharves. For this reason practically all large vessels make a port landing, those from the southward frequently using West Channel, which is marked by a light and buoys, and making the necessary turn around the west end of Pennock Island.

There are no regular commercial towboats, salvage, or wrecking gear available in southeastern Alaska although arrangements can be made in Ketchikan to obtain this equipment from Seattle or by the employment of vessels ordinarily engaged in other types of work. The Coast Guard cutters are available for rendering assistance in case of distress.

Ketchikan is the southernmost Alaskan port of entry, and marine documents are issued. The United States Public Health Service maintains a relief station and makes quarantine inspections. Contract hospital space is available in the private hospital.

The Coast Guard maintains a repair base which is located at the southeast end of the water front. One Coast Guard cutter and several tenders are based there. Harbor regulations are administered by the Coast Guard officer designated as the Captain of the Port. Mariners are requested to report directly to him, by prompt means, defects or deficiencies in aids to navigation affecting the local area. Recommendations as to aids to navigation or their improvement may be reported to the Captain of the Port; Commandant, 17th Coast Guard District, Juneau, Alaska; or the United States Coast Guard at Washington, D. C.

Other Government agencies with offices in the Federal Office Building are Fish and Wildlife Service, Forest Service, Bureau of Public Roads, Internal Revenue, U. S. District Attorney, U. S. Marshal, U. S. Commissioner, Immigration and Naturalization Service, and Veterans Administration.

There are approximately 2 miles of developed water front along which a number of wharves have been constructed for the accommodation of deep-sea vessels. These facilities are privately owned but are open to public use upon payment of wharfage charges. Several of the wharves have depths of 30 feet or more alongside. There are numerous floats for the accommodation of small craft, one of which is publicly owned.

Provisions of all kinds, ship chandlery, and coal in considerable quantity, can be obtained. Three oil companies maintain stations on the water front, and fuel oil, Diesel oil, distillate, gasoline, and lubricating oils can be obtained. Fresh water can be obtained on most of the wharves.

A chart agency of the Coast and Geodetic Survey is in the downtown area.

There are two marine ways, the largest of which is capable of hauling out vessels up to 400 tons, 30 feet beam, and 115 feet in length. The other way can handle boats of 100 tons, 24 feet beam, and 105 feet in length. There are machine shops where minor repairs to machinery can be made. All kinds of repairs to small craft and minor repairs to large ones can be made.

Ketchikan has regular passenger, express, and freight service to Puget Sound, British Columbia, and Alaska ports and towns, by water and air. There is a mail route to Hyder and way points which carries passengers between the local ports. Another mail route goes to Port Alexander and way points. In addition to the scheduled air lines, other air services operate from Ketchikan on a charter basis.

A highway parallels the Revillagigedo shore of Tongass Narrows. It extends from the south side of Herring Bay to a point about one mile north of Knudson Cove in Clover Passage.

The Alaska Communication System maintains radio telephone connections with the States and other parts of Alaska in addition to regular telegraphic service.

East Clump, a wooded islet on the south shore nearly opposite Bar Point, is marked by East Clump Light on its eastern extremity. The light is shown from a white wooden house, is 15 feet above water, and visible 4 miles. From East Clump to Lewis Reef, shoals extend 50 to 200 yards from the south shore, but the channel is well marked with buoys and beacons.

Chart 8094.—Lewis Reef extends from the south shore at **Lewis Point** nearly one-third the distance across the channel and is bare at half tide. It is marked by Lewis Reef Light, shown from a white wooden house on concrete pier, about 200 yards off the edge of the reef. The light is 15 feet above the water.

The Sunny Point Cannery of the Nakat Packing Company is on **Charcoal Point** on the northern shore about 2 miles westward of Ketchikan. The cannery and wharf extend across the flats to deep water, the center of the channel in Tongass Narrows passing only 125 yards off the wharf. A light marks the northwestern corner of the wharf. Fresh water is available from March 1 to October 1. It is reported that tidal currents form an eddy off Charcoal Point. This has a tendency to set vessels off the wharf and caution must be exercised in coming alongside as the strength of the current is also unequal along the wharf face and may cause a vessel to swing at bow or stern. Vessels have struck the wharf on several occasions.

A cannery of the Pacific American Fisheries is about 0.3 mile westward of Charcoal Point. The wharf has a length of 70 feet and a least depth of 24 feet (1951). The cannery was not in operation in 1951.

Peninsula Point is a wooded islet joined to the north shore by a gravel spit and marked by a daybeacon.

Ward Cove is a good anchorage on the north side of Tongass Narrows, about 5 miles northwestward of Ketchikan. It is about 0.3 mile wide at the entrance and wider inside. The anchorage ground is somewhat obstructed by **Bolles Ledge,** with a least depth of 1 fathom, which lies 250 yards from the eastern shore and is marked by a buoy. **East Island,** a wooded islet at the entrance, shut out by the west side of the bay, leads westward of the ledge. From the head of the bay a flat extends about 250 yards, through which a small stream comes in from a lake nearly 1 mile back. A mid-channel course leads safely into the cove; the shores are steep, and there are no dangers other than those mentioned. Good anchorage can be had in mid-channel westward of Bolles Ledge buoy in 12 fathoms, sandy and muddy bottom. An anchorage farther out may be taken if desired in 15 to 20 fathoms, sandy bottom.

A cannery operated by the Wards Cove Packing Company is on the eastern shore 0.7 mile from the head of the cove. The face of the main wharf is 150 feet long and has a least depth of 36 feet (1951). The Salmon By-Products Company plant is also on the eastern shore, 0.2 mile from the head of the cove. The face of the wharf is 85 feet long with a least depth of 20 feet (1951).

Wacker is a post office on the new highway near the northeast corner of Ward Cove.

Westward of Ward Cove and near the north side of Tongass Narrows is a group of small islands, more or less wooded, and rocks awash, all of which are mostly surrounded by ledges. These small islands protect **Refuge Cove** from any swells which might be running in Tongass Narrows. A rock which bares at low water is just left of the center of the cove. The southern side of the cove is clear. Entrance to the cover should be made on a course of 050° with Channel Island Light directly astern. The northern end of **Cowan Island** should be passed close-to, as a reef extends southerly off the island on the north side.

Channel Island is wooded, lies nearly in mid-channel, and has a good passage on either side, but that on the south side is generally used. A ledge extends 75 yards northeastward from the island. Channel Island Light, on the western end of the island, is shown from a white wooden house on square wooden skeleton structure; it is 20 feet above water and visible 8 miles. A fog signal is sounded on an electric diaphragm horn.

Ohio Rock, with 3½ fathoms over it and marked by a lighted buoy, is 600 yards westward of Channel Island Light.

Mud Bay, on the northern side of the narrows about 1.5 miles northwestward of Ward Cove, is shallow, with flats which bare extending 100 yards or more off the shores. It is used as a winter storage place for fish traps.

A number of totem poles and a replica of an old Indian meeting house are on the eastern point of the first bight westward of Mud Bay. This small bight has in the past few years been called **Totem Bight.**

Rosa Reef makes off about 0.2 mile from a point on the south shore 1.8 miles northwestward of Channel Island, and is covered at highest tides. Rosa Reef Light, on the east end of the reef, shown from a white house on pyramidal base, is 23 feet above water and visible 9 miles. The bight southward of Rosa Reef forms an indifferent anchorage; with the close proximity of Ward Cove it is not used. The eastern part of the bight is shoal for over 0.2 mile from shore.

Pond Reef is about 0.2 mile from the north shore near the west end of Tongass Narrows. It is bare at half tide, usually surrounded by kelp during the summer months, and is marked by a lighted buoy on the south side.

Vallenar Point is low and wooded and rises in a long easy slope to the high land of Gravina Island. A rocky patch, marked by a buoy, is 700 yards northeastward of the point. Close westward of the point are two wooded islets, and westward of them are three rocks awash at highest tides; there is no safe passage inside these rocks. The outer rock, **Vallenar Rock,** has deep water close-to, but south of it there are two rocks. The outer of these two lies about 200 yards southwestward of Vallenar Rock. Small boats with local knowledge often use the passage between Vallenar Point and the small islands close-to. It has a least found depth of 2½ fathoms in the middle of the passage. It is necessary to pass between the two shoals northeastward of Vallenar Point, which can usually be identified by being awash or by the surrounding kelp.

Guard Islands, two in number and close together, about 1.5 miles northwestward of Vallenar Point and 10 miles from Ketchikan, guard the western entrance to Tongass Narrows. Guard Islands Light, on the northern island, is shown from a white square tower; the light is 74 feet above water and visible 9 miles. A fog signal is sounded on an air diaphone; the radiobeacon is synchronized with fog signal for distance finding. The radiobeacon at the light will broadcast specially upon request for the purpose of enabling vessels to calibrate their radio direction finders; see U. S. Coast Guard *Light List* for

alerting whistle signals and operational information. A 3-fathom patch is 200 yards northward of the lighthouse. A rock, showing at low water and marked by kelp, is close south-southeastward of the islands, and 0.3 mile southeastward is a large kelp patch marking a reef, small portions of which show at low water. There is a passage on each side of the reef, but the one 0.8 mile wide between it and Vallenar Rock, called **Inside Passage**, is to be preferred.

Point Higgins, on the north shore opposite Vallenar Point, is nothing more than a slight change of direction in the shoreline.

Clarence Strait is described later in this chapter.

Chart 8102.—Behm Canal borders the eastern, northern, and western sides of Revillagigedo Island; its eastern entrance between **Point Sykes** and **Point Alava**, is about 5 miles northward of Mary Island Light. The western entrance of the canal between Point Higgins and Caamano Point, is about 1 mile northward of Guard Islands Light; the distance from the eastern entrance to the western entrance through Revillagigedo Channel and Tongass Narrows, is about 30 miles; the length of the canal from entrance to entrance is about 100 miles. The main channel of the canal is exceptionally free from dangers; the survey developed no sunken rocks or ledges that cannot be easily avoided by a stranger in clear weather, but an examination by means of a wire drag has not yet been made.

Currents.—The flood current enters Behm Canal at each end and meets somewhere in the vicinity of Burroughs Bay. In general the currents are not very strong, ordinarily from 1 to 2 knots. Tide rips generally occur on the ebb at the mouths of the various tributaries. During the ebb a strong westerly set is noticed in Behm Canal at the entrance to Naha Bay. In the early summer, milky colored water extends from Burroughs Bay to the western end of Gedney Island and up into Yes Bay. This is the result of the glacial silt carried down by the rivers emptying into Burroughs Bay.

About midway between Point Sykes and **Roe Point**, off the eastern shore, is a fair anchorage for small vessels in 5 to 10 fathoms, soft bottom, in the southern part of a small bay offshore from an abandoned cannery site.

Chart 8075.—Alava Bay, on the western shore of Behm Canal, about 2.8 miles from Point Alava, is partly open to southerly weather. Depths in the main part of the western bight are 26 to 28 fathoms but fair shelter for small vessels can be found close inshore in 6 to 10 fathoms, soft bottom. Some swell but very little wind comes into the head of this arm. The entrance to the western bight is constricted by a 1½-fathom shoal in mid-channel. The shoal is marked by thick kelp. The eastern bight is clear but is too deep to afford anchorage.

In **Narrow Pass**, to the westward of **Rudyerd Island**, depths of 34 to 89 fathoms have been found. The northeast and southwest shores of Rudyerd Island are very foul and should be given a wide berth. Small craft can find anchorage protected from south and southeasterly winds in either of the narrow bights at the north end of the island. Small craft can easily tie up along the steep shore near the south end of the bight. This bight is just wide enough to allow small craft to turn around.

Chart 8078.—Smeaton Bay enters Behm Canal from eastward 10 miles above Point Sykes and eastward of the southern end of Smeaton Island; it has an average width of 0.8 mile and length of about 11.5 miles. The water in the bay is too deep for anchorage,

but on the south side at the entrance, between **Carp Island** and **Short Point,** a vessel can lie in summer in 19 fathoms, hard bottom, protected from the summer winds. Small vessels may find shelter close-in in 5 to 10 fathoms. Seven miles from the entrance the bay divides into **Wilson Arm** and **Bakewell Arm.**

Princess Bay, to the westward of **Smeaton Island,** is open and exposed to the southward. Deep water extends close to the shores, and depths in the bay are too great for anchorage. In **Short Pass,** between **Wasp Point** and Smeaton Island, depths of 11 to 96 fathoms were obtained.

Small craft can find anchorage in the small bight in the western shore about 1 mile northward of **Sharp Point,** in 15 to 20 fathoms, hard bottom. This anchorage affords good protection from south and southeasterly winds. Anchorage for small craft can be had in the bight to westward of Sharp Point, depths ranging from 5 to 20 fathoms, hard bottom. In entering favor the western shore. Very small craft can find a land-locked anchorage in the bight on the western shore, about 1.5 miles southwestward of Sharp Point in 2 fathoms, soft bottom. This bight and the entrance contain several rocks, bare at low tide, one rock lying near the center of the entrance. Enter only on a rising tide using extreme caution.

Wasp Cove is on the western shore of Behm Canal, about 3 miles northward of Smeaton Island. It affords anchorage for small craft in 5 to 10 fathoms, soft bottom, free from obstructions.

Shoalwater Pass is a narrow body of water which separates **Winstanley Island** from the mainland. The pass is divided into two separate anchorages, the northerly one being the better of the two, with depths of 5 to 20 fathoms, mud bottom. The southerly anchorage has a depth of about 30 fathoms, muddy bottom, but the entrance is obstructed by the sunken rock described below. Small craft can pass through the narrows between the anchorages at high tide. **Candle Island** is on the western side of the southern entrance to the pass. A sunken rock with about 1 fathom over it is in the middle of the southern entrance about 0.9 mile northward of Candle Island. The bar at the northern entrance has a depth of 10 to 15 feet and should not be crossed at low tide except by small craft.

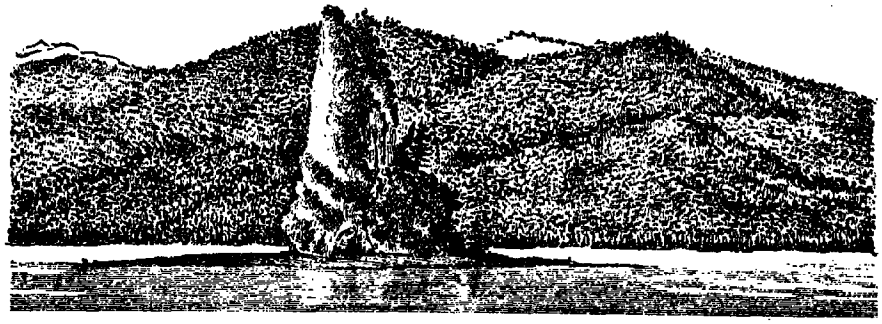
Entrance Island, which is fairly bold, may be passed on either hand in approaching the northern entrance to Shoalwater Pass. If passing north of it, keep it aboard at a distance of about 0.2 mile, taking care to avoid a group of rocks bare at low tide and surrounded by shallow water, which lie 0.8 mile to northward of the island. Pass in midchannel between the highwater islet at the north end of Winstanley Island and **Slag Point.** Then favor the mainland shore and proceed with caution until up with the wooded island on the Winstanley side of the channel. Leave this island on the starboard hand and select an anchorage south of it.

The Forest Service maintains a float landing off the mouth of **Winstanley Creek.** In 1951 the depth of water at the outer end of the float was reported to be 42 feet.

Checats Cove, on the eastern side of Behm Canal southward of **Edith Point,** affords anchorage for small vessels, protected from southerly winds, in about 8 to 10 fathoms, muddy bottom, about 100 to 200 yards northward of the southern entrance. Strangers should select an anchorage at low tide, as the flats extend for some distance and are then plainly visible. The Forest Service maintains a mooring dolphin here.

New Eddystone Rock, 20 miles above Point Sykes, is a remarkable shaft of rock 234 feet high, rising from a sand shoal in the middle of the canal, with deep water surrounding it. It may be passed on either hand, keeping it at a distance of 0.5 mile to avoid

the sand shoal. At the eastern extremity of the shoal is a small pinnacle rock which bares about 4 feet at mean lower low water.



New Eddystone Rock
(From Vancouver in 1793)

New Eddystone Islands are a group of islets and rocks, some of which cover; they extend for about 1.2 miles offshore northeastward of New Eddystone Rock. Small craft with local knowledge pass among these islands, but strangers should keep to westward of them.

Ella Creek empties into the small bight behind **Ella Point** on the western shore of Behm Canal.

Rudyerd Bay enters Behm Canal from eastward between **Point Eva** and **Point Louise,** about 23 miles above Point Sykes and 3.5 miles northeastward of New Eddystone Rock; it is about 11 miles long and has a general width of about 0.5 mile. The bay and approaches are free from dangers.

Two arms enter the bay from southward; the lower, named **Punchbowl Cove** on account of its precipitous sides, is 2 miles, and the upper about 7 miles, from the entrance. Temporary anchorage may be found close to the southern shore near the head of the Punchbowl in 25 fathoms.

Near the head of the upper arm and opposite a prominent landslide is an anchorage in 20 fathoms, hard bottom. Small craft can find temporary anchorage near the edge of the flats at the head of the bay and the head of the upper arm. Temporary anchorage may be had about 0.5 mile eastward of Point Louise and about 400 yards northward of a small, but prominent landslide, in 18 to 20 fathoms, hard bottom. The bottom is very irregular.

Sargent Bay, on the western shore of Behm Canal opposite Rudyerd Bay, is open and exposed to southward. Shoal water extends 50 to 100 yards off the points. Depths throughout the bay are too great for anchorage. **Cactus Point** is the northeastern point at the entrance to the bay. Foul ground extends from 100 to 200 yards off **Tramp Point,** the southern point at the entrance, and continues along the shore northwestward to Sargent Bay. A small boat passage is on the western side of the group of islands lying northwestward of Tramp Point. The passage is clear, but the islands should be favored to clear the foul ground along the western shore.

The channel on the western side of **Manzanita Island** is clear, but has a controlling depth of only 6 feet. This channel is used to a large extent by small fishing vessels. Mid-channel courses are good.

Manzanita Bay, on the western side of Behm Canal, westward of **Wart Point**, affords good anchorage in 20 to 23 fathoms, soft bottom. The head of the bay is filled with a flat, bare at low tide, and several rocks, bare at low tide, lie along the edge of the flat. The anchorage is in the southeastern bight of the bay. In entering, favor the eastern shore to avoid the rocks and flat previously mentioned. The Forest Service maintains a float in the small bight which lies on the left hand in entering Manzanita Bay. Depths at the outer end of the float are reported to be 8 fathoms.

The Forest Service maintains a mooring dolphin off the mouth of **Grace Creek**, 4.7 miles northward of Wart Point.

Snip Islands are off the western shore of Behm Canal, 1.2 miles northward of Grace Creek. Good anchorage for small craft can be had in the passage westward of the islands in about 15 fathoms, sandy bottom. The entrance is from northward. The southern entrance is obstructed by a bar which bares at low tide.

Walker Cove enters Behm Canal from eastward about 10 miles above Rudyerd Bay entrance and abreast Snip Islands. The cove is about 7 miles long and 0.5 mile wide and has great depths throughout except at the entrance. A summer anchorage can be made in mid-channel on the inside of the bar between **Hut** and **Ledge Points**, at the entrance in 10 to 20 fathoms; the bar has depths of 5 to 10 fathoms. A ledge extends 250 yards northwestward from Ledge Point and a rock with 1½ fathoms over it is 0.2 mile eastward of Ledge Point and 250 yards from the south shore. A rock awash at low water is about 55 yards southward of Hut Point, and a ledge extends about 90 yards offshore about 365 yards northeastward of the rock. These are the only dangers in the cove.

Channel Islands are two wooded islands about 0.6 mile off the eastern shore of Behm Canal, about midway between Walker Cove and Chickamin River. The islands may be passed on either side, but care should be taken to avoid the reef, awash at high tide, which extends about 0.2 mile southward of the islands.

Chickamin River enters Behm Canal from eastward, between **Fish** and **Trap Points**, about 5 miles above the entrance to Walker Cove. Large flats occupy nearly the whole of the bay at the mouth of the river and extend almost to the two points at the entrance from Behm Canal. The river is said to be navigable for skiffs some distance above its mouth, but it is winding, the current is strong, and the portages are numerous. Small craft can find temporary anchorage near the edge of the flat.

Portage Cove bares at low water. Depths of 3 to 8 fathoms can be found at the entrance, but these drop off quickly to deep water.

Saks Cove is on the northeast shore of Behm Canal 10 miles above the mouth of Chickamin River. The cove is about 1.5 miles long and 0.4 mile wide and affords anchorage near its north end; there are no dangers, except the small flat at the northeast corner of the cove, and a reef, bare at ¼ tide, which lies about 75 yards southeastward of **Fire Point**, the western point at the entrance.

Fitzgibbon Cove is on the northeastern shore of Behm Canal, about 1.5 miles southeastward of the entrance to Burroughs Bay. The entrance between **Dew Point** and **Hose Point** is clear. **Center Islets**, wooded, are near mid-channel, 0.4 mile inside the entrance. **Gibbs Rock**, bare and 15 feet high, is on the eastern side of the cove, 0.4 mile above Center Islets. A sunken rock with 7 feet over it is 110 yards 300° from Gibbs Rock. The cove affords good anchorage about 0.2 mile above Gibbs Rock in 11 to 13 fathoms, mud bottom.

To enter, pass in mid-channel eastward of Center Islets, and when the northern point of the islets is abeam, change course to follow the western shore at a distance of about

50 yards. When Gibbs Rock is on the starboard quarter, the sunken rock will have been passed, and vessels can proceed in mid-channel to an anchorage.

Burroughs Bay enters Behm Canal from the northeastward; it is about 5.5 miles long, 1.5 miles wide, and clear. **Unuk River** enters the head of the bay from northward and **Klahini River** from northeastward; Unuk River is said to be navigable a considerable distance for skiffs. The head of the bay and the mouths of both rivers are filled with flats. There is no secure anchorage; temporary anchorage for moderate-sized craft can be selected on the east side just southward of the flat of the Klahini River in about 30 fathoms. Small craft can anchor near the edges of the flats. The depths at the head of the bay are gradually shoaling. The Forest Service maintains a mooring dolphin here.

Burroughs Bay Light, 18 feet above water and visible 7 miles, is exhibited from a small white house on the northwestern side of the entrance to the Unuk River. The light is obscured from 048½° to 226¼°. It is maintained from April 1 to November 30.

Chart 8079.—Anchor Pass is a narrow strait about 6 miles westward of the entrance to Burroughs Bay, which separates the northeastern end of Bell Island from the mainland. There is good anchorage in the pass for small craft in the small cove just south of the restricted northern entrance in 3 to 5 fathoms, soft bottom. The northern entrance to Anchor Pass is shallow and rocky. The least depth over the shoalest reef, located in the middle of the pass at its northern end, is 1½ feet.

The estimated tidal current has a velocity of 2 to 3 knots at the northern end of the pass and flows northward from about 2 hours after low tide until 2 hours before the next low tide. From 2 hours before to 2 hours after low tide the current flows southward with a velocity of about 1 knot.

Behm Narrows, about 8 miles long and varying from 0.3 to 1.4 miles in width, separates **Bell Island** from Revillagigedo Island. The shores of the narrows are generally steep and heavily wooded. Anchorage can be had in the bight 0.5 mile southeastward of Bell Island Hot Springs in 20 fathoms, mud bottom. Care should be taken to avoid the rock and ledge at the western part of this bight.

Bell Island Hot Springs is a small health resport, with store, at the head of the cove at the southwest end of Bell Island. The float landing for small craft, maintained by the Forest Service off the end of the Bell Island Hot Springs wharf, has a depth of 42 feet at the outer end. There is a ramp for seaplanes. No fresh water is available.

Bell Island Light, on the shore back of the landing, is shown from a small, white house; the light is 35 feet above water.

Bell Arm, which separates the northwestern shore of Bell Island from the mainland, extends northeastward from Behm Canal and at its head is joined by Anchor Pass; it has good anchorage in the expansion at its head in 16 fathoms, soft bottom. The light, shown from a small white house on **Snipe Point**, is 32 feet above the water. It marks the entrance of Bell Arm and Behm Narrows. **Short Bay** and **Bailey Bay** are two small, narrow bays entering the side of northwestern Bell Arm. Short Bay, the eastern one, has good anchorage in 17 to 20 fathoms; a flat extends 300 yards from its head. Inland from Bailey Bay is an area of hot springs.

Hassler Pass and **Gedney Pass**, both broad and clear, are on the east side of Behm Canal and separate Hassler Island from Revillagigedo Island. At the head of Gedney Pass is **Shrimp Bay**, and at the head of the latter is a good anchorage in 16 fathoms, soft bottom, suitable for vessels of moderate size.

Dress Point is a broad point on the eastern side of the southern entrance to Hassler Pass. A ledge extends in a westerly direction for 200 yards from the center of the point with a depth of 4 fathoms at its outer edge. A snug anchorage for small craft is 1.5 miles northward of Dress Point on the eastern side of Hassler Pass, with depths of 5 to 17 fathoms.

Blind Pass, between **Black Island** and **Hassler Island,** is useless except as a small craft anchorage in the basin at the southwestern end of the pass. On account of rocks in this entrance local knowledge is necessary in entering the basin. The pass is closed by a sand bar just northeastward of the basin. The bar bares 3 feet at low water and is studded with small boulders up to a foot in diameter. Northeastward of the bar the water is deep, ranging from 10 to 50 fathoms.

Convenient Cove, in the southwestern end of Hassler Island between it and **Gedney Island,** is too deep for anchorage. The narrow passage eastward of the cove leading to Gedney Pass is clear except for some rocks on the northern shore and a ledge extending in a northerly direction from the easternmost islet.

Yes Bay enters Behm Canal from westward between **Bluff** and **Syble Points.** Bluff Point Light, 23 feet above the water, is shown from a small white house on the south side of the entrance of Yes Bay. The bay is about 5.5 miles long, 0.3 mile wide, and the entrance is free from dangers. Two rocks, bare at low water, are about 175 yards off the southern shore, 1.8 miles above Bluff Point. There is a cabin on the north shore opposite these rocks. A rock, bare at low water, is at the edge of the shoal water making out from the southern shore and 330 yards 143° from the site of the cannery wharf.

The ruins of a cannery are about 2.5 miles above the entrance on the northern point of the narrow passage leading to the first basin. Caution must be exercised in navigating in this area, particularly in the vicinity of the site of the wharf which stood 300 yards northward of the cannery. Broken piles are visible here at low water. Anchorage can be had about 600 yards southeastward of the cannery site in 22 fathoms, mud bottom.

A narrow channel leads southwestward of the cannery site to the first basin where good anchorage can be had in 15 to 30 fathoms, mud bottom. A good small boat anchorage in 8 fathoms is near the southeast end of this first basin. A shoal with a least depth of 1½ fathoms is about 0.8 mile above the entrance point and about 150 yards off the south shore. At the head of the first basin is a group of islands, eastward of which is a channel leading to the inner basin, where good anchorage can be had in 11 to 12 fathoms, mud bottom.

Care is required in navigating Yes Bay and strangers should do so at low water. Enter in mid-channel and then favor the northern shore to avoid the rocks, described previously, which lie off the southern shore. In entering the first basin, pass about 35 yards southward of the cannery site and keep the north shore close aboard until the basin opens up. If going to the inner basin, keep about 100 yards off the north shore until up to the group of islands which separate the two basins. Here the channel narrows to about 75 yards on account of a sunken rock with 3 feet over it, and a rock awash at low water, both of which are on the western side of the channel. In passing through this channel, keep the northeastern shore aboard at a distance of about 30 yards. The inner basin is clear.

Spacious Bay is a broad bay in the west shore of Behm Canal about 22 miles above Caamano Point. **Square Island** is in the entrance near the southern shore; the channel southward of the island is not recommended. Near its head the bottom is irregular and there is a considerable area of tidal flats with off-lying reefs and sunken rocks. Good anchor-

age can be selected in the lee of Square Island, sand and mud bottom. The bights in the northern shore are not recommended for anchorage.

Snail Point is readily identified by the distinct knoll, 308 feet high, about 0.5 mile southward of the point. On the western side of the point is a bight 0.5 mile in length which affords good anchorage for small craft. A sunken rock with ¾ fathom over it is in the middle of the bay and small craft should favor the eastern shore until clear of this rock and proceed to the head of the bay for anchorage.

Neets Bay indents the eastern shore of Behm Canal about 19 miles above Caamano Point. The bay is about 7.5 miles long and 1 mile wide, but has no good anchorage. Small craft, however, can find fair shelter in the last cove toward the head on the south side of the bay. Pass eastward of the small wooded islet and anchor east or south of it in 3 to 5 fathoms, sand bottom. The bottom is very irregular in the bay and there are several dangers, one of them being a sunken rock with ¼ fathom over it, 300 yards southwestward from the western end of **Bug Island**, which is in the middle of the entrance to the bay. Enter Neets Bay either north or south of Bug Island but south of **Clam Island.** A reported shoal extends from Clam Island to the north shore of the bay.

Bushy Point is a prominent projection on the eastern side of Behm Canal about 2 miles below Neets Bay. It is readily recognized from north and south by a series of dome-shaped hills immediately inshore from the point.

Bushy Point Cove is a small bay inside of Bushy Point. It is too deep for anchorage except for small craft which anchor close to the beach at the head of the bay.

Heckman Point, on the western shore of Behm Canal opposite Bushy Point, is prominent and readily identified by some reddish brown rock. On the western side of the point is a small bight which is used as a temporary anchorage for small craft.

Traitors Cove indents the eastern shore of Behm Canal about 15 miles above Caamano Point. An island is in the middle of the entrance. Ledges extend from this island in both southerly and northerly directions, the center of the channels on both sides being clear. About 300 yards 275° from the northern point at the entrance is a reef which bares 6 feet at low water, and which presents a real danger to craft leaving or entering the cove by the northern entrance.

The cove is 7 miles long and varies in width from 0.8 mile to about 80 yards. The strong tidal currents and rocks make navigation dangerous, and the cove should be avoided by a stranger. The upper part of the cove can be entered only by small craft at slack water, which is very short in duration, and on the flood small craft should keep away from the narrow entrance to the upper cove as there is danger of being swept through by the force of the current. There is very little time of slack water on spring tides, the current changing in direction very suddenly. The only anchorage is in the bight in the south shore of the cove about 2 miles above the entrance. Rocks are on both sides of the bight near its entrance, and a depth of 10 feet is found in mid-channel at the entrance.

Port Stewart is an indentation 3 miles long on the western side of Behm Canal, 12.5 miles northward of Caamano Point. Its southern entrance is marked by **Point Francis,** a prominent, wooded point. The northern entrance is not well defined, being low, flat country for half a mile back from the beach. Four wooded islets are across the mouth of the bay. There is a clear channel between the easternmost and southernmost islets, but there are some off-lying rocks to avoid. The best entrance is to the northward of the two middle islets. The passage between the southernmost wooded islet and the main shore is narrow, but clear, with a least depth of 5 fathoms.

Anchorage can be had in 16 fathoms, rock and mud bottom, 350 yards 315° from the northwestern point of the westernmost wooded islet. Small craft find excellent shelter in the land-locked bight in the northern shore of Port Stewart. To enter, keep the two larger islands in the center of the bay to starboard, being careful to avoid the charted, detached rocks on each hand. Pass west of the inner extensive shoal surrounding two very small islets. Head directly for a third small islet. When within a safe distance of the small islet, change course right and follow close-to that shore, avoiding the charted rocks on the left hand. When the bight opens up head into its mid-channel to anchorage in 7 fathoms, mud bottom.

The small bight on the eastern shore about 1 mile northward of **Escape Point** is too deep for anchorage, although in good weather small craft anchor in the southern end of this bight near Escape Point.

Wadding and **Raymond Coves** are indentations in the western shore of Behm Canal, opposite Naha Bay. They are useless as anchorages, and at low water there are extensive tidal flats of sand and gravel with some boulders.

Mike Point is a low, rocky point separating Wadding and Raymond Coves. The point is foul and should be given a good berth. The beach here is strewn with bleached logs and other drift, and this is also true, to a lesser extent, of all the shore northward to Point Francis.

Helm Bay, which indents the western shore of Behm Canal about 5.5 miles above Caamano Point, has a length of about 5.5 miles in a northwesterly direction, and a width at its entrance of 1.5 miles. The north entrance point is marked by **Trunk Island,** off **Helm Point,** a small, prominent island about 26 feet high and slightly wooded. The south entrance point is marked by a small bare islet about 100 yards long with a column of rock about 8 feet high standing near its center. Helm Bay Light, on a small white house, marks the outer islet on the south side of the entrance to Helm Bay; the light is 18 feet above water and visible 9 miles.

Behind **Forss Island,** on the western shore 3.3 miles in from the light, is a small cove at the head of which is a float with safe depths for small craft alongside. It is maintained by the Territory. Enter to it from the north, passing between two charted off-lying rocks.

There are some dangers, but mid-channel courses carry safely to the head of the bay. The channel leads between **Thomas Island** on the north and two wooded islands joined by a reef to southward. Pass in mid-channel northward of Forss Island and another wooded island beyond, above which the bay is comparatively clear. There is about half a mile of tidal flats at the head of the bay which drops suddenly into deep water.

Smugglers Cove is on the western side of Behm Canal, about 5 miles northward of Caamano Point. It is a fair anchorage for small craft, although local knowledge is necessary to clear the dangers. The extensive tide flats at the head of this bay are used for laying up floating fish traps.

Indian Point marks the northern entrance to Naha Bay. The country northward of the point is heavily wooded with elevations up to 2,688 feet. The shore is rocky and generally steep-to.

Naha Bay (Chart 8124), on the eastern side of Behm Canal, is about 11.5 miles northeastward of Caamano Point. **Loring** is a village on the north side near the head of the bay. Mail and passenger boats from Ketchikan make landings here, and this is the only means of communication.

The usual anchorage is just below the ruins of an old wharf about 300 yards from the shore of the village, in 19 fathoms, mud bottom. The shore in front of the village should not be approached closer than 100 yards. Small craft find anchorage in the small bay northward of **Dogfish Island** where shelter is had from any southwesterly squalls which occasionally strike home with considerable force. The bight eastward of the village is practically all dry at low water. Naha Bay and its approaches are clear. The Forest Service maintains a small float suitable for small craft at the north side of the head of the bay. The float is about 60 feet in length, parallel with the beach, and has a reported depth of 12 feet at its outer face.

Roosevelt Lagoon (Chart 8124) is a body of brackish water which is connected to Naha Bay only at extreme high water. The passage is dangerous and should not be used without local knowledge. Small barges at one time made this passage. A tramway leads from the head of the lagoon to the first lake northeastward of the lagoon.

Moser Bay (Chart 8124), an indentation in Revillagigedo Island about 1.5 miles in length, is separated from Naha Bay by **Cedar, Moser,** and **Stack Islands.** Good anchorage for small craft is found in 7 fathoms in the small bight in the northwestern part of the bay; for larger craft in 20 fathoms at the head of the bay. On the eastern side of the bay are two private homes with floats. At the head of the bay is a tidal flat about 0.5 mile long which is made use of by canneries in laying up their floating fish traps. A reef makes off southeastward of **Cod Point,** the western point at the entrance to **Long Arm.**

Clover Passage is the deep passage among the islands eastward of Betton Island leading to Naha Bay. Between the south end of Betton Island and Revillagigedo Island are **Pup** and **Clover Islands,** with a deep, clear passage between them and a channel eastward of the eastern one. Clover Passage Entrance Light, 14 feet above the water and visible 9 miles, is shown from a small white house on an islet southeastward of Pup Island and southwestward of Clover Island. The light is obscured from 101° to 227°. **Joe Island** has a deep though narrow channel on each side and is without outlying dangers. There are also deep passages between the islands northward of Grant Island. Clover Passage is frequently used by vessels going to Naha Bay from Tongass Narrows. There are few dangers and a mid-channel course carries safely. The usual route for small craft is between Pup and Clover Islands at the southeast end of Betton Island, eastward of Hump and Grant Islands, and the islands north of the latter. Grant Island Light, 17 feet above the water and visible 9 miles, is shown from a small white house about the middle of the western side of the island. **Cache Island,** the northernmost, round and wooded, and lying near the middle of Naha Bay, has deep water on all sides.

An anchorage for small craft is in **Knudson Cove,** the small bight on the southern side of Clover Passage, southeastward of Clover Island. Its entrance is marked on the western side by a daybeacon consisting of a white barrel-shaped object on a steel spindle set on a rock 50 yards off the southern entrance point. Knudson Cove Light, 10 feet above water on piles, is in the south end of the cove. Anchorage is found in 15 to 16 fathoms, mud bottom. There is less water in the middle of the entrance, there being a depth of 10 fathoms, rock bottom. A rock, awash at half tide at the head of the bight, is marked by a daybeacon. The anchorage is subject to strong williwaws. The Territory maintains a float in Knudson Cove. The depth at the outer end is reported to be 24 feet.

A highway extends along the shore of Tongass Narrows to Ketchikan.

Survey Point is at the southern end of Clover Passage. A small rocky point about 50 yards wide extends about 100 yards offshore. A rock about 30 feet high is on the southwest side of the point and a rock awash is close-to northeastward of the point.

Tatoosh Islands, westward of Betton Island, are a group of islands northward of which are numerous off-lying rocks known as **Tatoosh Rocks.** The southernmost island has deep water close to the western shore and a yellow cliff 130 feet high on this island makes a good landmark. The northwesternmost rock of Tatoosh Rocks is 14 feet high and has an off-lying reef which bares 10 feet at low water 140 yards to northwestward. The rocks are light-colored and show well in clear weather.

The passage between the southernmost Tatoosh Island and Betton Island is clear, but the northern passage is rocky, and local knowledge is necessary to navigate this area. Small craft use these waters for anchorage but there is some danger from williwaws.

Bond Bay and the smaller indentations between Bond Bay and Caamano Point Daybeacon are all used as temporary anchorages by the smaller fishing craft during the trolling season. These anchorages are exposed to southeastward and are not recommended due to the suddenness and great force with which the southeast winds strike home in this area.

A rocky shoal with a least depth of 4 fathoms is 990 yards 077° from the northern point of this bay. A rocky shoal with a depth of 1¼ fathoms is 730 yards 270° from the same point.

Caamano Point, the western point at the western entrance to Behm Canal, is a long, low point, its extremity being somewhat indefinite when abeam, due to the Bond Bay shore lying in the background and also from the fact that the light is not located on the actual point but about 0.5 mile to the westward. Caamano Point Light, 33 feet above the water and visible 9 miles, is shown from a small white house. The light is obscured from 118° to 276°.

Chart 8102.—Clarence Strait extends in a northerly direction from Dixon Entrance for 45 miles to Guard Islands and the western entrance to Tongass Narrows and Behm Canal, and thence in a northwesterly direction for 67 miles to Sumner Strait. From its south entrance to Zarembo Island, a distance of about 100 miles, the channel is broad and comparatively free from dangers, and most of it above Guard Islands has been examined by means of a wire drag. At Zarembo Island the strait divides. The channel eastward of the island, called Stikine Strait, is the route taken by vessels to Wrangell and Wrangell Narrows; that westward of the island, called Snow Passage, is used by vessels bound to Wrangell Narrows or westward through Sumner Strait as it is more direct.

Clarence Strait is described in the following order: Eastern shore to Behm Canal, western shore to Grindall Island, northward of Guard Islands, Kashevarof Passage, Snow Passage, Ernest Sound, and Stikine Strait.

Currents, Clarence Strait.—From the south entrance to the vicinity of Zarembo Island the estimated velocity of the tidal current at strength of flood or ebb is from 1 to 2 knots. The flood current sets northward through Clarence Strait, and the ebb in the opposite direction as far as Key Reef, following the general trend of the channel. At Nunez Rocks and Cape Chacon, the flood current sets northeastward around the cape and the ebb southwestward. Southward of the line of Cape Chacon the tidal currents are much confused.

In general, the currents in the strait set directly in and out during flood and ebb, except in the vicinity of the entrances to the estuaries, where a slight set across the channel may be experienced setting to or from them, especially the large ones; and along the shores of the strait where it is either slack or there is a small counter current. The most noticeable of these counter currents is at Dewey Anchorage and among the islands at Onslow Point, where it has considerable velocity, from 2 to 3 knots, and sets directly opposite in direction to the current in the strait. This counter current meets the main current at the entrance of the large bay east of Point Stanhope, and is confined to the bay and the immediate vicinity of the shore southeastward.

For directions through Clarence Strait from Tongass Narrows to Wrangell, see Chapter 3.

Chart 8075.—Sealed Passage is an approach to Felice Strait from Clarence Strait and lies between Duke Island on the east and Percy Islands and Hotspur Island on the west. On the southeast side of the southern end and extending 5 miles southwestward from **Point White**, the western extremity of Duke Island, there are numerous rocks, sunken and awash, of which Hassler Reef and the **Bee Rocks** are the outermost.

Duke Island, the rocks to southward, and Hassler Reef, 5.2 miles 215° from Point-White, have been described earlier in the chapter.

West Bee Rock, covered at half tide and with a heavy bed of kelp extending 0.5 mile northwestward of it, is about 1.4 miles 029° from Hassler Reef and 4 miles 217° from Point White.

East Bee Rock has two heads, covered at three-quarters tide, about 1.2 miles eastward of West Bee Rock. A rock with ½ fathom over it is 1.9 miles 019° from West Bee Rock.

A shoal of 1¾ fathoms is 2.8 miles 179° from Point White.

Percy Islands are a large number of low wooded islands about 3 miles in extent on the northwest side of Sealed Passage; the southernmost is 270 feet high. The passages between these islands are not navigable except for very small craft with local knowledge. Anchorage can be had either northward or westward of the southernmost island.

Sealing Reef is a double-headed rock, bare 5 feet at low water, about 1 mile 106° from the southern extremity of Percy Islands.

A pinnacle rock, not marked by kelp, on which the least found depth is 4¾ fathoms, is 1.5 miles 100° from the southern extremity of Percy Islands. The depth may be less. A group of rocks, some of which show 6 to 8 feet at high water, are 1.5 miles westward from Point White.

Hotspur Island, on the western side of Sealed Passage northeastward of Percy Islands, is heavily wooded and has a greatest elevation of 290 feet near the northern side.

Werlick Island, southward of Hotspur Island, is low and heavily wooded.

Vegas Islands, about 0.5 mile off the Duke Island shore, are 160 feet high and heavily wooded. Between them and Duke Island are several rocks.

Directions, Sealed Passage.—A **047°** course, with the north side of Vegas Islands just open of Annette Point until the south end of Werlick Island is abeam, will clear outer dangers, but passes within about 175 yards of the pinnacle rock 1.5 miles 100° from the southern extremity of Percy Islands.

Felice Strait extends from Clarence Strait to Revillagigedo Channel, between Duke, Cat, and Mary Islands on the southeast, and Annette Island on the northwest. It offers the most direct route for vessels from the southern end of Clarence Strait to the eastern arm of Behm Canal, but is little used. There are several dangers, but, with the exception of Indian Rock, those lying nearest the sailing line either show above water or are marked by buoys, and no difficulty should be experienced in making the passage through the strait in daytime and with clear weather.

Currents in Felice Strait have considerable strength. At Harris Island they have a maximum velocity of about 4 knots, diminishing rapidly at short distances away. Around Snipe Island the currents have a maximum velocity of 4 knots.

Directions, Felice Strait.—Pass 0.5 mile westward of Percy and Cow Islands and 0.2 mile westward of Harris Island Light to a position 0.2 mile north-northwestward of it. Then steer **093°**, with Snipe Island Light ahead, until Survey Point is abeam. Then steer **089°** with the lower part of Fish Island ahead, and the islets 1 mile westward of Harris Island astern, until Snipe Island Light is on the quarter and the shore northward along Annette Island opens up. This course passes close to northward of the buoys marking the northern extremities of Ajax and Wallace Reefs, and has been examined by means of a wire drag to a depth of 22 feet and is clear of dangers. When Snipe Island Light is on the quarter, follow the east shore of Annette Island about 0.3 mile off, until past Indian Rock. Thence the chart is the guide.

Point Percy, the westernmost point of Percy Islands and on the south side of the western entrance to Felice Strait, is a small island, 150 feet high, with a bold, rocky shore.

From Point Percy northeastward to Harris Island, the shore is free from dangers except close-in. Cow Island is a small, wooded island 100 feet high, northward of the Percy Island group. Northward of Cow Island are two wooded islets, 100 feet high; between the islets and Cow Island are two reefs that bare.

Harris Island is a small wooded island 90 feet high northwestward of Hotspur Island. Along the north shore of this island are considerable quantities of kelp which should be given a berth of at least 150 yards in rounding the island. Fair anchorage in 6 to 12 fathoms, sandy bottom, can be had 0.2 mile northeastward of Harris Island. Harris Island Light, shown from a small white house on the north end of the island, is 16 feet above the water and visible 9 miles. The light is obscured from 294° to 088°.

Point Davison and the western part of Annette Island are low and wooded. There are numerous off-lying islands and reefs for some distance from the main shore. The extremity of Point Davison is a double island with a small wooded patch on it, and is conspicuous only from eastward or westward. Point Davison Light, shown from a small white house on the outermost of the small islands off the south end of the point, is 35 feet above the water and visible 9 miles. The light is obscured from 138° to 258°.

A group of wooded islets are 0.2 to 0.8 mile off **Sextant Point,** the first point northward of Point Davison. Foul ground extends for 500 yards northward and 700 yards southward of these islets. Between the islets and Sextant Point is a clear, deep channel, 400 yards wide. The main channel of Felice Strait passes to eastward of the islets and midway between them and Harris Island.

Foul ground extends for 0.8 mile off **Moss Point,** which is 2 miles northward from Point Davison.

Chart 8074.—Tamgas Harbor, the entrance to which is about 1.5 miles northward of Harris Island, is a landlocked anchorage suitable for small and moderate-sized craft. This harbor is subject to strong winds in winter. Winds of over 70 miles per hour from northeast to southerly have been experienced when anchored off **Creek Point.** The depths are generally good except near the southwestern shore, which is shoal. **Grass Rock,** 0.2 mile off **Grey Point** on the western side of the entrance, is 15 feet high and grass-covered. A rock, bare at low water and marked by kelp, is about 200 yards 160° from Grass Rock. **Mule Rock,** 0.2 mile from the eastern shore at the entrance, covers at high water; it may be passed on either side. It is marked by Mule Rock Light. The light, shown from a small white house on a skeleton tower, is 30 feet high and visible 9 miles.

A shoal, marked by a buoy at its outer extremity, extends nearly 0.5 mile east-southeastward from **Deer Point** on the west side, 0.8 mile above Grass Rock.

Shoals extend 300 yards offshore between **Tent** and **Crab Points,** and 200 yards off **Yellow Point,** thus narrowing the channel to a width of about 250 yards between these points. A lighted buoy marks the end of the shoal off Tent Point, and a large unpainted rock is on the beach off the point. **Crab Point Shoal** is marked by a buoy and a wreck northward of it. Northwest of Crab Point are three 300-foot radio towers with red obstruction lights. The waterfall at the mouth of the creek at the base of **Berry Knoll** is visible only at low water.

The best anchorage is in 6 fathoms in the middle of the basin, about 0.5 mile northward of Crab Point, taking care to avoid the 2½-fathom spot shown on the chart.

Between Tent and Crab Points is an **L**-shaped fuel dock. The outer face is 203 feet long and has depths of 29 feet alongside. A float is on the north side of the fuel dock about midway to the shore. At the northwest end of the dock is a 25-ton stiff-leg crane. Diesel oil, kerosene, gasoline, and fresh water are piped to the dock; no other supplies are available. A dolphin marks the limits of the shoal extending into the channel between the lighted buoy off Tent Point and the fuel dock. On the west side of Crab Point is a seaplane ramp of crushed stone and sand with a Marsden Mat top 20 yards wide and 260 yards long. On the western shore in the northern part of the harbor is an unused supply wharf.

In entering Tamgas Harbor, pass about 500 yards westward of Mule Rock Light, and keep the eastern shore aboard, distant not over 300 yards until up to Tent Point. Then, guided by the aids, follow a mid-channel track into the harbor.

Survey Point, eastward of the entrance to Tamgas Harbor, is indefinite; both it and the southeastern portion of Annette Island are low and wooded for a distance of 1.5 miles, and then the land rises rapidly to the summit of **Davison Mountain.**

Ajax Reef, 2.5 miles 091° from Harris Island and about 0.5 mile offshore, extends 0.2 mile in a northeasterly direction and entirely covers at ¾ flood. It is surrounded by kelp. Ajax Reef Light is on the south side of the reef on a rock awash at high water. The light, shown from a small white house on a tower, is 31 feet above water and visible 9 miles.

Chart 8075.—Wallace Reef, 2 miles eastward from Ajax Reef and about 0.5 mile off the Annette Island shore, has a least depth of ¾ fathom over it, is surrounded by kelp, and is marked on its northerly side by a buoy.

Snipe Island is small, 10 feet above water, and has a few grassy patches on the highest part. It is marked by Snipe Island Light, shown from a small white house, 22 feet above water and visible 9 miles.

Annette Point, at the southeastern extremity of the island, is low and wooded and has deep water close-to.

Indian Rock, 2 miles northeastward of Annette Point and 0.8 mile off Annette Island, is a cluster of rocks about 0.3 mile in diameter, several of which bare at extreme low water and are marked by heavy kelp. A lighted buoy marks the westerly side of the shoal.

Bostwick Reef is 1 mile northeastward of Indian Rock; it is of considerable extent, marked by kelp, and has a least found depth of 1½ fathoms.

Ryus Bay (Chart 8120) is on the northwest side of Duke Island 1 mile eastward of Vegas Islands. It is easy of access, well sheltered, and affords excellent anchorage for small craft in 10 fathoms, muddy bottom.

Tamgas Reef, about 0.8 mile off the Duke Island shore, covers an area 500 yards long and 200 yards wide. It appears as a five-headed rock, one head showing about 3 feet at ordinary high water, the others showing at various stages of the tide.

Niquette Harbor is on the northwest side of Duke Island and is about 0.3 mile wide at the widest part. It extends about 0.5 mile in a southerly direction, narrowing to an inlet about 0.5 mile long which dries. A sunken rock is 100 yards off the eastern shore of the narrowest part of the entrance to the harbor, and a rock, awash, is opposite close to the western shore. Favor the western shore in entering. Anchorage for very small craft may be had in 4 to 6 fathoms in the bight within the entrance. Two rocks, awash, extend about 150 yards northward from the point on the south side of the western shore of the bight.

Dog Bay is a small open bight with 33 fathoms at the entrance, 17 fathoms near the head, and 13 to 15 fathoms in the southeast corner. Rocks lie off the eastern and western shores, as shown on the chart. A channel which bares 2 feet at low water leads from the head of Dog Bay to Pond Bay.

Dog Island is heavily wooded and has a rocky shore. **Double Islands,** small and wooded, are connected at low tide and are surrounded by a considerable area of rocks and reefs which bare. **Village Island** is low with a sand beach on all sides. During the summer months grass grows rankly around the old houses and totem poles on the island.

Fish Islands, two in number and surrounded by moderate-sized rocky ledges, are about 150 feet high and heavily wooded.

Pond Bay, southeastward of Dog Island between it and Duke Island, is 2.5 miles long, 0.5 mile wide, and affords good anchorage when once inside, but is little used on account of the dangerous approach. The entrance from Felice Strait and Dog Bay, westward of Dog Island, bares about 2 feet at low tide. A 6-fathom passage leads northward of Dog Island into Pond Bay, but it is obstructed by rocks and requires local knowledge to enter safely.

The best approach to Pond Bay is from Revillagigedo Channel through **Cat Passage** between Grave Point and three islets off the southeast point of Cat Island. The best water leads about 0.3 mile off Grave Point until up to a reef extending southwestward from a small high-water island off the northeast point of the entrance to the bay; thence it leads about in mid-channel. It is advisable for a stranger to enter at low water and with caution. Rocks in depths of 4½ and 6 feet have been reported in the western end of Cat Passage.

Danger Passage, between Cat and Mary Islands, and Mary Island have been described with Revillagigedo Channel earlier in this chapter.

Beaver Creek, on the western side of Mary Island, is a small creek the entrance to which is not readily discerned at high water. A 2¾-fathom spot is 0.3 mile to the southward of its entrance.

Custom House Cove is an indentation in the west side of Mary Island that affords good shelter during southeasterly weather. The anchorage is in the middle of the cove, 300 yards from the bare ledges fringing the shore.

Giant Point, the northern extremity of Mary Island, has reefs extending 200 yards northward from it.

Kwain Bay and **Crab Bay** are on the east shore of Annette Island opposite Mary Island. The former affords fair anchorage for moderate-sized vessels and has an apparently clear entrance southward of the rocks in the center of the bay. Crab Bay is an excellent anchorage for small craft and is considerably used.

Nichols Passage is between **Annette Island** on the east and **Gravina Island** on the west, and connects Clarence Strait with the southeastern end of Tongass Narrows. It offers the shortest route for vessels from Dixon Entrance and the southern part of Clarence Strait to Ketchikan. There are several clusters of dangerous rocks in the passage but they are easily avoided in daylight and clear weather. The channel eastward of Warburton Island is the one generally used by large vessels and is marked by lights and buoys. Most small craft when entering or leaving Clarence Strait from the north or from Moira Sound use the narrow channel which passes between the Bronaugh Islands and Gravina Island into Nichols Passage.

Currents.—Vessels bound to Nichols Passage from points across Clarence Strait should take the currents into consideration, for the course is rarely made good. In Nichols Passage the flood sets northward with a velocity of 1 to 3 knots, the greatest strength being felt in the vicinity of Walden Rocks. Currents are considerably influenced by the winds.

Directions.—For courses and distances via Nichols Passage from Ketchikan to Cordova Bay, see Chapter 3.

The southern end of Annette Island (eastern side of Nichols Passage), from Point Davison to Yellow Hill, is about 200 feet high and wooded. The shoreline is irregular and broken by numerous small bights, islands, and rocks. **Yellow Hill** is a yellow-topped hill, 525 feet high, 1.5 miles southward from Metlakahtla. The summit is formed by several bare, rounded knolls of approximately equal elevation.

Hid Reef lies nearly 2 miles off the Annette Island shore at the southern entrance to Nichols Passage. On the reef are three distinct clumps of rocks, bare at about half tide, with narrow passages between them. The outermost rock is 2.8 miles southwestward from Cedar Point, and is marked by a lighted whistle buoy.

Canoe Cove is used by small boats. It is entered through the wide north passage.

Smuggler Cove is open and exposed. In the upper part of the cove is a beach of fine clear sand 200 yards long.

Dall Head, the southern extremity of Gravina Island, is the western headland at the southern entrance to Nichols Passage. It is low and wooded, the elevation of the lower part being about 200 feet to the top of the trees. At a distance of 1.5 miles northward of

Dall Head the land rises rapidly to the high mountains of **Dall Ridge,** which, with its high and remarkable peaks of nearly 3,000 feet elevation, forms a conspicuous landmark from Clarence Strait and Dixon Entrance in clear weather. The southern end of Dall Ridge is unusually rugged and broken. The southernmost summit, elevation 1,780 feet, is crowned with a narrow cap of trees, below which for 600 feet are bare cliffs of gray and brownish rock. Several rounded hills of about 500 to 600 feet elevation are covered with dead trees and show white against the mountains of Dall Ridge. At the south end of Dall Ridge are two large landslides facing south.

Bronaugh Islands, extending from 0.5 to 2 miles southeastward from Dall Head, are low and wooded, with rocks and reefs surrounding them. The easternmost island of the group, known as **Point McCartey,** is bare on the southern and eastern edges. It is marked by Point McCartey Light, shown from a white, wooden house on a brown skeleton tower. The light is 50 feet above water and visible 9 miles; it is obscured from 080° to 090° and from 113° to 191°.

A rock, bare at half tide, is 0.7 mile 235° from Point McCartey Light. Several other similar rocks are between this one and the Bronaugh Islands. A rock, baring 2 feet and with deep water close to it, is about 0.3 mile 105° from Point McCartey. This rock is marked by a buoy.

Banks and broken ground, with least found depths of 7 to 15 fathoms, are about 0.6 mile northeastward from Point McCartey. This area should be avoided.

Directions.—The narrow passage between the Bronaugh Islands and Gravina Island, having a least found depth of 35 feet, is considerably used by small craft. When using it, if approaching from westward, round the buoy about 0.5 mile south of Dall Head. Keep it close-to on the starboard side and head a little south of the north tangent of the island ahead for a tall flat-topped tree, course **084°.** When the long tangent of the east shoreline of Dall Point opens, change course left and pass 100 yards off the shore of the wooded island on the starboard hand. When the north point of the island is abeam, head so as to pass 100 yards off the eastern shore of Dall Point and mid-channel between it and the small islets. This brings the tall tree with the flat top directly astern. This course should head for the tangent of a second shoulder of Dall Point. When past the two small islets and the charted rock lying north of them on the starboard side, head for the west tangent of the small island lying off the shoreline of the large wooded island ahead. Pass 50 yards off the small islet and then favor the shore of the large island, passing it about 50 yards off, to avoid a dangerous rock reported bare at near low water in approximate position, Lat. 55°09′.05, Long. 131°43′.6. When nearing the northern point of the large island, increase the distance from its shore and proceed into deep water on a north-northeast course.

Dall Bay, on the western side of Nichols Passage 1 mile northward of Dall Head, has many dangers which are shown on the chart. A shoal area with two rocks on it, awash at low tide, extends northeast from the western shore toward the center of the bay. The rocks are 0.25 and 0.2 mile off the western shore of the large island off Dall Bay. An uncharted rock is reported about 0.1 mile off the same shore in the approximate position previously given. A sounding of 2 fathoms was obtained, but from reports, there is a less depth of about 4 feet over the rock.

Dall Bay offers good anchorage in 8 fathoms, mud bottom, between the two islands well inside the bay. There is also small-craft shelter farther in, depth 3 fathoms, soft

mud bottom. A mooring dolphin is driven near the head of the bay and there is a privately maintained mooring float. The bay is used for storing floating fish traps.

Enter Dall Bay north of the shoal area projecting toward its middle. Pass north of the charted rock lying 0.2 mile off the northeast tip of the most easterly of the two inner islands. Round the rock on the port side and steer to pass mid-channel between the two islands. To pass beyond the two inner islands favor the right hand shore, passing close-to so as to avoid the rocks in the middle of the bay.

Chart 8074.—Warburton Island is about 2.8 miles northeastward of Point McCartey and 1.2 miles from the shore of Annette Island. It is about 0.2 mile in diameter, 130 feet high, round-topped, and has steep, rocky shores. A rock with 1½ fathoms over it lies nearly 200 yards westward of the island. Warburton Island Light, shown from a white wooden house on the eastern side of the island, is 35 feet above water and visible 8 miles. The light is obscured from 061° to 178°.

Kelp Rocks are four patches, with deep water around them as follows: Two rocks which show 3 feet at low water are 1 mile and 1.2 miles, respectively, 314° from Warburton Island Light; a rock with ¾ fathom over it is 1.2 miles 345° from Warburton Island; a rock with 1¾ fathoms over it at the north end of the group is 1.5 miles 003° from Warburton Island, and is marked by a buoy on its northeast side. Warburton Island, open from the southwest end of Annette Island, leads eastward of Kelp Rocks. The northerly rock is on the range of the waterfall in Port Chester and the north end of Gull Island.

Port Chester is an extensive bay indenting the western shore of Annette Island eastward of Warburton Island. **Village Point,** on the south side of the entrance, is low and sandy, with a gravel beach on the eastern side. Westward of Village Point are extensive reefs which bare to a distance of 0.2 mile offshore. Village Point Light is shown from a steel skeleton tower on the Union Oil wharf 40 feet above the water.

Metlakahtla, a native mission and post office, is on the south side of Port Chester. The city wharf is a small wharf and float on the west side of Village Point. There is a depth of 10 feet at the outer face of the wharf; the float nearly bares at extreme low water. About 300 yards southeastward of Village Point are a cannery and wharf. There is a least depth of 23 feet alongside the wharf near the center, with deeper water toward the ends; the wharf is 185 feet long. Vessels usually make a port landing. Fresh water is piped to the cannery wharf. There is a store, where provisions in limited quantities can be obtained, and also a blacksmith shop. A large white church with two square towers is conspicuous from Nichols Passage.

A Federal project provides for an anchorage basin 10 feet deep and protected by a stone breakwater southeastward of the cannery wharf. In July 1951 no work had been done on this project.

Port Chester is encumbered by numerous islands and reefs, of which the southernmost is **Gull Island,** 150 feet high and wooded. Lying 0.4 mile west-southwestward of Gull Island is a rock, awash at highest tides, surrounding which, and extending to the islet, are extensive ledges with bare heads; the western extremity of these ledges is marked by a buoy. Another ledge with bare heads extends about 0.7 mile eastward from Gull Island. A lighted buoy is moored on the west side of the 1¼-fathom rock lying between Scrub Island and the ledge eastward of Gull Island.

Scrub Islands have two scraggy clumps of trees and are surrounded by ledges, mostly covered at high water.

Hub Rock is a small bare ledge about 6 feet above high water. A 1-fathom spot is about 625 yards 030° from Hub Rock.

Martin Rock, awash at low water, is 325 yards 322° from Hub Rock; it is not marked by kelp.

Murdo Island, locally known as **Battleship Island** from its one mast-like dead tree and several turret-like stubs, is grass-covered, with several small trees growing among the stubs. Extensive ledges extend 0.4 mile westward and southward from the island.

Fillmore Rock is about 0.3 mile north-northwestward of Murdo Island and bares 1 foot at lowest tides.

Lively Rock is about 0.5 mile 350° from Murdo Island and has 5 feet over it at low water. It is marked by a lighted buoy moored northeast of the rock.

Hemlock Island, close to the north shore of Port Chester, is 225 feet high and wooded. It is fringed with reefs, and at lowest tides is connected at its northerly corner with Annette Island.

Leading to Port Chester are three channels, of which the southern one, between Gull Island and Village Point, is of chief importance; it has been examined by means of a wire drag and the dangers are shown on the chart. Enter on an **085°** course with Warburton Island Light directly astern. The second entrance is the narrow passage between Murdo and Gull Islands; it is seldom used.

The northern entrance leads from a point 0.3 mile or more off Driest Point toward the south edge of Hemlock Island until within about 0.3 mile from the island, when the greater part of the village of Metlakahtla will be seen eastward of Murdo Island, and Yellow Hill will be in line with the church. Then head between the wharf and the sawmill, passing between Scrub Islands and the eastern extremity of the ledge off Gull Island, passing the lighted buoy marking the 1¼-fathom rock close-to on the port side. This channel should not be used without local knowledge.

Port Chester does not afford good anchorage. During southeasterly gales winds blow with great violence across it, and williwaws of almost hurricane force sweep down from **Purple Mountain** and across the anchorage. Probably the best anchorage is to be had at the intersection of the following ranges: Tangent to Driest Point showing between the Scrub Islands, and the outermost house on Village Point just open from the wharf. The depth here is 14 fathoms, muddy bottom.

Driest Point, on the northwest side of Port Chester and separating it from Sylburn Harbor, is a narrow rocky stretch of land, 250 feet high, and wooded down to high-water line. Foul ground extends 0.5 mile northward from the point.

Sylburn Harbor is a small bay northward of Driest Point, the south end of which affords fair anchorage for small craft in 7 to 18 fathoms. Nearly in the middle of the outer entrance to Sylburn Harbor is a large double rock which is covered several feet at high water. Strangers entering the harbor are advised to wait for low water when the dangers are visible. A **159°** course, with the middle of Blank Inlet astern and the middle of the south bight ahead, leads midway between the foul ground off Driest Point and the rock in the middle of the outer entrance.

Chart 8085.—Seal Cove is on the west side of Nichols Passage, 4 miles northward of Point McCartey. It has depths of about 30 to 36 feet, but on account of its narrow entrance, is suitable for small craft only. A reef, mostly bare at half tide, extends across the entrance, through which are two channels. The northern one has a depth of 8 feet and

width of 75 yards, but it is full of boulders and dangerous. The southern entrance is generally used. It is close to the southern shore, between it and a ledge bare at low water about 50 yards off, and has a depth of 9 feet. There are thick kelp and strong currents in the channel. A rock with 7 feet over it, surrounded by kelp and marked by a buoy, is 0.4 mile 097° from the highest part of the reef in the entrance to Seal Cove.

Chart 8075.—Bostwick Inlet, on the west side of Nichols Passage, 6 miles northward of Point McCartey, extends 2.2 miles northwestward. It affords no shelter in southeast weather. The southerly shore is generally foul and the upper part of the bay bares for 0.8 mile from the head. In entering, follow the north shore at a distance of about 0.2 mile. A buoy is moored on the southwestern side of the channel in a depth of 13 feet 200 feet northeastward of a rock awash at high tide.

Chart 8094.—Blank Inlet, westward of **Gravina Point**, the eastern extremity of Gravina Island, extends 3 miles northwestward into the shore of Gravina Island. It is open to the sea from Nichols Passage and affords no sheltered anchorage. A rock, bare 7 feet at low water, is almost in the center of the inlet.

Blank Islands, two in number, 200 feet high and wooded, are near the north side of the entrance to Blank Inlet. The southerly shoreline is bare rock for 50 to 100 yards outside the trees, and the shore is bold. Small craft can find good anchorage in the bight on the north side of the islands. Blank Islands Light, on the south end of the southernmost island of the group and shown from a white wooden house, is 30 feet above water and visible 9 miles. The light is obscured from 031° to 198°.

Walden Rocks are a group of bare rocks at the north entrance to Nichols Passage. The group is about 300 yards long by 125 yards wide, and at its eastern end shows about 15 feet at high water, at which time the smaller rocks are covered. Westward of the group, about 150 yards, is a rock that covers at half tide and shows kelp. Close northward of the group are other kelp-marked rocks, and 0.2 mile north-northwestward is one with 1 fathom over it. Southward of Walden Rocks 0.6 mile is a large double rock which covers at three-quarters flood; between it and Annette Island are a number of rocks which bare.

On **Walden Point** is a native fishing camp with considerable shelter for small craft directly off it. **Bailey Rock**, which covers at high water, is about 1 mile south-southwestward from Walden Point. Bailey Rock Light, shown from a white slatted daymark on a post marking the rock, is 24 feet above water and visible 9 miles.

Annette Bay, at the northwestern end of Annette Island, is 0.8 mile wide at the entrance and narrows to a small stream; it is 3.5 miles long, has deep water, and does not afford anchorage for vessels. Small craft can anchor near its head in 7 to 8 fathoms. **Race Point**, the northern extremity of Annette Island, and the north point at the entrance to the bay, is wooded and has a greatest elevation of about 150 feet. A ledge, which covers at high water only, extends 300 yards in the prolongation of Race Point. The point should be given a berth of 500 yards.

Chart 8102.—The western shore of Gravina Island from Dall Head to South Vallenar Point is heavily timbered, bold, and rocky. Close to shore are many large boulders and rocks, and the bottom is rocky and uneven. The 100-fathom curve is from 0.5 to 0.8 mile offshore and it is advisable to give the coast a berth of that distance.

Tidal currents are usually strong close to shore, especially on the flood, reaching an estimated velocity of 2 knots. Small tide rips are found off the more prominent points when the wind is opposed to the current. Westward of Bronaugh Islands moderate tide rips are set up on a flood current with a northerly wind. Around South Vallenar Point, an estimated velocity of 2½ knots is reached on the flood and 1½ knots on the ebb, with moderate tide rips when wind and current are opposed. West of Vallenar Point the flood current is estimated at 3 knots and 1½ knots on the ebb with strong tide rips on the ebb during a southeasterly storm.

Dall Head has been described with Nichols Passage.

Rocks and islands extend about 0.6 mile offshore for a distance of 1.2 miles northwestward from Dall Head. A small open bight, foul near the head, with depths of 6 to 7 fathoms in the entrance, is 1.4 miles northwestward from Dall Head. A small rocky islet is off the southern shore of the entrance. A sunken rock is 400 yards off the wooded islet southward of the entrance; it is 1.5 miles 292° from Dall Head.

Nehenta Bay, open to the southward, is 2.5 miles northwestward of Dall Head. Depths of 12 to 14 fathoms were obtained in the channel westward of the small rocky islet in the middle of the entrance which marks the end of the chain of rocks and rocky islets which extend northward from the island at the south entrance point. Foul ground extends 0.1 mile from the head of the bay, and a 7-foot spot is 650 yards 212° from the mid-channel rock. Depths of 12 to 14 fathoms were obtained in the middle of the bay, while depths of 17 fathoms were obtained in the small bight eastward of mid-channel rock. The narrow arm, 0.4 mile long in a westerly direction on the western side of the bay, has a depth of 3½ fathoms at the entrance and 2½ fathoms halfway to the head. A reef extends from the northern shore to within 50 yards of the southern shore of this arm.

Phocena Rock, 25 feet high, is 275 yards offshore, 0.4 mile to the westward of the northwestern point of the entrance to Nehenta Bay.

The small cove, 3.6 miles northwestward from Dall Head, open to the southward, has depths of 9 to 15 fathoms just within the entrance. Foul ground extends about 200 yards off the western point of the entrance. The northwest corner of the cove is foul for about 0.1 mile from the shore, to the southward of which is an area about 200 yards wide, with depths of 1 to 3 fathoms, where fishermen find fair-weather anchorage. The bight to the eastward of the eastern point of the entrance has 7 fathoms at the entrance and shoals rapidly to the head. The cove between the double point westward of the entrance to the cove is foul.

Nelson Cove, 5 miles northwestward from Dall Head, is open to the westward and northwestward. Depths of 6 fathoms are found at the entrance, 1 fathom 200 yards within, and shoal water to the head.

Chart 8094.—Grant Cove, 1.6 miles south-southeastward of South Vallenar Point, is exposed to the westward. From depths of 21 fathoms at the entrance it shoals to 10 fathoms at the edge of the flat 300 yards from the head. A small wooded islet, a small rocky islet, and a rock awash lie about 250 yards off the southern point of the entrance. A mooring log is anchored near the head of the cove in 10 fathoms.

The small cove 0.8 mile north-northwestward from Grant Cove is open and exposed, shallow and foul, and a rock which bares 3 feet on the lowest tides lies 220 yards off the northwest entrance point of this cove. The small cove 1.1 miles north-northwestward from Grant Cove bares at low water, with the exception of a very narrow opening 200 yards

long midway in the entrance which has depths of about 2 fathoms. A large kelp-marked shoal which bares, is about 1,100 yards west-southwestward of the cove.

South Vallenar Point, near the northwest end of Gravina Island on the northeast side of Clarence Strait, may be recognized by three bare rocks on its north side.

A ridge with three shoal spots extends 1 mile north-northwestward from South Vallenar Point. The first, with depths of 5 fathoms, is 0.3 mile from the point; the second, with 1¾ fathoms on it, is 0.5 mile from the point; the third, with 6½ fathoms on it, is 1 mile from the point. The bottom is rocky, very irregular, and there is a possibility of lesser depths.

Vallenar Bay, between South Vallenar and Vallenar Points, affords good shelter from winds drawing up the strait. Close northward of South Vallenar Point are three low bare rocks about 0.2 mile apart, with no passage southward of them. A mud flat, dry at low water, extends 0.5 mile from the head of the bay. Anchor in about 14 fathoms with the two southernmost rocks in line, bearing 266°, and Guard Islands in line with the high bank forming the northeast shore of the bay, bearing 342°.

Vallenar Point and Guard Islands have been described earlier in this chapter.

Chart 8145.—Cape Chacon has been described earlier in this chapter.

The south end of Prince of Wales Island west of Cape Chacon is described in Chapter 6.

From Cape Chacon to Stone Rock Bay, the shoreline is rocky and the bottom is irregular. During the fishing season numerous traps line this section of the coast. Temporary anchorage has been obtained about 0.5 mile offshore about 1.5 miles northward from the cape in depths of 18 to 20 fathoms. About 2.3 miles northward from the cape, and about 900 yards offshore from **Huaji Cliff**, is a 2-fathom shoal.

Stone Rock, 15 feet high, gray-colored and bare, is 3.5 miles northward of Cape Chacon. Within 800 yards in a southwesterly direction from Stone Rock is a rock awash at half tide, a rock awash at three-quarter tide, and a 1¾-fathom spot. A rock awash at low water is 250 yards westward from Stone Rock.

Stone Rock Bay, about 4.5 miles northward from Cape Chacon, is an open bight with deep water and irregular bottom. Foul ground extends off the entrance points, and there is a 5-fathom shoal midway in the entrance. Small fishing craft anchor close to shore, but the use of the bay as an anchorage is not recommended.

Mallard Bay, about 1 mile long in a westerly direction, 0.2 mile wide at the entrance, narrowing to 0.1 mile within, is about 5 miles northward from Cape Chacon. Foul ground extends about 0.6 mile offshore from the point separating Stone Rock Bay and Mallard Bay. A 2-fathom spot is 0.6 mile from the point on the south side of the entrance. About 0.5 mile within the entrance shoals extend about 200 yards from the northern and southern shores. A fish buying scow is anchored near the head of the bay from May 1 to September 15. All fishermen supplies are obtainable. There is a mooring float for small craft. Fresh water can be obtained at the float.

Fair weather anchorage may be had near the head of the bay in 15 fathoms, sandy bottom, with about 200 yards swinging room. Enter on a 290° course favoring the northern shore of the bay. The channel between the shoals making out from the northern and southern shores is narrow.

McLean Arm, a narrow inlet about 6.5 miles above Cape Chacon, is about 4.5 miles long in a westerly direction. **McLean Point,** the south point at the entrance, is

low, but at a short distance back rises to a dome-shaped hill 840 feet high. The north point at the entrance is a bare rock, 22 feet high, 100 yards southward of **Island Point**, a wooded island close to the main shore. McLean Point Light, on the east side of the point, shown from a white wooden house, is 58 feet above water and visible 6 miles. The light is obscured from 005° to 177°.

The head of the arm has two branches. The southern and larger affords anchorage in its widest part in 20 fathoms, sticky bottom, with swinging room for a small vessel. Just above the anchorage and close to the southerly shore is a rock with two stunted trees. A small flat is in the bight southeastward of the islet; a flat extends 0.2 mile from the head of this branch. At the entrance to the north branch, anchorage can be selected in about 17 fathoms, but it is less desirable, and care must be taken to avoid a ledge, bare at low water, which extends about 250 yards eastward from the point dividing the two branches. Large vessels can anchor at the head of the main arm in 28 to 30 fathoms, irregular, rocky bottom. A mid-channel course will lead safely to the anchorage. The williwaws come down from the adjacent mountains with considerable force. A small craft can find fair anchorage close under the southern shore about 3.2 miles inside the entrance. Fresh water can be obtained from several streams.

Gardner Bay, about 7.8 miles northward from Cape Chacon, affords good anchorage, but its narrow entrance restricts its use to small vessels. The northern point of the entrance is a bold, light-colored, rocky point, timbered on top. A breaker close to the point and one in the bight westward of the point frequently show. A group of small wooded islands with rocks awash off the southeastern end, is about 200 yards off the southern point of the entrance. A group of islands chokes the entrance to the inner bay. The channel northward of the islands is narrow and crooked, its use is not recommended. The channel to the southward is about 100 feet wide and has a least found depth of 8 fathoms. About midway between the islands off the point and those in the entrance is a 1½-fathom spot marked by kelp. Fresh water may be obtained from several streams.

Fishing vessels and small craft frequently use the channel to the southward of the outer islands and rocks. Mid-channel courses suffice.

Entering northward of the outer islands steer **272°**, heading for the southeast end of the islands in the entrance. Change course when abeam the western end of the northern point of the entrance to **228°**, heading for the east side of the point on the southern shore. This course heads midway between the 1½-fathom spot off the outer islands and the shoal ground off the southeastern end of the islands in the entrance. When the channel opens up, head **305°** for mid-channel.

Boats should proceed with caution when entering. Depths in the narrow part range from 9 to 20 fathoms, dropping to 31 fathoms just westward of the islands, shoaling to 14 fathoms, mud bottom, in the center of the cove at the head of the bay where anchorage space is about 0.2 mile in extent. The points at the entrance to the cove should be given a berth of about 150 yards. Close to shore in the bight southeastward from the anchorage is a half-tide rock. In the cove deep water extends to 100 yards off the beach. Scows are moored in 6 to 8 fathoms in the small bight in the southerly shore about 0.5 mile from the narrow channel.

Kendrick Bay, about 10 miles above Cape Chacon, extends 3.5 miles in a westerly direction with a width of about 0.8 mile. Except for a reef in the middle of the bay 2 miles inside the entrance, it is free from dangers until near its head.

Three arms lead southward and westward from Kendrick Bay. **South Arm** is 2.5 miles long, clear, and near its head affords good anchorage for small craft. **Short Arm** is 1.2 miles long and clear until 0.2 mile from the head. **West Arm** is 2 miles long and foul for a distance of 0.5 mile inside the entrance, and should be entered preferably at low water. Enter southward of the islets and steer about **311°**, proceeding with caution. Good anchorage for small craft can be had near the head of the arm; however, during the colder winter months ice forms in this area and it cannot be used as anchorage.

Kendrick Islands, on the north side of the entrance to Kendrick Bay, are a group of about 20 islands of varying sizes, and for the most part wooded. The highest and largest one has an elevation of 380 feet. Small craft with local knowledge can enter Kendrick Bay from northward by passing northward of all the islands, between them and the main shore. Good anchorage and shelter for small craft can be found among the islands.

Chart 8102.—The north point of Kendrick Bay rises rather sharply to a large flat-topped peak about 1,275 feet high, forming a headland which shows prominently from points along the western side of the strait.

The shoreline from the north entrance point of Kendrick Bay to Hidden Bay, a distance of about 2.2 miles, is very broken. Rocks lie offshore from 0.2 to 0.3 mile. An inlet, 0.6 mile long in a westerly direction and about 0.1 mile wide, lies about 1.2 miles above the point. The channel is narrow and has general depths of 6 to 7 fathoms, except in the narrow part, where they range from 2 to 4 fathoms. A sunken rock lies 0.3 mile offshore in line with the southern shore of the inlet, while rocks, awash, lie 0.5 mile to the eastward of the north point of the entrance.

Hidden Bay indents the western shore of Clarence Strait about 15 miles northward of Cape Chacon. The entrance is less than 200 yards wide and lies to the northward of a long rocky islet, the most northerly of the group near the entrance. A sunken rock lies about 0.3 mile eastward of the eastern end of this islet. The largest island of the group, 200 feet high, lies to the southward. The south entrance point at the first narrows rises to a rounding hill 260 feet high. The north entrance point is low, with a little knob near the extremity. Depths of 2½ fathoms were obtained in the first narrows, and rocks lie close to its southern shore. Depths of 8 to 20 fathoms were obtained in the first cove. A rock lies 50 yards off the eastern entrance point of the second narrows. Depths in the second narrows range from 1½ to 7 fathoms and ledges project from its southeastern shore. Depths in the inner cove range from 8 to 16 fathoms.

A **300°** course carries to the entrance, passing southward of a 2-fathom spot off the north point of the entrance. The course then follows the trend of the channel, favoring the starboard shore. A stranger entering for the first time should select low-water slack when the reefs outside and the rocks in the entrance will be showing. The currents in the narrow part of the entrance are strong. Small craft may, with care, work their way to the entrance from the southward back of the islands. The bay is suitable for small craft only.

Scott Point, about 1 mile northward of Hidden Bay, is a round point with an abrupt shoreline characterized by large gray ledges. It rises rapidly to an elevation of about 1,000 feet.

Ingraham Bay, the entrance to which lies about 1.2 miles northwestward from Scott Point, is about 0.8 mile wide at the entrance. Rocks, usually marked by kelp, extend about 200 yards off the entrance points. The bay has two branches and is about 3.5 miles long to the head of the southern branch. The northern branch starts about 0.8 mile within the

entrance and is about 1.5 miles long. In the entrance to the bay is a group of three small islets with rocks awash, extending about 150 yards in a southeasterly direction off the eastern island, and about the same distance in a westerly direction off the western island. A group of three rocky islets lies off the north arm, about 400 yards northwestward of the outer group. Rocks extend about 125 yards off the north shore of the western island of the inner group.

To enter the bay, the channel to the southward of the outer group or the channel between the two groups may be used. The channel northward of the inner group is very narrow and should not be used.

To enter the north arm, pass southward of the group of rocky islets off its entrance. When approaching the narrow entrance, favor the port side of the channel to avoid the rocks, awash, which lie about 20 yards off the small bare rock close to the north shore. The controlling depth in the narrows is 6 fathoms. Follow the trend of the channel. Leave the small islet in the second narrows on the port hand and anchor in 12 to 15 fathoms in the bight at the head of the arm. This arm is suitable for small craft only.

To enter the south arm, the small wooded islet, 200 yards northwestward of the long wooded tongue which marks the southeast point of the entrance to this arm, is left about 100 yards on the port hand. The channel leads between this islet and the long reef, 200 yards to the westward, which parallels the shore. The small mid-channel rocky islet, 0.5 mile 276° from the wooded islet, is left on the starboard hand. A rock, awash at low water, lies 20 yards northward of the mid-channel rock. Then pass the prominent point on the southern shore at a distance of about 175 yards, leaving two rocky islets on the starboard hand. Round the point at a distance of 175 to 200 yards to avoid the rocks close to it and then head well into the bight to avoid the reef which extends 250 yards eastward of the prominent point on the western shore. Where the channel again narrows, favor the southern shore. The channel lies midway between the wooded islet off the point on the southern shore at the western end of the narrows and the rocks off the northwestern shore. After rounding the wooded islet, give the small islet to the southward of it a berth of at least 300 yards. Anchorage may be obtained in 8 fathoms near the head of the bay or in the cove on the north shore.

Ingraham Point, the northwest entrance point of Ingraham Bay, is low and wooded for a distance of 0.6 mile from the point where it commences a sharp rise to a wooded ridge, 1,560 feet high. The shoreline to Polk Island, a distance of 1.2 miles, is rocky and foul.

Polk Island is about 0.8 mile long in a northwesterly direction and less than 0.2 mile wide, and is about 100 feet high to the tree tops. A reef, bare at half tide, lies midway between the island and the Prince of Wales Island shore. The north end of the channel is obstructed by rocks and islets, but very small craft can work their way through.

A small rocky islet with a prominent tree lies close to the southeast end of Polk Island. From the northward or southward, for a distance of 2 miles, it is noticeable.

Chichagof Bay lies about 2.5 miles northward from Ingraham Point. It is about 0.3 mile in length and width and has depths varying from 12 fathoms in the entrance to 4 fathoms near the shore. A reef extends 200 yards in a northerly direction from the southern shore, 0.2 mile from the entrance point. A narrow inlet, with depths of 4 to 8 fathoms, extends 0.3 mile in a southerly direction from the southwest corner of the bay. A rock, awash, lies slightly to the southeastward of the middle of the entrance to the inlet.

Rip Point, about 3 miles northward from Ingraham Point, is low for about 1 mile back from the shore, then rises steeply to a long ridge with an elevation of about 1,000 feet. There is a small wooded knob about 250 feet high in the center of the flat area and several hummocks with an elevation of 200 feet or less. Foul ground extends 0.3 mile southeastward from the point.

Sun Rocks, the two most prominent rocks in this area, about 100 yards long, 20 yards wide, 15 feet high lie about 0.2 mile southeastward from Rip Point. Tide rips extend 0.8 mile off Sun Rocks and Rip Point during a southeast wind and ebb tide.

A small cove lies 0.3 mile southwestward from Rip Point. Rocks lie on both sides of the entrance about 50 yards offshore. A rock lies about 50 yards off the middle of the northwest shore. Depths in the middle of the cove range from 11 to 25 fathoms.

Moira Sound indents the western shore of Clarence Strait, about 25 miles northward of Cape Chacon; it is 4.5 miles wide between Rip Point and Adams Point. **Adams Point,** the north point of the entrance, is low and wooded. Near the extremity is a knob about 350 feet high. The land rises to an elevation of about 1,540 feet 1 mile from the point. Rocks extend about 0.2 mile off the eastern shore of the point. The general direction of the sound is southwesterly, and within the entrance it divides into three separate arms.

South Arm extends about 5 miles to the southward and has numerous reefs which uncover at low water. Keep the west shore well aboard in entering. **West Arm** has a length of 2.5 miles and then divides into two short arms, the northern, known as **Dickman Bay,** the southern as **Frederick Cove. Johnson Cove** has a length of about 2 miles and extends southward from the south shore of the sound about 5 miles from the entrance. These arms have not been surveyed, and caution is required in navigating the sound westward of **Black Point.** A sunken rock is reported to be about 0.3 mile southward of Black Point.

A chain of islands stretches from Rip Point toward Adams Point, the northern of which, known as **Moira Rock,** is 30 feet high. Moira Rock Light, on the highest part of the rock and shown from a white wooden house, is 40 feet above water and visible 9 miles. A bank is 1 mile northeastward from Moira Rock on which depths of 9 fathoms were obtained. **Moira Island,** 0.6 mile long and wooded, is about 0.9 mile to the southward of Moira Rock. The channel between Moira Rock and Adams Point has depths ranging from 40 to 170 fathoms.

A small islet is about 0.1 mile eastward of the north end of Moira Island. Kelp and rocks are in the channel between them. A group of rocks, awash at low water and marked by kelp, is midway between Moira Rock and Moira Island. Deep water surrounds these rocks; the channel between them and Moira Rock appears to be clear.

Kegan Cove is 3 miles west of Black Point. The outer cove is fair anchorage in 8 to 12 fathoms, mud bottom. The inner cove has an entrance 50 yards wide and can be entered by boats drawing 8 feet, on the upper half of the tide. The left shoreline should be favored when entering. Excellent shelter and anchorage in 6 to 10 fathoms, mud bottom, can be had inside. A small mooring float maintained by the Forest Service is anchored in the inner cove. **Kegan Creek,** outlet to **Kegan Lakes,** flows into the head of the cove. It is one of the favorite trout streams in the Ketchikan district because of the large Rainbow trout caught there. A marker on the east side of the stream indicated the end of a trail paralleling the creek to the shore of the first lake.

Whiterock Island, about 0.3 mile to the eastward of Moira Island, is about 0.5 mile in diameter, irregular in shape, wooded, and about 215 feet high. **White Rock,** on the southeast side of Whiterock Island, is a large grayish-white, conical-shaped rock, about

125 feet long and 85 feet high. To the southward is a smaller rock with the same general features. The small cove on the northwest shore of Whiterock Island is foul. Midway between the southern ends of Moira and Whiterock Islands is a reef, awash at three-quarters tide. A channel, about 250 yards wide, apparently clear, lies to the westward of this reef, favoring Moira Island. The channel between Whiterock Island and the reef is foul. Foul ground extends off the northern and eastern shores of Whiterock Island for about 0.2 mile and off the southern shore for about 0.5 mile.

Menefee Anchorage, about 1 mile westward from Rip Point, is much used by fishing craft, but is not suitable for large vessels. Anchorage may be had in about 15 fathoms, mud and rock bottom, with 200 yards swinging room. By following the shoreline from Rip Point at a distance of 0.2 to 0.3 mile, a clear channel may be carried to the anchorage. **Menefee,** near the anchorage, is a summer camp of the Metlakahtla Indians. The small cove, southward of the village, with depths of 21 fathoms in the center and shoal water near the eastern shore, is entered westward of the mid-channel islet.

Menefee Islands, about 1.3 miles westward of Rip Point, are two large wooded islands. A narrow ledge and small rocky islets project about 250 yards from the north shore of the western and larger island. A group of three large islets and several smaller ones, covering an area about 0.9 mile long in a southwesterly direction, lies about 0.3 mile northwestward of the larger Menefee Island. Foul ground extends 300 yards southeastward of the northeast islands. The channel between these islands and the Menefee group is obstructed at the northeast end by a mid-channel rock and at the southwest end by a rock in mid-channel, awash at low water.

A bight lies about 1.5 miles to the westward of Menefee Anchorage. In the center of the bight is a rock, awash at high tide. A 4¾-fathom bank lies about 400 yards westward from the rock. There are numerous rocks and islets along the southern shores. The small cove on the northeastern shore of the bight might furnish anchorage for small vessels in 10 fathoms of water.

Egg Islands are a group of wooded islands about 2.8 miles southwestward of Moira Rock.

Chart 8074.—Niblack Anchorage entrance is about 3.3 miles 243° from Moira Rock on the west side of Moira Sound southward of the entrance to North Arm. The anchorage is only about 400 yards wide, but furnishes secure anchorage in 6 to 12 fathoms, muddy bottom. The entrance is narrow, in one place only 100 yards wide, but the harbor is easily entered by steamers. At the head of the harbor is the abandoned Niblack mine. Several streams empty into the harbor.

Safety Rock is a grass-covered rock about 15 feet high, in the middle of the entrance and westward of the Egg Island group. A rock, awash, is 75 yards southward from the south point of **Clare Island.** A ledge, bare at half tide, is 0.6 mile 249° from Safety Rock. A rock with 1¾ fathoms on it is 200 yards from the south shore 0.5 mile from the head of Niblack Anchorage. The channel usually followed passes about 0.3 mile northwestward of Moira Rock, northwestward of Safety Rock and the ledge, and to the southward of the rock off Clare Island. The north side of the narrow entrance in range with Red Rock (and south shore) near the head of the harbor clears the ledge.

Chart 8076.—From Adams Point to **Point Halliday,** the northern point of the entrance to North Arm, the shoreline is broken and there are many rocks close to shore. A 1-fathom

spot is reported to be 0.4 mile 098° from Point Halliday. Point Halliday and **Crowell Point,** the western point at the entrance to North Arm, are marked by daybeacons.

North Arm is in the northwest side of Moira Sound about 2.5 miles westward of Moira Rock. It is 600 yards wide at the entrance and nearly 5 miles long. A secure anchorage can be found inside near the eastern shore, about 1 mile from the entrance directly south of the small cedar covered island, in 6 to 10 fathoms, mud bottom.

Deichman Island, 2 miles inside the entrance of North Arm, has foul ground between it and the shore eastward, and foul ground extends 200 yards southeastward and southward from it. **Almquist Rock,** charted as *Reported PD,* 0.4 mile 171° from the south end of Deichman Island, has been struck by small craft on minus tides, and is reported to be covered by 5 feet at mean lower low water. It has been searched for and a sounding of 2¾ fathoms obtained 100 yards east of the charted position of the rock. When entering beyond Cannery Cove, the southern shore should be favored until well past Almquist Rock.

At the head North Arm divides into two fingers. The northern finger is foul and should not be entered. The southern finger is free of danger and a mid-channel course can be steered for 0.4 mile inside its entrance to where a small bay makes off to the left. The only danger is a rock lying very near shore on the left hand side. A mid-channel course into the bay is clear of danger. The bay furnishes excellent shelter from all weather in 4 fathoms, soft mud bottom.

Beck Rock, 700 yards westward of Deichman Island and 400 yards from the southern shore, is covered at high water; its northeast and southeast sides should be given a berth of 200 yards. **Cannery Rock,** 1.1 miles westward of Deichman Island and 300 yards off **Cannery Point,** is covered at half tide; a rock awash at low water, is nearly 200 yards 135° from it, and a rock with 5 feet over it is reported to lie 100 yards southward from it.

Nowiskay Cove, in the north side of the arm north-northwestward from Cannery Rock, is about 0.1 mile wide and has depths of 17 fathoms at the entrance, shoaling to 4 fathoms at the head. It has not been thoroughly surveyed. In entering, the track usually followed leads southward of Beck Rock and northward of Cannery Rock.

Good anchorage in 15 fathoms can be had in **Cannery Cove,** on the west side of Cannery Point. Good anchorage for small craft can be had in the bight on the north side of the arm, 0.8 mile inside of Point Halliday.

Port Johnson, on the west side of Clarence Strait, between Adams Point and Wedge Islands, is a narrow deep inlet with a length of about 3.5 miles in a westerly direction. There is anchorage, with scant swinging room for a small vessel, at its head in 13 to 23 fathoms. At the head of the bay is a divide and trail leading to the north arm of Moira Sound.

Scraggy Point and **Inner Point,** at the entrance to Port Johnson, present no characteristics of interest to the navigator.

Dolomi Bay is on the north side of Port Johnson, about 1.8 miles to the westward of Point Adams. It is a small arm, 0.5 mile long, on which is the abandoned mining camp of **Dolomi.** Small craft may anchor in 6 to 7 fathoms, soft bottom, and limited swinging room. An abandoned tramway leads to the mines on the north shore of Paul Lake 2 miles northwestward from the town. The high mountain at the head of **Paul Lake** is a prominent landmark. The summit is grass-covered, the slopes are uniform, and it is not often clouded; elevation, 2,250 feet.

To enter Port Johnson, steer 281° with the north end of the larger wooded island eastward of Scraggy Point ahead. This course passes about 600 yards to the southward of the 2¼-fathom spot which lies about 1 mile to the southward of the large Wedge Island, and it passes about 450 yards northward of the ledge which extends 0.2 mile northward from Adams Point. From the entrance, mid-channel courses hold good.

French and **Dutch Harbors** are locally known small-boat anchorages behind the islands northward of the entrance to Port Johnson. They do not furnish good anchorages, and the approaches are rocky.

Chart 8102.—Wedge Islands are a group of low islands and rocks 2 miles to the northward of the entrance to Port Johnson. The highest point on any of the islands is 190 feet to the tree tops. From the larger island, rocks, bare and awash, extend for about 0.6 mile to the southward and shoal and irregular bottom extends about 1 mile to the southwestward. A 2¼-fathom spot lies 1 mile to the southward of this island. Three rocks, bare at low water, lie 0.5 mile northwestward from the north end of the larger island. A sunken rock lies 0.2 mile northward from these rocks. A shoal with 7 fathoms on it lies 0.7 mile to the northward of the north end of large Wedge Island. A channel 0.4 mile wide, with a least found mid-channel depth of 30 fathoms, lies about 0.6 mile westward of large Wedge Island; its direction is **030°**. This course lies within 400 yards of dangerous shoals on either side, and those without local knowledge should not attempt to use the channel.

Foul ground extends 0.3 to 0.5 mile offshore, to the point 4 miles northward of Port Johnson. From this point to Windy Point, a distance of 2 miles, foul ground extends about 200 yards offshore.

Windy Point, low and wooded, with an island close-to on each side, lies between two small exposed coves. The southern cove has mid-channel depths of 6 to 9 fathoms but is foul to the westward of the small island near the north shore. The northern cove has mid-channel depths of 9 to 14 fathoms but is foul toward the head. Rocks extend off the point for about 240 yards.

From Scraggy Point to Chasina Point, which is the point about 4.5 miles northward from Windy Point, the land is thickly wooded and slopes gently for about 0.2 mile from the shore and then rises quickly to a ridge about 1,200 feet high. Two small exposed coves lie midway between Windy Point and Chasina Point. Mid-channel depths in the southeast cove range from 9 to 11 fathoms, shoaling to 4 fathoms near the head. The northwest cove has depths in the middle of 9 to 13 fathoms; the western bight has depths of 3 to 5 fathoms; the southern bight is foul.

Currents in the vicinity of Wedge Islands to Skin Island are stronger on the flood and at spring tides reach an estimated velocity of 2 knots. Moderate tide rips are set up with the wind against the current northward of Wedge Island in the vicinity of Windy Point.

Cholmondeley Sound is a deep inlet entering Prince of Wales Island between Chasina Point and Skin Island. Its extreme length is about 16 miles; it has several arms, all of which are deep and bold with heavily wooded mountain slopes ending with steep-to rock shorelines. The sound and its tributaries have not been closely surveyed but are generally free from dangers.

Chasina Point, the south point of the entrance to Cholmondeley Sound, is a wooded rounded point without any prominent features. The land is low for a distance of about

0.8 miles and then rises rapidly to an elevation of about 1,065 feet. It is advisable to give the point a berth of at least 0.3 mile in rounding it.

Chasina Island, a low wooded islet about 350 yards long and 225 yards wide, is about 0.8 mile westward from Chasina Point, about 200 yards offshore. The passage behind the island is foul. A 1¾-fathom spot is midway between Chasina Point and Chasina Island and about 250 yards offshore.

Chasina Anchorage, to the westward of Chasina Island, affords a lee only from easterly to southerly winds. Anchorage may be obtained on a rocky patch in 10 fathoms with the northwest corner of Chasina Island bearing about 042° and Skin Island Light bearing about 338°; swinging room is about 250 yards. Anchorage in 17 fathoms, with the light on the same bearing, may be obtained farther offshore.

Skin Island, 1.8 miles 300° from Chasina Point and 0.8 mile off the northwest point of the entrance to Cholmondeley Sound, is about 0.6 mile long, 0.4 mile wide, wooded, and about 170 feet high on the southeast side. A reef, bare at three-quarter tide, is about 450 yards to the southwestward of the island. A group of small islets is between the reef and Skin Island. A rock, awash at low water, is about 200 yards off the point on the western side of the island. Skin Island Light, on the northeast point of the island, shown from a white wooden house, is 33 feet above water and visible 6 miles. The light is obscured from 006° to 154°.

The channel between Skin Island and Prince of Wales Island shore to the westward is navigable, but the bottom is very irregular. A 3¾-fathom patch is about 0.5 mile westward of the rounding point on the western side of Skin Island. There is deep water between this patch and the island. A 7-fathom spot is about 0.8 mile westward of the same point. The northwest entrance point of Cholmondeley Sound, the point to the southward of Skin Island, and the 3½-fathom spot are on range. A course about 250 yards eastward of this range carries clear of known dangers, but the channel is not recommended. The bight to the southeastward of Anderson Point is foul.

Hump Island is about 4 miles to the southward of Skin Island. It is about 700 yards long and 500 yards wide, timbered, about 400 feet high, and presents a conical appearance.

Lancaster Cove, about 1 mile southeastward of Hump Island, is the northern one of two coves lying eastward of an island on the eastern side of Cholmondeley Sound. It is 300 yards wide and affords good anchorage in 13 to 14 fathoms. It can be entered on either side of the wooded island, 0.2 mile long, in its entrance. A rock, bare at one-quarter ebb, lies 200 yards northward of the northwest end of the island, and a rock with a least depth of 3½-fathoms, lies 175 yards northeastward of the southeast end of the island.

Kitkun Bay, with its entrance west of **Babe Islands,** about 6 miles southward of Chasina Point, extends for about 3 miles in a generally southwesterly direction from the southern side of Cholmondeley Sound. It has not been surveyed.

Dora Bay, on the south side, about 8 miles inside the entrance to Cholmondeley Sound, may be used as an anchorage, but is not recommended. There is an irregular ridge across its entrance, the least water found on which is 9 fathoms. The anchorage at the head of the bay is in 25 to 35 fathoms.

Sunny Cove lies on the north side at the head of the main part of Cholmondeley Sound, 9 miles westward of Chasina Anchorage, and affords anchorage for small craft. There was formerly a cannery on **Sunny Point,** the rounding point on the northern side of the entrance to the cove.

The head of Cholmondeley Sound is divided into two arms known as **South Arm** and **West Arm,** neither of which has been surveyed. West Arm has a straight unbroken north shoreline. Its southern shore has two indentations, the first just above the confluence of the two arms is small but furnishes shelter for small craft with anchor depths of 4 to 8 fathoms. The second indentation in the south shore is southwest of the most easterly of the chain of small wooded islets. Anchorage with ample swinging room may be had here behind the islet toward the head of the small bay in 7 to 15 fathoms, soft bottom. Enter directly toward the head of the small bay from the main channel course, keeping the islet on the port hand. Anchorage may also be had in 7 to 15 fathoms of water, soft bottom, at the head of the bay. This anchorage is exposed to strong winds drawing through the low pass from Hetta Inlet.

From the head of West Arm a portage trail leads about 3.5 miles to the head of Hetta Inlet.

South Arm is free of known dangers except for one reported sunken rock about mid-channel and 1 mile inside its entrance. This rock was struck by a vessel but is not definitely located. It is charted as position doubtful. Vessels entering South Arm can favor either shore in the vicinity of the rock but otherwise steer mid-channel courses to the head of the arm to anchorage in 6 to 10 fathoms, soft bottom. Strong winds from Klakus Inlet draw through the low pass at the head of South Arm.

All tributaries of Cholmondeley Sound freeze in their upper reaches during the winter.

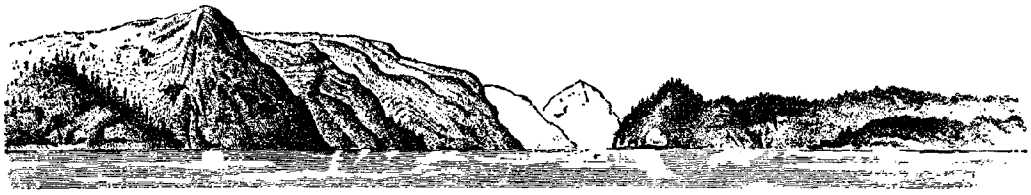
Enter Cholmondeley Sound on course **039°**, passing 0.5 mile off Chasina Point. Steer mid-channel courses to the head of West Arm, passing to the north of the chain of wooded islets.

Clover Bay, with the entrance between Clover Point and **Anderson Point,** about 1.3 miles westward of Skin Island, is about 1.8 miles long and 0.3 mile wide. A rock lies about 170 yards north-northwestward of Anderson Point and a 6¾-fathom spot lies in mid-channel in the entrance. Foul ground extends about 400 yards eastward from Anderson Point. A 7½-fathom spot lies about 0.8 mile within the entrance, 200 yards from the southern shore; otherwise depths within the bay for a mile from the entrance range from 19 to 31 fathoms. The head of the bay is blocked by small islands. A small cove with depths of 14 to 18 fathoms lies to the northward of **King Island,** the largest of the group. A bar, with depths of 3½ fathoms on it, stretches across the entrance to the cove from King Island to the rock off the point on the northern shore. A rock lies 75 yards northwestward of King Island, within the cove.

Clover Point, a narrow wooded neck of land about 100 feet high, projects northward for about 0.6 mile. About 1 mile inshore the land rises to a series of knobs and ridges, 350 to 700 feet high, with higher peaks inland. A bank, small in extent, with 8 fathoms on it, lies 0.6 mile northward from Clover Point.

The cove to the westward of Clover Point is blocked by rocks and islets. The open bight 1 mile northwestward of Clover Point is deep. A small 8-fathom patch lies in mid-entrance. The cove, which lies about 1.6 miles northwestward from Clover Point, has depths of 11 to 12 fathoms until near the head. Rocks extend off the southern point of the entrance for 500 yards, and a rock, bare at half tide, lies in mid-entrance. A flat area, with depths of 16 to 17 fathoms, extends about 0.6 mile in a northeasterly direction from the north entrance point of the cove.

Chart 8142.—Kasaan Bay has its entrance on the western side of Clarence Strait, between Island Point and Grindall Island, where it is 4 miles wide and extends about 17.5 miles westward. About halfway up the bay, in the middle, are several islands. The shores of the bay and islands are steep-to and heavily wooded. A high steep mountain range extends along the northern shore of the bay almost to the head. Fog often prevails in the southern part of Clarence Strait, while the atmosphere is clear in Kasaan Bay. During southeasterly stormy weather, clouds and mist travel low along the northern shore, while the southern shore is generally free from low-flying scud. During southeast storms the sea at the entrance is rough and treacherous for small craft. Temporary anchorage while waiting for the fog to lift may be had on an extensive bank with depths of 8 to 16 fathoms, which lies 0.6 to 1.2 miles southward from Grindall Point.



Kasaan Bay; Grindall Point bearing ESE, distant 12 miles

(Original sketch made before 1883)

Kasaan Bay and Twelvemile Arm have been wire dragged but most of the coves and inlets along the shores have not. All known dangers are shown on Chart 8142. Mid-channel depths are generally good.

Currents in Clarence Strait from Clover Bay to High Island are most noticeable on the flood, and with a southerly wind attain an estimated velocity of 2 to 2½ knots. From Island Point southward there is generally a southerly eddy close to shore during flood tides. Off Island Point and the east end of High Island, moderate tide rips are formed when the wind is against the current.

Island Point, the south point at the entrance to Kasaan Bay, is rounded and wooded and has an elevation of about 100 feet. A small rocky islet is close to the northern shore and two small rocks are close to the eastern shore of the point. The shoreline is grayish-white rock about 25 feet high. Moderate tide rips are encountered off the point.

The small cove to the westward of Island Point has depths of 22 fathoms at the entrance shoaling to 6 fathoms near the head. It is used as an anchorage by fishing boats but is exposed to the eastward.

Twenty Fathom Bank is 2 miles east-southeastward of Island Point. The bottom is rocky with a least depth of 17 fathoms. The bank is used extensively by fishermen engaged in trolling.

High Island is about 1.3 miles to the northward of Island Point. It is wooded and 418 feet high. From the southward there appear to be twin summits on High Island, but they merge into one from the eastward and again become visible from the northwestward. The slope of the island is uniform. The northeast and south shores are abrupt consisting of gray rock, 20 to 40 feet high. High Island Light, 40 feet above the water, and visible 9 miles, is shown from a small white house on the northeastern side of the island. The light is obscured from 328° to 133°. A rocky islet 140 yards long, 35 yards wide, 43 feet high with a few trees on it, is 180 yards off the eastern end of the island.

Patterson Island extends westward for 1.3 miles from the western end of High Island, from which it is separated by a channel about 100 yards wide, which appears to be clear for small boats. The island is about 0.3 mile wide and timbered. It has three summits; the highest at the eastern end is 263 feet in elevation. A bight makes into the southerly shore of the island near the western end, in the depression between the western summit and the eastern ridge. It is used as an anchorage during northerly weather, but affords no protection during southeasterly weather. Several rocks which cover at high water are at the entrance. The outermost rock, which bares at half tide, is 0.2 mile, 116° from the western point of the entrance to the bight. A house is at the head of the bight.

A rock with 1¼ fathoms of water over it is about 0.4 mile south-southwestward from the easternmost point of Patterson Island, and it is not always marked by kelp; otherwise, the passage southward of the island has been found clear. Two rocks bare at the lowest tide are about 60 yards off the northern shore of Patterson Island.

Grindall Island the northern point of the entrance to Kasaan Bay, 4 miles northward from Island Point, is about 1.5 miles long in an easterly direction and about 0.5 mile wide. It is heavily wooded and has two knobs near the southwest end, the western knob having an elevation of about 440 feet, the eastern knob being about 300 feet high. The eastern part of the island is low. **Approach Point** is the eastern extremity of the island.

Grindall Point has a symmetrically rounded lone hill, 618 feet high, which is discernible in nearly every direction and forms an excellent landmark, being separated from the higher land of the peninsula. From the upper reaches of Kasaan Bay it may possibly be mistaken for the hill on Grindall Island, which it obscures from view.

Grindall Passage is frequently used by those with local knowledge. It is safe for steamers, though the clear part of the channel is only 150 yards wide in the narrowest part. A wooded islet and two bare rocks south of it lie close to the western end of Grindall Island. A 1½-fathom spot lies 275 yards 290° from the southernmost rock. A rock with a depth of 2¼ fathoms lies in the middle of the passage, 300 yards northward of the wooded islet off the western end of Grindall Island. A patch of foul ground lies on the western side of the southern entrance to the passage. This foul ground will be cleared by keeping to eastward of the range formed by two prominent points, one on either side of the cove on the western side of the passage. The northern point has a wooded islet close by which should not be mistaken for the point. Pass close to the southern point of the cove to avoid the 2¼-fathom spot in the middle of the passage. The northern entrance is clear.

A good anchorage in northerly weather for small vessels may be had in what is locally called **Grindall Anchorage,** the small cove at the end of Grindall Point. Anchor in 7 to 12 fathoms, soft bottom. In southerly weather fair protection can be found directly across the pass off the abandoned fox farm buildings. Fresh water may be obtained here. The current floods easterly through Grindall Passage and ebbs westerly and is of moderate strength.

Trollers Cove is back of a chain of islands about 1.8 miles westward from Island Point. The cove is about 225 yards in diameter and has depths of 4 to 6 fathoms. It is considered a good small boat anchorage and is used by those fishing on Twenty Fathom Bank. Three channels are used in entering. The channel to the eastward of the islands bares at low water, is foul, and should be used only by those with local knowledge. The channel in the middle of the chain of islands has a depth of 2 fathoms. It is marked by Trollers Cove Light, shown from a small white house, and is 15 feet above the water.

The light is obscured from 029° to 192°. The channel to the westward of the islands is the best.

Round the western island at a distance of about 125 yards and then follow a middle channel course to the southward of the islands. Pass about 50 yards southward of the south shore of the eastern island to avoid a sunken rock which is about 100 yards to the southward of the island. When abeam the eastern end of the island, anchor in about 5 fathoms of water.

The small cove to the westward of the western island has three rocky islets and several rocks marked by kelp in the center. It is not recommended as an anchorage.

Skowl Arm is about 12 miles long, and the head of it is only about 2 miles from the head of Cholmondeley Sound, though the intervening land is high. The eastern point at the entrance to this arm is known as **Skowl Point;** it is really a group of small islands lying close inshore. Skowl Point Light, on a wooden tower, is on the outlying bare rock about 300 yards northward of the point. The light is 12 feet above water and visible 8 miles.

On its side, about 3.5 miles up the arm, is the abandoned Haida village of **Old Kasaan.** No evidence, other than a few very much weathered totem poles and a few graves, now exist as evidence of the village. **Old Kasaan National Monument** was established October 25, 1916. The monument is under the jurisdiction of the National Park Service and contains 38 acres. In front of the village site a ledge, covered at high water, extends about 100 yards from shore. A contracted fair-weather anchorage can be made in 15 fathoms, about 250 yards from shore off the southwest end of the village, with the south end of the large island eastward of the village in line with Skowl Point.

Smith Cove, the large bay to the eastward of Old Kasaan village site and about 2 miles west of **Kasaan Point,** affords good anchorage in 10 to 20 fathoms, soft bottom. With moderate caution it can be entered, being careful to avoid the 3-fathom shoal lying off the two small wooded islets at the entrance.

Saltery Cove is a small bay, about 1 mile long, in the southeastern shore of Skowl Arm, about 2.5 miles westward of Skowl Point and just northeastward of McKenzie Inlet. A group of islands is in the entrance to Saltery Cove. Five rocks, bare at low water, are off the north end of the largest island, the outermost of which is about 300 yards from the north point of the island. Saltery Cove Light, on a small islet 0.4 mile 109° from Khayyam Point, is shown from a small white house; the light is 6 feet above water and visible 6 miles. There is a reef on the eastern side of the bay and shoal water at its head. The channel eastward of the group of islands in the entrance is the one mostly used. The cove offers a well protected anchorage at its head for small craft in 4 to 9 fathoms, mud bottom.

McKenzie Inlet, the south branch of Skowl Arm, extends 5 miles in a southerly direction. **McKenzie Rock,** which always shows, is about 0.5 mile westward from **Khayyam Point,** the eastern point at the entrance, and there is no safe channel between. A rock awash at low water, is 300 yards from the eastern shore, 0.5 mile southward of McKenzie Rock.

About 1 mile inside its entrance the channel leads between **East Sentinel** and **West Sentinel Islands,** two rounded wooded islands. Kelp extends from the islands a short distance into the channel, which is narrow and in which the mid-channel depth is 11 fathoms. A careful mid-channel course between the islands leads through safely; south-

ward of the islands the inlet is clear. There is a good anchorage near the head of the inlet on the west side of **Peacock Island**, in depths of 7 to 12 fathoms, soft bottom.

Paul Bight, on the western side of the entrance to McKenzie Inlet, affords anchorage for small craft in 5 to 8 fathoms. A group of bare rocks lies off the northern point at the entrance. A rock with 5 feet over it is reported to be about 125 yards off the northwest shore and 200 yards southwestward of the largest bare rock in the entrance. In entering, favor the southern point.

Polk Inlet extends west and south from beyond the village site of Old Kasaan. It is unsurveyed and must be entered with extreme caution. The tidal currents have an estimated maximum velocity of from 2 to 3 knots in the contracted parts of the inlet.

Enter Skowl Arm on course **263°** with Skowl Point Light 0.2 mile on port beam. This course will lead to the south shoreline of the restricted entrance to Polk Inlet. When the kelp surrounded submerged rock is abeam on the starboard side, change course to **279°**. Favor the shore on the port hand, passing 60 yards off the steep-to end of the point on that side. When the small cove beyond the point on the port side opens up change course to **264°**. Continue on this course until a deep bay to port opens, then change to **235°**. Favor the detached grass-topped rock on the starboard hand, passing it 120 feet off, and avoiding the submerged rocks just beyond on the starboard side. The end of the point on the port hand will also be about 120 feet off. When past abeam of this point, change course to **201°**. Continue on this course, favoring the west shore. When the logging camp on the western shore is abeam and 0.3 mile off, change course to **158°** and head for tangent of point ahead on the starboard side. Round this point about 60 feet off and pass the small islet on the port side about the same distance off on course **136°**. This course heads directly for the tangent of a double point ahead on the starboard side. Round this double point about 60 feet off and change course to **171°** when the second part of the point is past the beam. This course will lead to anchorage in 10 to 4 fathoms of water, soft bottom, about 1.3 mile from the head of the bay. This anchorage is exposed to strong gusts of wind in southeast weather. Safer shelter will be found just north of the false island on the east side of the inlet, about 2 miles from its head. There is good anchorage here for small craft in 3 to 5 fathoms, soft bottom.

Black Rock, bare 9 feet at mean lower low water, is about 1 mile northward from Kasaan Point. The range formed by the northeast tangent of **Daisy Island** and the rocky islet southeastward of Daisy Island clears Black Rock by a distance of 200 yards.

Kasaan Island, about 2 miles in length, low and wooded, and **Round Island,** a small wooded islet northwestward of Kasaan Island, are the most noticeable of the islands in the middle of Kasaan Bay. A reef bare at ¾ tide is 0.6 mile 160° from the west end of Kasaan Island. The channel southward of this reef and southward of Kasaan Island has been wire-dragged and found clear of dangers. The entrances at both ends of the channel are clear, with the exception of a 2¾-fathom spot 200 yards northwestward of **Berry Island.** A 5¼-fathom spot is 0.9 mile, 125° from the east end of Kasaan Island.

Anchorage for small boats is to be found in the landlocked inlet on the northeast side of Kasaan Island in 7 to 10 fathoms, soft bottom. This is called **Happy Harbor** locally. The entrance is 4 feet deep at low water and caution is necessary in entering. When approaching this entrance steer mid-channel until abeam of the light on the starboard side, then favor the port side until inside the inlet. A rock is 0.1 mile 336° from the northeastern entrance point of the bight. Kasaan Island Light, on the southerly side of the entrance to the cove on the northeast side of the island, is shown from a small white

house 13 feet above water. The light is obscured from 253° to 162½°. A buoy is moored on the east side of the channel about 200 yards northward of the rock, awash, off the northeastern entrance point. After entering the narrow channel, favor the port side until through the entrance. The lagoon on the south side of Kasaan Island is sheltered but subject to strong winds drawing through from the north. The channel is very narrow and bares at low water.

The small bay about 1.8 miles southward of the western end of Kasaan Island affords anchorage for small boats in depths of 6 to 10 fathoms. A reef bare at low water extends about 200 yards eastward of the small island at the southwestern side of the entrance. A dangerous rock with least depth of 6 feet is directly in line with the end of the reef and the point on the other side. When entering favor the point, keeping it on the port hand. Depths of 4 fathoms were obtained in the entrance.

Kasaan is a native village with a cannery and wharf on the north shore of Kasaan Bay westward of Grindall Island. Kasaan Light, on the shore southeast of the cannery wharf and shown from a small white house, is 26 feet above the water and visible 9 miles. It is obscured from 120½° to 302½°. Kasaan has a post office and radio communication during the cannery season. Fishermen's supplies may be obtained from the general stores and fresh water at the wharf. The main wharf has a face of 125 feet, with a depth of 32 feet at mean lower low water. The cannery maintains a machine shop and stores of gasoline, fuel oil, and Diesel oil for its own use. The point westward of the village is foul and should be given at least 150 yards clearance.

Coal Bay, on the south shore of Kasaan Bay about 1.5 miles southeastward of Outer Point, affords good anchorage in 15 fathoms except in northerly weather. It is probable that winter gales from the northwest blow hard into the bay. A reef, bare at low water, extends about 0.3 mile in a northerly direction off the western point of the entrance to the bay. A shoal with 2¾ fathoms on it is 0.4 mile 062° from the same point.

Kina Cove, about 0.5 mile to the westward of Coal Bay, is about 1.6 miles long and 0.5 mile wide. It affords good anchorage in 8 to 10 fathoms, 0.8 mile inside the entrance. In entering, follow a mid-channel course. A reef is about 100 yards off the western shore about 200 yards southward of the western point of the narrow entrance to the inner bay.

Karta Bay, at the head of Kasaan Bay about 2 miles northwestward of Sandy Point, affords good anchorange in 10 to 12 fathoms, with a clearance of about 430 yards. A 1¾-fathom spot is about 0.2 mile offshore about 0.2 mile from Sandy Point. **Mound Point,** on the north side of the entrance to Karta Bay, is prominent. Mound Point Light, shown from a small white house, is 42 feet above water and visible 9 miles; it is obscured from 064° to 184°. A buoy, moored in 30 feet, marks the northern edge of a 4¾-fathom shoal 1.0 mile 114° from Mound Point Light. A number of shoals with less water on them are farther inshore in the direction of Sandy Point.

It Mine, on the north side of Kasaan Bay about 3.5 miles westward of Kasaan, has been abandoned.

The head of Kasaan Bay is separated from the main part of the bay by a chain of wooded islands and affords secure anchorage in 5 to 8 fathoms. In heavy southeast weather the northeast part of this inner bay affords the only secure anchorage in 7 to 12 fathoms, soft bottom. The best entrance is between the fourth and fifth islands counting from eastward. This passage, marked by buoys, is 225 yards wide, but the channel is only 50 yards wide between the 3-fathom curves, with a depth of 4 fathoms in the middle.

Salt Chuck, at the head of Kasaan Bay, can be entered only at the higher stages of tide. The entrance is very narrow with a depth of only 2½ feet abeam of the abandoned light which marks it. Beyond the light the channel deepens to 8 feet. Salt Chuck, a landlocked harbor with depths of 7 to 11 fathoms, soft bottom, is 1.3 miles in length and 0.5 mile wide. The **Salt Chuck Mine** at its head is not operating at present. When operation is resumed the mail boat from Ketchikan will make weekly calls.

Enter near high-water slack. Steer a mid-channel course past the abandoned navigation light on the starboard hand. When through the narrow part of the entrance and the tripod daybeacon on the small islet ahead is visible, head for it. When past the end of the point on the port side a house will show on the far shore of the bay. Change course left and head for the house, passing midway between the small islet and the end of the point. Continue on this course until the float anchored in the middle of the bay to the north of your course and the north tangent of the wooded island back of it are on line. Change course and steer that range to the float which is anchored in 7 fathoms.

The only known danger inside the harbor is an extensive shoal making out from the eastern shore of the wooded island on the right near its southern end. The end of this shoal bares at a minus tide. This bay is not surveyed and must be entered with caution.

Twelvemile Arm, an inlet extending southwestward from near the head of Kasaan Bay, is about 12 miles in length and narrow. The depths are generally good.

Sandy Point, the northerly point at the entrance to Twelvemile Arm on the western shore, is low and wooded. A reef about 300 yards wide extends off the point in a south-southeasterly direction for about 500 yards. The approximate center of the reef is marked by a flat islet only about 4 feet out of water at high tide. The immediate vicinity of this reef is shoal and rocky. For a mile to the southwestward, the shoreline forms two small bights, and is marked by rocks and islets. Beyond this point the shore is clear to Loy Island and the entrance to Hollis Anchorage.

Outer Point is a rocky, wooded promontory about 200 feet high to the tree tops. It is on the southern shore at the entrance to Twelvemile Arm. A small island with a lone tree on it is just off the point to the northeastward in Kasaan Bay. Reefs extend about 150 yards offshore on the Twelvemile Arm side.

Jarvis Island is about 1 mile below Outer Point along the southeast shore of Twelvemile Arm. The shoreline is abrupt like the general shoreline. The northernmost of the Jarvis Islands is a small grass-covered rock about 600 yards from shore. A 1¼-fathom shoal is about 300 yards north-northwestward of this rock. A small, almost round, island stands out from this group; it is about 100 yards in diameter, is wooded, and has an elevation of about 200 feet to the tree tops. A reef about 50 yards in diameter is just off the north shore of this island. To a ship entering Twelvemile Arm, this reef appears as two rocks awash, except at very low water. At high water the reef is covered.

Loy Islands, a group of small islands, lie to the northeastward of the entrance to Hollis Anchorage on the west shore of Twelvemile Arm. The water toward the center of the arm from these islands is clear. Behind the islands the bottom is foul and full of reefs. In the bight northward of the islands are two rocks, awash at low water, which lie about one-third the distance between the large island on the south and the shore on the north. Farther back in the bight is a sunken rock, and still farther back a reef, awash at low water. The bight is hardly large enough for anchorage and the rocks render it of no value as such.

Hollis Anchorage, on the west side of Twelvemile Arm, affords good anchorage in 6 to 7 fathoms, but it is somewhat contracted by a 1½-fathom rocky shoal of considerable area which extends about 250 yards off the southeastern shore; also by the extensive flat which extends off the mouth of **Maybeso Creek.** In entering, avoid the gravel reef, bare at half-tide, which makes off from the southern shore to the center of the channel, and the rock, bare at one-third tide, lying 80 yards off the north shore opposite the reef. **Hollis** is an abandoned village on the western side of the anchorage.

Althouse Point is the southern point at the entrance to Hollis Anchorage. A rocky shoal with 2 fathoms over it is 550 yards southward of the point and 330 yards offshore.

Harris River Bay, at the mouth of **Harris River** is bare, but at high tide small craft can reach the abandoned Harris Creek Mine, 1.5 miles from Twelvemile Arm. A road leads to the mine from the southern point of the bay.

Mid-channel courses lead in good water through Twelvemile Arm. Numerous rocky reefs at the points do not extend more than 60 yards offshore. In the middle of the arm, about 0.5 mile 030° from the first wooded islet at the head of the arm, is a small grass-covered islet which is just awash at extreme high tide. A rocky shoal that bares at mean lower low water is 500 yards 030° from this islet and numerous patches of rocks that bare at about one-fourth tide lie between the islet and the western shore.

Chart 8102.—Behm Canal has been described earlier in this chapter.

Clarence Strait above Guard Islands has been wire-dragged and the dangers are shown on the various charts. The coast of **Cleveland Peninsula** from Caamano Point to Lemesurier Point, a distance of about 20.5 miles, is rocky, bold, and heavily wooded. Deep water approaches close inshore and there are no dangers more than 0.5 mile offshore.

Between Caamano Point and Lemesurier Point are several shallow bights where launches may anchor, but their use during stormy weather is attended with extreme danger.

Caamano Point, the southern extremity of Cleveland Peninsula, is marked by a light. Ledges extend southeastward. **Niblack Point** is marked by a daybeacon.

Ship Island, 14.5 miles above Guard Islands and 0.3 mile offshore on the east side of Clarence Strait, is 35 feet high, and has a few scraggy trees on it. A ledge extends a short distance from the south end. Between the island and the main shore is a depth of 25 feet, verified by means of a wire drag.

Ship Island Light, on the highest part of the islet and shown from a white wooden house, is 40 feet above water and visible 9 miles. The light is partially obscured by trees between the island and the main shore.

Chart 8124.—**Meyers Chuck** is a small harbor about 1.6 miles southeastward of Lemesurier Point. The entrance is between a light on the north end of **Meyers Island** and a buoy which marks the end of the reef which extends eastward of the small island northward of Meyers Island. A small settlement is in the cove back of Meyers Island. Good anchorage for small craft can be had and there are two floats. There is a general store and gasoline can be obtained. There are a grid for beaching small boats and a machine shop and blacksmith shop for minor repairs to machinery. Anchorage for small craft can also be had in the narrow arm next to the mainland. This arm, however, freezes over in the winter and the outer harbor does not. Meyers Chuck Light on the north point of

Meyers Island at the south side of the entrance to Meyers Chuck and shown from a white wooden house, is 22 feet above water; it is obscured from 244° to 040°.

To enter, give the northwestern point of Meyers Island a good berth to avoid a sunken rock with 5 or 6 feet over it, which is reported to lie about 100 yards off this point. Pass midway between the light and the buoy and turn eastward into the harbor.

Misery Island, northwestward from Meyers Chuck, is about 800 yards long, 225 yards wide, and about 200 feet high to the tree tops. The western shore is faced by almost perpendicular cliffs about 40 feet high. Two rocks are southward from the island; the outermost, distant about 300 yards, bares 4 feet at mean lower low water. A small rock, marked by kelp, is 300 yards eastward of the island. A sunken rock with about 4 feet over it is reported to lie about 150 yards off the mainland shore, 0.3 mile eastward from the southern point of Misery Island. There is reported to be 3 or 4 fathoms in the passage between the north end of Misery Island and the mainland. Favor the mainland shore.

Lemesurier Point, the south point at the entrance to Ernest Sound, is long, low, and wooded; its shores are bold.

Lemly Rocks, 0.2 mile off Lemesurier Point, are about 3 feet high. At low water there are three rocks close together with sunken rocks between them.

McHenry Ledge, with a depth of ¼ fathom and showing kelp, is 0.7 mile 320° from Lemly Rocks; it is marked by a lighted bell buoy 200 yards northwestward of it. There is a good passage between McHenry Ledge and Lemly Rocks, but the currents have considerable velocity; strong tide rips have been reported. A number of groundings have occurred on Lemly Rocks in attempting the passage in thick weather.

Ernest Sound is described later in this chapter.

Chart 8102.—The western shore of Clarence Strait from Grindall Point to Tolstoi Point, a distance of about 16 miles, is rocky, abrupt, wooded, and rises rapidly to peaks ranging from 1,300 feet to 2,100 feet in elevation. There are small inlets and indentations, the largest of which are Lyman Anchorage and Windfall Harbor.

Streets Island, a rocky islet 350 yards long in a northwesterly direction, 80 yards wide, 22 feet high, with a low bush near the center, is about 9 miles westward of Guard Islands, 0.4 mile from the western shore of Clarence Strait, and about 2.2 miles north-northwest from Approach Point, Grindall Island. Kelp extends a short distance from the ends of the island. A depth of 4 fathoms was obtained in the channel between the island and the main shore.

Chart 8076.—Lyman Anchorage is on the southwest shore of Clarence Strait about 4.5 miles southwestward of Ship Island. Its outer part is an open bight about 1 mile wide at its entrance. The inner harbor, extending 0.5 mile to the southwest from the head of the main bay, is about 200 yards wide, and has a controlling depth of 1¾ fathoms at its narrowest part. It offers excellent shelter in all weather for small craft, 3 to 8 fathoms anchor depths, mud bottom.

A rock with 1¾ fathoms over it and marked by kelp, is 250 yards northward of **Lyman Point,** the eastern point of the entrance, and a 2¼-fathom spot is 200 yards offshore, 0.2 mile east-northeastward of the same point.

Lyman Rock, awash at lowest tides, is near the middle of the anchorage, and is marked by a buoy on its southeast side. At the south end of Lyman Anchorage is a narrow

arm extending southward 0.5 mile with a depth of 10 feet in the channel and affording a secure anchorage for small craft at its head in 6 to 8 fathoms.

Hadley, on the southeast side of Lyman Anchorage eastward of **Sawmill Point,** was the shipping point for mines in the vicinity, which are not now in operation. The wharf is in ruins.

Figgins Point is a very bluff point approximately 1 mile northward of Lyman Anchorage. Rocks, bare at low water, are about 100 yards off the point.

Chart 8102.—Windfall Harbor, about 4 miles northwestward of Lyman Anchorage, is a narrow, crooked inlet extending to the southwestward for approximately 1 mile. Its entrance is obstructed by rocks, reefs, and islands. It is a poor anchorage and should be avoided by all except small craft. Rocks extend about 300 yards off the shore of the point to the southward.

From Windfall Harbor to Tolstoi Point small rocks and islets extend offshore for about 300 yards. **Tolstoi Point,** 9 miles above Lyman Point, is high, bluff, wooded, and has a low, bare rock close to its north end and a similar rock at its western end.

Chart 8124.—Tolstoi Bay has its entrance westward of Tolstoi Point and extends in a general southerly direction for about 4 miles. At the entrance it is about 0.8 mile wide, narrowing to 0.4 mile at the anchorage. The eastern shore is high and steep; the head of the bay is flat, and the land is low and marshy. Near the eastern shore at the head of the bay is a wooded islet, and south of it is a line of islets and rocks, some of which are covered at high water. There is anchorage in about 10 to 15 fathoms in mid-channel westward of the wooded islet, protected from all directions except from northward, from which direction the wind and sea come home, making the anchorage uncomfortable. Southwest winds draw through with considerable force. A reported sunken rock, marked by kelp, is 150 yards off the point on the west side about 0.5 mile northward of the wooded islet at the anchorage. A mid-channel track leads to the anchorage.

On the west side of Tolstoi Bay about 1.2 miles southward of the entrance is a small harbor marked by a wooded islet 150 yards offshore. The entrance is obstructed by an islet in mid-channel and a rock that shows at low water off its western side, leaving a clear channel less than 100 yards wide on the northeast side of the islet. The harbor is about 0.5 mile long and 300 yards wide; the anchorage is in about 9 fathoms near the middle. In entering pass southward of the outlying wooded islet.

There is no safe passage inside the group of small islands lying close to the west point at the entrance to Tolstoi Bay, although entering from southeast, between sunken rocks, contracted anchorage will be found for small craft in 9 fathoms.

Chart 8102.—Thorne Bay has its navigable entrance on the north side of a large island obstructing its mouth, 2.5 miles westward from Tolstoi Point. A rock lies close to the northern shore of the channel, northward of the island. Favor the island shore past this point. Thorne Bay is about 0.4 mile wide and extends approximately south-southwestward for 1.5 miles, with depths of 5½ to 9 fathoms. It divides into two branches, one extending 2.5 miles northwestward, with depths of 8 fathoms, shoaling to 3 fathoms near the head, where an arm, navigable for small craft only at high tide, extends in a north-northwesterly direction for about 1.5 miles; the other branch extends in a south-

easterly direction for about 1 mile, with depths of 7 to 8 fathoms to a point which divides the head of this branch into two coves which are shallow.

The bight southward of the large island in the entrance has depths of 8 to 15 fathoms; the channel to it favors the main shore, and rocks extend from the island almost to mid-channel. A 12-foot channel leads from the bight to Thorne Bay close to the west shore of the island. The small cove in the north shore of the bay, westward of the island in the entrance, has depths of 2 to 3 fathoms. The foregoing information is based on very meager data from a reconnaissance survey.

Tolstoi Island, about 2 miles northwestward of Tolstoi Point, is low and flat, with a few scrubby trees.

Snug Anchorage lies about 1 mile westward of Tolstoi Island. It is about 1.2 miles long and from 0.1 to 0.2 mile wide. An islet lies in the center of the bight at the head of the anchorage. In entering, pass southward of the islands off the entrance, then favor the western shore to avoid the rock awash, which lies about 300 yards southward of the northern point of the entrance. The channel passes to the westward of the small islets which lie close to the northern shore. Depths of 5 fathoms were obtained in the narrowest part of the channel, and depths of 7 to 25 fathoms were found at the head of the cove. In the small cove eastward of Snug Anchorage, depths of 12 to 15 fathoms were found. A rock lies near the head of this cove. Neither place has been thoroughly surveyed, and irregular depths indicate the necessity for caution.

Forss Cove lies about 1.8 miles north-northwestward from Tolstoi Island. A narrow channel 0.3 mile long in a southerly direction and in places less than 50 yards wide, opens into a bight 0.5 mile long in a westerly direction and 0.2 mile wide, in which there are numerous small islets. The entrance is reported foul.

From Forss Cove to Narrow Point there are numerous small bights (exposed to southerly winds) in which there are rocks and small islets.

Narrow Point, about 7.5 miles north-northwestward of Tolstoi Point, shows as a wooded knob just above the wooded shore in its vicinity. Narrow Point Light, shown from a red wooden house, is 35 feet above water and visible 9 miles. The light is obscured from 336° to 152°.

Chart 8124.—Ratz Harbor, lying about 7 miles north-northwestward of Narrow Point, is a small anchorage but little more than 0.5 mile long and 0.2 mile wide; it affords shelter from all winds except from north to northeast, and these probably blow home with some force. Williwaws from the southeast at times strike with great force in this anchorage. The northern point at the entrance is a ledge with an islet near the shore, and two heads, each with a single scrubby tree, near its southeast end all connected at low water. The outer head is marked by a light. Ratz Harbor Entrance Light, shown from a small white house, is 20 feet above the water. From the southeast point at the entrance a ledge, covered only at high water, extends 130 yards northwestward. The width of the channel between is about 230 yards.

A careful mid-channel course carries in clear. A depth of 5 to 8 fathoms was found at the entrance and 8 to 11 fathoms inside. The usual anchorage is in the middle of the southern part of the harbor. There is a flat in the western indentation of the harbor; otherwise there are no dangers.

Chart 8201.—A small cove, open to the southeastward, is about 1.5 miles southeastward of Ratz Harbor. It is rocky in the northern part.

The shoreline from Ratz Harbor to **Clear Creek,** a distance of 6.3 miles, is practically straight. A small rock, 20 feet high, is 450 yards to the northward of the mouth of the creek.

Luck Point, on the west side of Clarence Strait opposite Point Stanhope, is a rounding point without marked features. Here the shoreline turns westward and changes from a steep, rocky formation to a boulder beach about 100 yards wide. About 0.4 mile westward from Luck Point a narrow ledge extends offshore for about 0.3 mile. About 1.2 miles northwestward from Luck Point, rocks, bare at low water, parallel the beach for a distance of about 1 mile; the outermost is distant about 0.2 mile from the shore.

Etolin Island, on the northern side of Clarence Strait near its head, separates Ernest Sound from Stikine Strait. The coast is bold, rocky, and densely wooded, and is broken by numerous inlets and off-lying islands.

Chart 8161.—The Onslow Islands, on the north side at the entrance to Ernest Sound, are five wooded islands and numerous small ones, the largest of which is **Onslow Island,** 3.2 miles long and about 350 feet high.

The western shore of Onslow Island is indented with small bays filled with ledges and rocks. Small rocks and islets extend offshore 0.1 to 0.3 mile. An inlet about 0.5 mile long, opening from the southward and then extending eastward, lies about 1.8 miles from Ernest Point. It is unsurveyed, but it is reported that 8 feet can be carried through the narrow neck near high water, and that 4 fathoms, mud bottom, are obtained within. Rocks, awash, and kelp lie in the entrance, and tide rips extend off the point.

Ernest Point is the southernmost point of Onslow Island and is the northwestern entrance point to Ernest Sound. Foul ground extends for 0.5 mile south-southeastward of the point.

Onslow Point consists of two wooded islets with a large bare rock to southeastward; deep water lies close off the point to southwestward. Reefs and foul ground connect Onslow Point with **Eagle Island,** a large wooded island northward of Onslow Point. The cove on the southeast side of Eagle Island is foul. Tide rips form off Onslow Point.

Muffin Islands are a group of four small wooded islands about 0.4 mile eastward of Eagle Island. The channel between Eagle Island and Muffin Islands is clear. Reefs extend offshore about 0.6 mile to the northward and northwestward of the Muffin Islands.

The southeast and eastern shores of **Stones Islands** are foul; rocks extend offshore 0.2 to 0.5 mile. The small bight between the Stones Islands affords shelter for very small craft to the southeastward of the wooded island in the entrance. Anchorage may be obtained in 5 fathoms, mud bottom; the channels leading to it are tortuous. The cove in the northern shore of the larger Stones Island is completely filled by flats. No fresh water was found here.

The channel between Onslow Island and Eagle Island is clear except for reefs which make out from each side of the channel about 1 mile northward from the southern end of Eagle Island. The end of each reef is marked by a rock, the rock on the eastern side of the channel bares 8 feet at low water, and the rock on the western side bares 6 feet at low water. Mid-channel courses are good; when passing between the two rocks, slightly favor the eastern side. The cove on the western side of the channel to the southward of the north end of Eagle Island has depths of 2½ fathoms in the middle and depths of

11 fathoms, mud bottom, at the entrance. Water may be obtained from a small stream at the head.

The channel between Onslow and Stones Islands is irregular, depths of 6 fathoms being found near the southern end. A wooded island lies in the passage with deep water between it and the larger Stones Island. A rock, which bares, lies 200 yards off the island, and in passing favor the larger Stones Island. The channel southward of Carlton Island is foul and bares at low water. The passage northward of Carlton Island has depths of 6 to 7 fathoms and from the southward passes eastward of the rock, which bares about 8 feet and lies 500 yards eastward of Carlton Island.

A dangerous rock which bares about 6 feet lies in mid-channel in the passage northward of Stones Islands. Keep Stones Islands close aboard about 100 yards distant when this rock is covered. A dangerous ledge, which bares, extends more than halfway from Etolin Island toward eastern Stones Island and renders this passage dangerous except at low water.

These channels are small boat passages and are not suitable as anchorage on account of the rocky bottom and the currents, which vary in strength from 2 to 4 knots and often are considerably strengthened by a moderate breeze.

Chart 8124.—Dewey Anchorage, on the northeast side of Clarence Strait opposite Ratz Harbor, can be used as a summer anchorage, but the bottom is irregular and rocky, there are several dangers in the entrance, and the protection is poor. **Gull Point,** the northwestern extremity of Onslow Island, is the southeast point at the entrance. A sunken rock lies 200 yards off the point, and a reef, bare at lowest tide, lies 0.6 mile southward of it. **Carlton Island,** flat and timbered, is the larger island northeastward of Gull Point; a shoal extends 350 yards southwestward from its western end. **Mabel Island,** 0.2 mile in diameter, lies about 0.8 mile northwestward of Gull Point; a reef covered at half tide and without kelp lies 0.6 mile south-southwestward of Mabel Island; a reef bare at half tide lies 0.8 mile northwestward of Mabel Island, and a rock bare at half tide lies 0.3 mile southwestward of the reef. **Center Island,** 200 yards in diameter, lies midway between Mabel Island and the northern shore; rocky bottom with 4 fathoms lies 300 yards southward of Center Island, and there are 4½- to 4¾-fathom patches between the island and the shore northeastward.

Caution.—The area has not been wire-dragged; there may be other dangers not charted.

Split Island, small and wooded, lies 0.3 mile to the southward of **Kelp Point,** the northwest entrance point of Dewey Anchorage. A reef lies close to the eastern end of the island. **Double Island,** small and wooded, 180 feet high, lies 0.6 mile to the southward of Kelp Point. A small wooded islet lies 0.1 mile eastward of Double Island, and foul ground extends to the northeastward; the channel between is foul.

To enter Dewey Anchorage from southward, stand in on the line of the east sides of Mabel and Center Islands until abreast Gull Point, and then pass midway between Mabel and Carlton Islands. Anchor 0.4 to 0.5 mile northwestward of Carlton Island in 15 to 18 fathoms.

From westward, pass 0.5 mile southward of Double Island and head for the north end of Center Island. When abeam the west end of Mabel Island, proceed with caution to the anchorage.

Small craft can find better anchorage 0.5 mile eastward of Carlton Island in 6 to 8 fathoms, hard sand bottom. This anchorage can be entered from westward, passing northward of Carlton Island, or from southeastward, using one of the passages described above.

Chart 8201.—McHenry Anchorage has a clear width of about 700 yards and a length of about 1 mile from Avon Island to a small island at its head. It is sheltered except from westward, and small vessels can anchor in the southeast part of the harbor with shelter from all winds. **Avon Island,** on the north side of the entrance, is small, wooded, and lies close to shore; it should be given a berth of over 200 yards. A reef extends about 400 yards in an easterly direction from the east side of Avon Island. A rock, with a depth of 1¾ fathoms over it, is 0.5 mile southward of the western end of Avon Island. **Sand Islet,** with a green bush on it, is close to the southeast point at the entrance; a reef, bare at low water and showing kelp, extends 0.2 mile northwestward from it, and a shoal extends 250 yards eastward of Sand Islet.

To enter McHenry Anchorage keep Avon Island aboard, distant about 400 yards, and anchor in the middle, with Sand Islet bearing about 198°, in 9 to 12 fathoms; or a small vessel can follow a mid-channel course and anchor 250 yards westward of the wooded island in the southeast end of the harbor in 5 to 7 fathoms.

Quartz Rock is the extremity of the reef, awash at high water, about 0.3 mile westward from the point northwestward of McHenry Anchorage.

McHenry Inlet has its entrance 5 miles eastward of Point Stanhope and less than 2 miles northward from McHenry Anchorage. It is horn-shaped, about 4 miles long, and 0.5 to 0.8 mile wide. Foul ground extends about 1.5 miles in a westerly direction from the southeast entrance point. **Range Island,** the small wooded island in mid-channel at the entrance, is the most northerly of the group off this point and lies about 0.5 mile to the southward of a small rocky islet off the northwestern point of the entrance, with a clear channel between. A 2-fathom spot is 1.2 miles 310° from Range Island. A long narrow ridge, with depths of 6 to 10 fathoms with deep water on each side, is in mid-channel, in the direction of the channel, 0.6 mile northeastward of Range Island.

McHenry Islet, a small rocky islet, is 1.6 miles 082° from Range Island. Foul ground extends in a southerly direction from this islet for about 200 yards, and to the northwestward extends to the north shore of the bay.

Nut Rock is about 700 yards 220° from McHenry Islet. A sunken rock is 550 yards 073° from McHenry Islet.

In entering, pass about 0.1 mile northward of Range Island, then turn between McHenry Islet and Nut Rock, favoring Nut Rock, and follow the trend of the channel favoring the southeastern shore until past the sunken rock northeastward of McHenry Islet; then follow mid-channel courses. Anchorage may be had in 12 to 19 fathoms, beyond the turn in the channel. Foul ground extends about 0.3 mile from the head of the bay.

Jadski Cove, on the northern side of McHenry Inlet, has its entrance about 1 mile northeastward of Range Island. Depths of 11 and 12 fathoms are found in the bight in the northwest end of the cove, but the approaches are foul.

Chart 8120.—Burnett Inlet, about 5 miles northeastward of Point Stanhope, extends in a northerly direction for about 7 miles, with an average width of 0.2 mile. **Fawn Island,** wooded, and about 0.3 mile in diameter, is on the western side of the channel at the en-

trance. Three small wooded islands and some rocks extend 0.2 mile off the north shore of Fawn Island. The approach to the channel northward of the islands from the westward has not been surveyed. A small wooded islet, with a rock awash 150 yards off its northern end, is 0.3 mile westward of Fawn Island. A 2½-fathom spot is 0.5 mile southeastward of Fawn Island close to the eastern shore. The narrow channel eastward of the shoal is apparently deep but the bottom is irregular.

Rocks extend from 50 to 100 yards off the eastern and southern shores of **Cannery Point,** the western point of the entrance. A reef, bare at low water, marked by a buoy, is about 300 yards off Cannery Point. The channel between it and the point is too narrow for ships to use. A shoal about 0.2 mile long in a northerly direction is about 0.3 mile eastward of Cannery Point, almost in mid-channel. It has two knobs; the northwestern, with a depth of 1¼ fathoms, marked by a buoy, is separated by 12-fathom depths from the southeastern knob, on which 6¼ fathoms were found. The channel between the shoal and the reef to the westward has depths of 34 fathoms.

The small cove behind Cannery Point has depths of 6 to 8 fathoms in the middle, with swinging room of about 150 yards, and is used by fishing craft for an anchorage. There is a float on the eastern side of the cove with ample depths alongside for small craft.

North and **South Burnett Islands** lie close to the eastern shore of Burnett Inlet near the entrance. The passage between the mid-channel shoal and South Burnett Island has depths of 19 fathoms. **Deadman Island** lies at the northern end of the bight off the northwestern shore near the entrance. A narrow shoal with depths of 6¼ fathoms lies midway between Deadman Island and North Burnett Island. The channel westward of this shoal has depths of 27 fathoms, but leads over a 5½-fathom spot and probably less water. The channel eastward of this shoal has depths of 24 fathoms.

Chart 8160.—The inlet above Deadman Island has not been surveyed, but a line of soundings shows depths increasing to 67 fathoms 1 mile from Deadman Island, then decreasing to 9 fathoms near the narrows, 2.5 miles from the head, beyond which no soundings were made. There is reported to be 3 to 5 fathoms through the narrows, which is obstructed by kelp. A current in the narrows, estimated at 5 to 6 knots on the last of the ebb, has been reported. There is a prominent waterfall on the eastern shore 3 miles from the entrance. The inlet is too deep for secure anchorage. Enter to the southward and eastward of Fawn Island, then proceed between the buoys.

Mosman Inlet, about 4 miles northeastward of Point Stanhope, makes north-northwestward into Etolin Island for about 6 miles, with an average width of about 0.3 mile. This inlet has not been surveyed. There are two rocks on the eastern side about 0.8 mile above **Marble Point,** the eastern point at the entrance. A reef extends from the north end of the islet lying 1 mile north-northwestward of Marble Point to the western shore. This reef obstructs the northern approach to the coves on the western side of the entrance to the inlet.

Cooney Cove is a narrow inlet to the northeastward of Rocky Bay. It is exposed to the southward, the approach is foul, and there are rocks near the head.

Rocky Bay, to the northward of Point Stanhope, is studded with rocky islets and sunken rocks. **Streets Lake** has its outlet in the middle bight at the head of Rocky Bay. A rock with ½ fathom of water on it is 2.5 miles 060° from Point Stanhope.

Point Stanhope is the southern extremity of a group of islands having an average height of about 140 feet to the tree tops. A rock with a depth of 1 fathom on it, marked by a buoy, is 0.8 mile southward of the point. There are several passages among these islands available for small craft bound to Rocky Bay. **Three Way Passage**, having its entrance about 1.5 miles northwestward of Point Stanhope, is the best. It has a depth of 5 fathoms, is narrow, leads close to several dangers, and local knowledge is desirable for its safe navigation.

Anchorage may be obtained by small craft drawing less than 4 feet of water in the channel just eastward of Three Way Passage. The widest part of the channel is about 150 yards and is entered by way of Three Way Passage. There is an anchorage for very small craft in the cove 2.6 miles northwestward from Point Stanhope. The channel which leads from the head of the cove to Rocky Bay bares in spots and is suitable only for boats drawing 2 or 3 feet of water.

The Etolin Island shore from Point Stanhope to Point Harrington, a distance of about 11.8 miles, is rocky and generally foul. A fringe of islands parallels the coast, about 0.5 mile off, almost to Point Harrington. It comprises **Abraham Islands, Screen Islands, Marsh Island,** and **Steamer Rock,** a wooded islet about 100 feet high, off the southern end of which is a rock 12 feet high, the end of a ledge. It is advisable for vessels in navigating the strait to give the shore a berth of at least 1 mile and pass westward of Lincoln Rock Light. The passage eastward of the islands may be used by small craft. The known dangers are shown on the chart.

Lincoln Rock Light stands on **Lincoln Rock** 0.5 mile westward of Abraham Islands, 150 feet high and wooded, and 1 mile from the northeast shore of the strait, with no safe passage for large vessels between. The light, shown from a brown square pyramidal skeleton tower on a concrete base, is 58 feet above water and visible 11 miles. The fog signal, sounded on a diaphone horn, is at the light. The keeper's dwelling, which is prominent, is on a small islet 0.2 mile northeastward of the light.

Small vessels find shelter behind the small islands in the bay which lies 1.2 miles southeastward of Steamer Point. Stikine Strait is described later in this chapter.

Johnson Cove, to the eastward of the northern end of Screen Island, offers anchorage for four or five small vessels of less than 4-foot draft but only to those with local knowledge. Strangers should not attempt this entrance. Swinging room is limited by ledges on the northwestern side of the cove and shoal water toward its head. Several islands are off the entrance. The cove is entered southward of the rock, awash, 150 yards off the southeast end of the large island near the entrance and eastward of the rock, awash at high water, in mid-channel at the entrance. Fresh water may be obtained from streams which empty into the cove. There is a small float in the cove and a number of houses on the shore.

Chart 8164.—Steamer Bay, eastward of **Point Harrington,** affords anchorage at its head, but the holding ground is not good and southeast winds draw with considerable force through **Porcupine Creek.** It is open to northwestward. The bay is 1 mile wide at its entrance, gradually contracting near its head to less than 0.2 mile, then again widening into a basin 0.3 mile in diameter, into which a creek empties. For a distance of 1.2 miles from Point Harrington both shores of the bay have some rocks close inshore.

The bay is easy of access, a mid-channel course leading fair into the inner basin. The best anchorage is probably near the middle of the basin, favoring the eastern shore

in about 16 fathoms, though small craft may find better bottom by anchoring in 6 fathoms close to the eastern shore, just past a cabin on the beach and southward of **Independence Island,** a bare rock 3 feet high, which lies near the shore on the northeast side of the basin.

Mariposa Rock, with 3½ fathoms of water over it and marked by a buoy, is 0.6 mile 312° from Point Harrington.

Chart 8160.—The deep cove just south of Steamer Point, locally called **Kindergarden Harbor,** is used extensively as anchorage for small craft. It is one of the best anchorages in the area and affords protection in all weather. Enter mid-channel, passing south of the small wooded islet, and anchor in 5 to 7 fathoms, soft bottom.

Steamer Point, 3 miles northward of Point Harrington, is bold, steep, and heavily wooded. Deep water extends close to the point. Steamer Point Light is on a small wooded islet close to the point northward of Steamer Point. The light, shown from a red house 10 feet high, is 30 feet above the water and visible 9 miles. It is obscured from 213° to 017°.

Kashevarof Passage and Snow Passage form the head of Clarence Strait and are the two passages connecting with Sumner Strait to westward of Zarembo Island. Kashevarof Passage is wide but is beset with rocks, reefs, and shoals, with strong tidal currents and tide rips. All known dangers in the pass are charted and the pass is extensively used by small craft. Large vessels use Snow Passage which is clear and marked by lights.

Chart 8162.—A cove, about 0.6 mile wide and 0.4 mile long, is about 3.5 miles northwestward from Luck Point. The head of the cove is noticeable for its low-water area, a sand beach about 300 yards wide. A rock, bare at half tide, is in the middle of the cove, and some rocks are on the edge of the sand flat to the westward of mid-channel. A rock, bare at low water, is 0.4 mile northwestward from the eastern point of the entrance, and rocks bare at low water, are about 0.2 mile offshore from the east point of the entrance for about 0.5 mile to the eastward.

Coffman Cove is on the western side of Clarence Strait about 5 miles west-southwestward of Lincoln Rock Light. It is about 0.8 mile long and 0.2 mile wide. The western half of the cove is filled with rocks, some of which are bare at low water. Good anchorage for small craft may be had in the middle of the southeastern part of the cove in 10 to 15 fathoms, muddy bottom, and a mid-channel course will carry in safely. A flat extends about 0.2 mile from the southeast end of the cove.

Chart 8160.—Kashevarof Islands, on the northeast side of Kashevarof Passage, are low and wooded, though there are many bare rocks. There are many passages between the islands but all are beset with rocks and reefs and require local knowledge for safe navigation.

The **Blashke Islands** form a group of islands at the southeast end of the Kashevarof group. All are wooded and separated by narrow foul channels. **Rose Rock, Rose Island, Seal Rock, The Triplets,** and **Deichman Rock** lie on the foul ground to the southward.

Chart 8162.—Lake Bay is on the southern side of Kashevarof Passage between **Stevenson Island** and **Coffman Island,** a distance of 3.5 miles, and is about 2.8 miles long.

Across the entrance and in the bay are detached islands and reefs and the best channel is from northeastward, between Beck and Coffman Islands.

Beck Island, small and wooded, is about 0.8 mile northwestward of Coffman Island. Beck Island Light, on the south side of the island and shown from a white wooden house, is 20 feet above water and visible 6 miles. The light is obscured from 098° to 255°.

Gull Rock and **Barnacle Rock,** awash at highest tides, lie about 0.6 mile south-southwestward and westward, respectively, from Beck Island; they should be given a berth of over 300 yards. There are also extensive sunken reefs between Beck Island and **Bush Rock.** The latter is 0.6 mile off Stevenson Island, is 35 feet high, and has bushes on top.

Abreast **Keg Point** on Stevenson Island the channel is about 250 yards wide between an extensive shoal which makes out from the eastern shore and a shoal projecting out 175 yards from Keg Point. There is good anchorage inside the restricted entrance for large or small craft in 6 to 15 fathoms, soft bottom. An occupied cabin is on the east shore of the entrance to **Lake Bay Creek.**

To enter Lake Bay, pass about 0.5 mile northward of Coffman Island, and about 350 yards southward of Beck Island and southward of a 3-fathom rock and steer **255°** passing midway between Gull Rock and Barnacle Rock and heading for the cross beacon on Keg Point. When well past the shoal on the port side, about 400 yards off Keg Point and the tangent of the left shore of the entrance to Lake Bay Creek opens up, change course to **202°** and head for anchorage in the depth you desire. When leaving anchorage in the entrance to Lake Bay Creek from abeam Keg Point, 400 yards off, a safe course of **000°** may be steered, passing 400 yards to the west of Bush Rock, midway between it and the shoal on the left. When past Point Barnes you may enter from this course either Lake Barnes or Whale Passage.

Chart 8160.—Point Barnes, the northeastern extremity of Stevenson Island, is low and wooded, without characteristics of interest to the navigator.

Lake Barnes is a salt water lake of considerable extent lying southwest of Stevenson Island. It has two outlets through which strong currents flow during changes of tide. Small craft up to 10-foot draft may enter into the lake on high slack water, passing through **Indian Creek,** the westerly of the two entrances. This passage has submerged dangers and must be navigated with extreme caution. It has a least depth of 6 feet in mid-channel.

Enter on course **189°** keeping 0.2 mile off the point on the port side. When past all islands on the starboard side and almost abeam a point on that side change course left and favor that shoreline until past two submerged rocks. Then steer mid-channel avoiding heavy kelp beds as much as possible. Good anchorage may be had in the lake in 4 to 7 fathoms.

On high water small boats with outboards go from Lake Barnes through **Gold and Gallion Lagoon** into the large inner lake, locally called **Sweetwater Lake.**

Whale Passage leads westward of **Thorne Island,** is reasonably well surveyed, and all known dangers are charted. It can be safely navigated with proper caution. Mid-channel courses through the constricted areas are easily followed and clear all known dangers. The passage is used extensively by fishermen and trappers.

Shelter for small craft may be found on the north side of the passage near its south entrance, in the small cove just after passing between the two charted rocks directly

off a small cabin near the beach in 5 fathoms, soft bottom. The bay which extends to the northwest near the middle of the passage affords good anchorage with ample swinging room in 4 to 10 fathoms, soft bottom. An excellent anchorage for small craft in all weather may be found when headed north from the middle of the passage, on the eastern side between the irregularly shaped wooded island and the shore of Thorne Island. Enter around the northern end of the wooded island and north of the charted rock, pass south along the eastern side of the island, keeping a charted rock on the starboard side, and come to anchor in 4 to 5 fathoms of water, soft bottom, off the southeastern tip of the small island and a cabin on the shore of Thorne Island.

To enter Whale Passage from the south steer mid-channel, passing the small wooded islet close-to on the port side. Continue on mid-channel courses, passing between the two charted rocks. All known dangers through the passage are marked by heavy kelp. Pass north of the next group of charted rocks and of the small wooded islet and south of the rock lying off the point projecting from the north, between the point and the large wooded island into the wider part of the passage. Mid-channel courses through the wide part of the passage are free of dangers. Round the irregular shaped wooded island and the rock lying off its northern end, passing in 6 fathoms between two charted rocks and changing course left, passing a small wooded islet on the starboard side, avoiding the rock off its southwest shore and cross the 1¼-fathom shoal. From here steer mid-channel through the north entrance of the passage.

Exchange Cove, on the northwestern side of Kashevarof Passage, is about 0.2 mile wide and 1 mile long, and is the largest sheltered anchorage in this vicinity. It has room for several small vessels and is well protected from all directions. The depths are 10 fathoms at the entrance, shoaling gradually toward the head. **Exchange Island** forms the eastern shore of the northern part of the cove.

The islets and bays at the northwestern end of Kashevarof Passage are described with Snow Passage following.

The currents at the northwest end of Kashevarof Passage are similar to those of Snow Passage, but their velocity is considerably less.

The main channel, leading between Beck Island and The Triplets and as far west as **West Island,** has been examined by means of a wire drag, and the dangers are shown on the charts. The section from West Island to Fire and Echo Islands has many dangers and has not been closely examined, but there is an apparently clear channel leading from the southern end of West Island.

West Island should be left about 0.5 mile on the starboard hand to avoid a 2¾-fathom spot. Pass midway between West Island and the small sparsely wooded islet which lies almost in mid-channel to the westward of West Island; thence about 0.2 mile to the eastward of the small rocky wooded islet which lies about 0.8 mile eastward of the south end of Exchange Island; thence in mid-channel between Exchange Island and the small double island to the northward; thence in mid-channel to westward of Fire Island; thence between Tide and Bushy Islands, or Rookery and Tide Islands.

There is a channel to the eastward of **Fire Island,** between it and **Echo Island** is a small wooded island about 150 feet high with foul shores; the channel to the westward is preferred. The channel to the southward of **Shrubby Island** is used by small craft. In making the passage kelp should be avoided at all times. The bottom is very irregular and the channel has not been wire-dragged. The channel between **East** and **Middle Islands** is used by small boats.

There is a channel eastward from 1 mile north of the northern end of West Island and south of the small wooded island with the two islets beyond remaining on the port-side; thence mid-channel between Shrubby Island and the most northerly of the Middle Islands. Follow the shore of the Middle Islands about 0.4 mile off and south of the larger wooded island nearest Shrubby Island.

On the south side of the last described channel, between the 240-foot island and the larger island southeast of it, is a shelter for small craft in all weather. The entrance passes over a 1-fathom depth to anchorage in 2½ fathoms off a float and house.

Key Reef is an extensive reef lying about 1.8 miles from the Kashevarof Islands. The northern end of the reef, about 3.5 miles westward of Point Harrington, usually shows at high water as two rocks about 5 feet high and about 100 yards long, but they are awash at extreme high tides. Key Reef Light, near the northern end of the reef, is shown from a white wooden house on truncated concrete pyramid. The light is 35 feet above water and visible 9 miles. A number of low-water rocks are near Key Reef, one lying 0.8 mile southeastward covers at three-fourths flood.

Bluff Island is a small wooded island about 1.8 miles to the westward of Key Reef. Reefs extend at low tides about 200 yards from the northwest and southeast ends of the island. The eastern and western shores are clear. A daybeacon marks the east shore of the island.

Zarembo Island, about 15 miles in diameter, heavily wooded, and rising to an elevation of about 2,500 feet, is at the head of Clarence Strait. A rather low valley extends east and west across the island. The shoreline is rocky, with off-lying rocks and reefs, except along the eastern shore. The channels around Zarembo Island have been wire dragged and the swept areas are shown within the tinted section of the chart.

Point Nesbitt, the southern point of Zarembo Island, is low, rising to high ground inshore.

Nesbitt Reef is a dangerous reef extending 0.8 mile southward from Point Nesbitt. Near the outer end of the reef is a rock covering at three-quarters flood. There are rocks, bare at low water, a short distance outside it and a string of rocks between it and the shore, which covers at various stages of the tide. The tidal currents have considerable velocity in its vicinity, and care should be taken, especially in foggy weather. Shoals with 5½ to 10 fathoms over them have been found eastward of the reef.

Nesbitt Reef Light, shown from a skeleton tower on a concrete pier on the southern end of Nesbitt Reef, is 27 feet above water and visible 9 miles.

From Point Nesbitt to **McNamara Point,** a low wooded point marked by a daybeacon, a distance of 9 miles, ledges extend offshore in places about 0.3 mile, nearly all of which bare at low water. Those abreast the bare rocks close to the middle of the east side of Bushy Island are always covered and are marked by kelp at slack water. Rocks extend about 0.5 mile southward from McNamara Point. At night, deep shadows are cast by the high land inshore, and the daybeacon cannot always be readily picked up.

From McNamara Point to St. John Harbor the shore is fringed with ledges to a distance of 0.5 mile in places, with broken ground farther out, and this shore should be given a berth of 1 mile or more.

A rock, bare 5 feet at mean lower low water, is 0.3 mile offshore 1.3 mile 315° from Point Nesbitt. A rock, bare at low water, is about 0.2 mile from the east shore of Shrubby Island and about 2 miles westward of Point Nesbitt.

At the southeast end of **Bushy Island** is a bare rock, about 0.3 mile from shore, from which a covering ledge extends 0.2 mile southward. The bare black rocks, close to the middle of the east side of Bushy Island, are several feet high.

Bushy Island Light is shown from a white house on a brown cylindrical base erected on a rock off the northeastern end of Bushy Island. The light is 22 feet above water and visible 9 miles. The light is obscured from 353° to 111°. From points to the westward the light appears well off the Bushy Island shore.

A lighted buoy is about 0.7 mile eastward from Bushy Island Light. It marks the eastern side of the channel close to a kelp patch near the edge of which are two rocks covered at half tide.

A fish buyer's scow is anchored each summer in the small cove on the north shore of Bushy Island and south of the small islet. Halibut and salmon are purchased and all necessary supplies for fishermen including food, clothing, gasoline, fuel and Diesel oil may be obtained. A radio schedule is maintained with Alaska Communications System.

Snow Passage is between Bushy Island, the northernmost of the Kashevarof group, and Zarembo Island. It is a deep channel about 0.5 mile wide, with foul shores and strong tidal currents. Snow Passage is largely used by vessels bound from or to Wrangell Narrows or between Clarence and Sumner Straits, and not desiring to touch at Wrangell, as it is shorter than the route through Stikine Strait. It has been examined by means of a wire drag and is clear in mid-channel, except for a shoal with a depth of 4½ fathoms in the middle of the channel northeastward of Rookery Islands. The shoals in Snow Passage are clearly marked by kelp at slack water. During spring tides a considerable number of drifting logs may be encountered in the passage of a size dangerous to vessels.

Excellent anchorage may be had west of Bushy Island in 15 to 20 fathoms, with Tide Islet bearing 209°, distant 1 mile. This anchorage is protected from all but winds from the northwest.

The currents of Snow Passage somewhat resemble those of Seymour and Sergius Narrows in their peculiarities. The currents from Sumner Strait meet those from Clarence Strait in the vicinity of Key Reef. The flood or southeasterly current has a maximum velocity of 3 to 5 knots and the ebb or northwesterly current 4 to 6 knots in the narrowest part of the passage. Swirls, of some severity at times, occur from abreast Ossipee Channel to the north end of Bushy Island; westward of the last named point they are very much lessened. For predicted times and velocities of the current the *Current Tables, Pacific Coast,* should be consulted.

Ossipee Channel, between Shrubby and Bushy Islands, has not been dragged, but an examination by means of the lead indicates a clear channel. Thick kelp and ledges line the channel on both sides, but the mid-channel is apparently clear.

The current sets fair with the channel in Ossipee Channel. When the current runs north in Snow Passage, its direction in Ossipee Channel is west, and vice versa.

Tide Islet, small and wooded, about 120 feet high to the tree tops, is about 2.2 miles to the westward of Bushy Island. Rocks, marked by kelp and bare at low water, lie to the southeastward and southwestward, close-to.

Rookery Islands, two in number, about 150 feet high and wooded, lie in mid-channel near the northwest end of the passage and 1.8 miles southwestward of McNamara Point. Between the islands are a bare rock and ledges that cover, and close westward of western Rookery Island are two islets, each having a clump of trees.

Rookery Island Light is on a small white house on the northeast end of the easternmost of the Rookery Islands. The light is 40 feet above the water and visible 9 miles. It is obscured from 279° to 163°.

Salmon Bay is about 1.2 miles westward of Rookery Islands. Small craft can find sheltered anchorage in 1 to 3 fathoms near the head. It is extensively used as a harbor by local boats during certain seasons of the year.

A line of detached rocks 1.2 miles long, bare at different stages of the tide and marked by kelp at slack water, lies about midway between Rookery Islands and Point Colpoys and from 0.2 to 0.6 mile offshore. The channel leading along the shore westward of them appears to be clear.

The bays and coves to the southward of Salmon Bay are nearly dry at low water and have foul entrances. They lead into a salt marsh which parallels the beach. Overfalls, currents, and rocks make the various entrances dangerous except at high water. It is reported that at extreme high water boats drawing 5 feet make the passage from Salmon Bay to the first bay to the southward through the salt marsh.

Point Colpoys, about 4.5 miles westward of McNamara Point, is low and wooded.

Point Colpoys Light, shown from a white wooden house, is 15 feet above water and visible 9 miles. The light is obscured from 302° to 114°. Irregular bottom extends about 0.3 mile to the northward, and from a position about 1.2 miles eastward of the light shoals extend in the general direction of Rookery Islands.

Bay Point is a low wooded point about 1 mile to the southeastward of Point Colpoys.

For courses through Snow Passage see Chapter 3.

Chart 8201.—Ernest Sound and Stikine Strait, with their connecting passages, Zimovia Strait, Blake Channel, and Eastern Passage, afford various routes from Clarence Strait to Wrangell. Large vessels go by way of Stikine Strait, but small craft frequently go by way of Ernest Sound and Zimovia Strait, or by Ernest Sound, Blake Channel, and Eastern Passage, these last two routes affording better protection in stormy weather. The distances to Wrangell by these routes from a point 2 miles westward of Lemesurier Point are 52, 50, and 60 miles, respectively.

Chart 8161.—Ernest Sound is the large body of water which opens from Clarence Strait between Lemesurier Point and Onslow Point, with a width of about 4 miles between the points. Its general direction is north-northeastward for 25 miles to Point Warde; from this point, under the name of Bradfield Canal, it extends 17 miles in a general easterly direction, with a width of about 1 mile. There are numerous small islands in the sound and two large ones, one on each side, about midway of its length.

From Ernest Sound two arms extend north-northwestward, and joining near the mouth of Stikine River, inclose Wrangell Island. The western arm is called Zimovia Strait. The southern part of the eastern arm is called Blake Channel and the northern part Eastern Passage. A passage to Wrangell through Ernest Sound, Blake Channel, and Eastern Passage is practicable, and is sometimes used. Small craft use Zimovia Strait frequently.

The main part of Ernest Sound as far north as **Eaton Point,** about 13 miles northeastward of Lemesurier Point, a channel 0.8 to 1.5 miles wide from Eaton Point to the north end of Deer Island, and the channel from Deer Island to the junction of Blake Channel and Bradfield Canal, and through Blake Channel and Eastern Passage, have

been examined by means of a wire drag. None of the other tributaries, except Union Bay and a part of Zimovia Strait, have been closely examined by means of the wire drag.

The principal dangers in the main part of Ernest Sound are McHenry Ledge, with a depth of ¼ fathom, and a 3-fathom rock off the entrance to Union Bay. To keep in the middle of the dragged channel between Eaton Point and the north end of Deer Island, vessels should pass 0.6 mile westward of Eaton Point, 1.2 miles westward of Point Peters, in mid-channel between Deer and Niblack Islands, and 0.6 mile westward of the north end of Deer Island.

Lemesurier Point, Lemly Rocks, McHenry Ledge, the Onslow Group, on the north side of the entrance to Ernest Sound, together with Ernest Point, Onslow Point, and the passages leading from Ernest Sound to Dewey Anchorage, have been described with Clarence Strait earlier in this chapter.

Currents.—The tidal currents in Ernest Sound follow the general direction of the channel. The ebb current has a velocity of 2 to 4 knots, the flood current a little less. At the junction of Bradfield Canal and Blake Channel is a joining of tidal currents causing swirls.

Chart 8124.—**Union Bay,** eastward of Lemesurier Point, is about 3.5 miles wide at the entrance, 1.2 miles at its head, and is about 3 miles long; at its head is a large lagoon, mostly bare at low water, into which a large stream, **Black Bear Creek,** empties. The waters of the bay are deep, but there is anchorage with protection from southward, on the east side of the head of the bay, in about 18 fathoms. The southwest angle of the bay is foul for 0.2 mile offshore. The bay has been examined by means of a wire drag. The only danger, except near the shores, is a rock with a depth of 3 fathoms marked by a buoy, in the middle of the entrance and 3.4 miles 030° from Lemly Rocks. At high water do not approach the head of the bay too rapidly, as the points at the entrance to the lagoon are platforms of rock only 3 feet above high water and are not readily distinguished. Anchor in 18 fathoms, about 0.4 mile offshore, on the east side of the head of the bay, with the northeast point at the entrance to the lagoon bearing about 140°.

There is a wharf in Union Bay about midway between Union Point and the head of the bay. It has a 130-foot face with a least depth of 30 feet alongside. The mailboat stops here each week.

Fishermen use the cove behind the small islet 0.5 mile northward of the wharf and the long chuck 1.5 miles northward of the wharf for anchorage.

Small boats use the channel between **Union Point,** which is low and wooded, and the two islets southward of it.

An estimated current of 3 knots sets southward around Union Point at strength of ebb.

Local magnetic disturbance.—On the eastern side of Union Bay is a belt 0.4 mile wide, 0.4 mile offshore, where the variation was observed to be as much as 38° east of normal. On the small islet off the northeast point of the bay 0.8 mile to the southwestward of Union Point, the variation of the compass was found to be as much as 38° east of normal.

Vixen Harbor, 0.8 mile eastward of Union Point, is about 0.4 mile long, with an even sand and mud bottom and an average depth of 4½ fathoms. The entrance channel, about 100 yards wide, has depths of only 2 fathoms. In entering proceed carefully to the northward of and close to the small islands in the entrance. Temporary anchorage for

larger craft may be had in 16 fathoms, sand and gravel, 0.4 mile northward of the small island in the entrance.

Chart 8161.—Vixen Inlet, about 6.5 miles northeastward of Lemesurier Point, has a small islet, **Sunshine Island**, in the middle of the entrance and a stream at the head. A reef makes out about 0.2 mile from the south shore at **Vixen Point.** A reef extends about 0.3 mile southwestward from the point to the southward of Vixen Point. A reef with a least depth of ¾ fathom, not marked by kelp, is in the middle of the entrance, 1.2 miles 284° from Sunshine Island. A rock, bare at half tide, is about 270 yards off the southern shore, 1.1 miles 258° from Sunshine Island. A rock, bare at extreme low water, is 400 yards eastward of Sunshine Island. A reef extends westward about 550 yards from the first point on the north shore eastward of Sunshine Island.

In entering, the passage to the southward of Sunshine Island is preferable. When about 1.5 miles from Sunshine Island, bring it to bear **127°** and head for the island. Round the southern end at a distance of about 250 yards and select anchorage in depths of 11 to 14 fathoms. A shoal which makes out from the southeast shore 1 mile eastward from Sunshine Island is to be avoided. The inlet dries for a considerable distance from the head of the flats, dropping off sharply to 7 fathoms.

Emerald Bay, open and exposed, is 2.8 miles northward of Vixen Point. It is used by fishermen during easterly weather but is a poor anchorage. A stream empties at its head.

Easterly Island, a small timbered island 197 feet high, is in mid-channel, about 2.8 miles northward of Vixen Point. It has sheer steep sides. A rock bare at half tide is close to the southeast point of the island.

Petersen Islands, separated by a narrow channel with a depth of 3 fathoms and having the appearance of a split island, are about 3 miles to the southward of Brownson Island. A group of rocks, bare at low water, are about 1.4 miles northward of the islands. A rock, bare at half tide, is 1 mile 351° from Petersen Islands.

Westerly Island, small, wooded, and about 85 feet high, is about 1 mile to the southward of Brownson Island. The channel between it and Brownson Island is clear, except for the rocks northward of Petersen Islands.

Brownson Island, on the west side of Ernest Sound 7 miles to the northeastward of Onslow Point, is about 7 miles long, 1.5 to 2.5 miles wide, and is cut almost in two by a large lagoon. The southern part of the island has an elevation of 1,900 feet; the northern part, 1,438 feet. A group of small islands is separated from the southern end of the island by a channel about 200 yards wide, suitable for launches, which also find anchorage there.

An island, small and wooded, about 186 feet high, is 0.5 mile eastward of the southern end of Brownson Island. A rock, awash at extreme high tide, is about 400 yards eastward of the north end of the island. About 400 yards eastward of the rock is a cluster of rocks, bare about 5 feet at mean lower low water, which constitutes a danger. In navigating this section of Ernest Sound, Eaton Point on the Cleveland Peninsula shore, should be favored.

A small, narrow island, with rocks off its north and south ends, lies close to the eastern shore of Brownson Island, near the southern end. The channel separating the two is used by launches, the deeper water being westward of the rock off the point northward of the middle of the island.

Canoe Passage separates Brownson Island from Etolin Island. It runs in a northerly direction, with depths too great for anchorage, until the narrows are reached 2 miles from the northern end, where the channel goes dry at low tide, and in places is 100 yards wide. The narrows are about 0.3 mile long. Pass eastward of a small islet at the north end of the narrows. A shoal makes out about 150 yards from the west shore, 0.4 mile southward of the north end of the passage. Beyond this point mid-channel depths are the greatest. At the north end of Brownson Island, the passage turns eastward, increases in width, and affords anchorage in 13 fathoms, sand bottom.

Deer Island northeastward of Brownson Island, on the eastern side of Ernest Sound, is about 7 miles long, 2 miles wide, and attains a maximum elevation of 2,527 feet. There are a number of islands and rocks close to the western shore of the island.

The cove, the western shores of which are formed by two islands on the western side of the southern end of Deer Island, has depths of 10 to 17 fathoms in the narrowest part of the entrance and depths of 24 to 39 fathoms within. Rocks extend about 200 yards off the eastern point of the entrance. A rock, the outermost of two which bare at low water, lies 800 yards within the entrance, just westward of mid-channel. A 3-fathom spot lies 500 yards within the entrance 300 yards from the western shore. There is a narrow small-boat passage between the two islands and between the northern island and Deer Island. The cove in the western shore of Deer Island, 2 miles from the southern end, has depths of 21 to 41 fathoms. Rocks lie 0.5 mile within the entrance, 200 yards from the western shore. The channel leading northwestward from the northwest end of the cove bares in places at low water. This channel and the channels between the islands close to the western shore of Deer Island are suitable for small boats only.

Point Peters is the southern point of Deer Island. A 3½-fathom spot is 400 yards northward of **Kuakan Point**, the northern point of the island, and a small cove too deep for anchorage lies southeastward of the point.

Seward Passage, deep and clear, separates Deer Island from the mainland. **Watkins Point**, the southern point of the southern entrance, is low and timbered. **Sunny Bay** and the small coves between Watkins Point and **Point Santa Anna** are used by launches. A group of islands lies off the western end of Sunny Bay, the outermost of which, **Change Island**, is about 87 feet high and timbered.

The first cove to the southeastward of Change Island in Sunny Bay has depths of 8 to 11 fathoms, with a 3¾-fathom spot in the middle of the entrance. The second cove has depths of 16 to 32 fathoms, while the third has depths of 11 to 25 fathoms, the greater depths being found near the head of this cove. An islet lies off the western point of the third cove, and a rock, awash, lies in mid-channel between this islet and the eastern shore.

Santa Anna Inlet, on the east side of Seward Passage about 3 miles eastward of the south end of Deer Island, is about 1.8 miles long in a southeasterly direction. A shoal area extends about 200 yards off the southwestern shore about 0.8 mile from the entrance. From a mile within the entrance the mid-channel depths decrease gradually from 18 to 9 fathoms. Small craft will find good anchorage in 9 fathoms at the head of the inlet.

Frosty Bay, on the east side of Seward Passage near the north end, is about 1 mile long and 380 yards wide. Two rocks, bare at half tide, lie about 150 yards northward of the south point of the entrance. Fishing craft anchor in 6 fathoms in the southwest part of the bay. On the northeast shore is an old skid road. The head of the bay narrows,

then widens, forming a bight with depths less than 1 fathom. A large stream empties at the head of the bay.

Niblack Islands are a cluster of small islands lying between Brownson and Deer Islands. The passage on the eastern side is deep and clear and has been wire-dragged. A dangerous rock, bare at mean lower low water, lies about 800 yards 020° from the 200-foot island which lies midway between Bold Island and the Niblack group.

Bold Island, 0.5 mile long, 326 feet high, with a conspicuous cliff 100 feet high on the west shore, lies at the entrance to Menefee Inlet. A channel with a depth of 15 fathoms separates Bold Island from a group of small islands to the southward. A rock, bare 1 foot at mean lower low water, lies 0.5 mile southeastward of the south end of this group. The channel to the southward and westward of this rock and the channel northward of Bold Island carry deep water.

Menefee Inlet, on the west side of Ernest Sound, is 7 miles long, 1.5 miles wide at the entrance, and 0.3 mile wide at the head. It is deep to within a mile of the head, where three fair-sized streams empty. A rock, bare at half tide, lies about 180 yards off the west shore 1.5 miles from the head of the inlet. About 250 yards above and below the rock and about 50 yards offshore are two rocks bare at all stages of the tide.

Anchorage may be had about 1.2 miles from the head of the inlet in 14 fathoms, sand and mud bottom.

Fisherman Chuck separates **Menefee Point,** the low wooded point on the south side of Menefee Inlet, from Etolin Island. It is from 30 to 100 yards in width, has a depth of 14 fathoms at the northern entrance, shoals to 2 fathoms 0.3 mile to the southward, and thence to the southern end is dry except at high water. It is used as an anchorage by fishermen.

Southwest Cove, to the northward of Bold Island, is too deep for anchorage. A reef extends offshore about 100 yards from a point at the head of the cove. Very small craft find anchorage back of the island on the east side of the cove.

Zimovia Strait is described under separate heading.

Found Island, at the southern entrance to Zimovia Strait, is about 0.3 mile in length, rectangular in shape, wooded, about 198 feet high, with ledges extending about 300 feet off the northern shore. A grass-covered rock, 12 feet high, lies 0.2 mile to the westward of the north end of the island. A rock, bare 1 foot at mean lower low water, marked by a beacon, lies 0.4 mile northward of Found Island.

Blanche Rock, 7 feet high, off the south point of the entrance to Zimovia Strait, is conspicuous on account of its color.

Southeast Cove, about 1.5 miles northwestward of Found Island, is about 1.5 miles long, about 1 mile at the entrance and wedge-shaped; it does not afford anchorage.

Fools Inlet, about 5 miles to the northeastward of Found Island, is about 3.5 miles long in a northwesterly direction and 0.5 mile wide. Mud flats bare 0.9 mile from its head almost to two small islets. Anchorage may be had in 14 to 19 fathoms southward of the southern island. Depths of 8 to 13 fathoms extend 0.3 mile off the eastern shore, 1.8 miles from the head of the inlet.

Point Warde to the southeastward of Fools Inlet, the southern point at the entrance to Bradfield Canal, rises to two not very definite timbered knobs about 580 feet and 695 feet high, with higher land to the eastward. The shore is rocky. Cliffs on the western face of the point average 80 feet in height.

A cannery was formerly located at the head of the cove 1 mile to the southward of Point Warde. Foul ground extends about 75 yards off the northern shore. The cove has depths of 23 to 30 fathoms in the middle. It shoals gradually to the northern shore. In the small bight on the northern side of the cove, depths range from 6 to 9 fathoms.

Bradfield Canal is apparently free from dangers, but has not been closely surveyed. About 12 miles from Point Warde, the canal is nearly closed by **Duck Point,** wooded. The cove west of the point affords the best protection for small craft in the canal. To enter, proceed into the middle of the cove until approaching the mouth of the large stream on the starboard, then favor the shore on the port side. The best anchorage is past the stream and a small point on the starboard side into the head of the cove to anchorage in depths from 5 to 8 fathoms, soft bottom.

The navigable channel follows the north shore of the point, being restricted in one place to a width of 0.2 mile by a small islet which is passed on its south side. Beyond the point the canal continues 2 miles, where it ends in a broad flat off the mouths of two large streams.

Humpback Bay and **Anan Bay** are two open bights on the south shore of Bradfield Canal. A large salmon stream empties into Humpback Bay which offers good shelter and anchorage for small craft during southerly weather in 5 to 10 fathoms, mud bottom. There are no known dangers other than those charted. The United States Forest Service maintains a bear observatory on **Anan Creek** at the large waterfall about 0.5 mile from the beach. A trail marker on the beach indicates the end of a well maintained trail leading inland along the creek and passing the bear observatory. This area is visited each year by many people who come to observe the thousands of salmon in the stream and passing up the falls also the many black bear feeding on the salmon.

Zimovia Strait, between Etolin Island and Wrangell Island, connects Ernest Sound with the east end of Sumner Strait. It is about 25 miles long, varied in width from 0.5 to 2.5 miles, and furnishes a convenient route for small vessels bound from Ketchikan to Wrangell. The critical part of the passage is southeastward of the deserted village where the channel is tortuous and is marked by buoys and lights.

Currents.—In Zimovia Strait the currents meet among Village Islands, the flood current setting toward this locality from each end of the strait, and the ebb current from this locality setting out in both directions. The approximate velocity of the current at strength of flood or ebb is from 1½ to 2 knots. Between Woronkofski and Wrangell Islands, the ebb sets southward and out through Chichagof Pass with a velocity of nearly 3 knots, and the flood sets northward with a velocity of about 1 knot.

Directions.—Zimovia Strait has been wire dragged from Sumner Strait to Olive Cove. The southern section has been sounded. The channel in places is narrow and intricate, the depths are irregular, and local knowledge is desirable for safe navigation.

A small cove on the Etolin Island side of the channel, about 1.4 miles from the southern entrance, is about 0.6 mile long, 0.4 mile wide, and has depths of 20 fathoms 0.3 mile from the head, shoaling to 11 fathoms at the head.

Thoms Place on the Wrangell Islands side of the channel 3.5 miles from the southern entrance, is 1.5 miles long, 0.4 mile wide, has two small wooded islets in the entrance and near the head a group of islets close to the southwest shore and another close to the northeast shore. In entering, pass between the entrance islands, where soundings of 10 fathoms were obtained. The channel between the eastern island and the Wrangell

Island shore is foul. Depths of 8 to 12 fathoms were found in the bight just inside the entrance. The head of the bay is foul. A wooded island about 0.2 mile in diameter, 360 feet high, lies 0.2 mile off the headland at the entrance to Thoms Place.

A lagoon, about 0.8 mile long, lies to the westward of Thoms Place. Rocks lie off the entrance, and the channel is narrow, with a controlling depth of ½ fathom. A small bight just within the entrance has depths of 6 to 10 fathoms. There are several smooth beaches which have been used for beaching boats. The head of the lagoon is foul.

About 6 miles from the southern entrance to the strait is a group of low wooded islands, the largest and highest having an elevation of 268 feet.

Trap Rock, sand and boulders, bare 1 foot at low water, lies 0.5 mile eastward of the entrance to Whaletail Cove. A buoy is moored 100 yards eastward of Trap Rock. A rock, awash at lower low water, lies 175 yards to the southward of Trap Rock.

An unwatched light, on a small white house, is located on an islet off the western point of the largest island of the **Zimovia Islets** to the eastward of Whaletail Cove.

A small islet, 125 feet high, lies about 775 yards northward from Trap Rock. Small vessels anchor in the vicinity.

Whaletail Cove, westward of Trap Rock, about 0.8 mile long and 0.2 mile wide, has two branches; the entrance has depths of about 1 foot. The western branch, almost entirely dry at low water, has a small island at its entrance. Depths of 3½ to 9 fathoms are found in the eastern branch, the greater depths being near the southern shore. This branch shoals rapidly near the head.

Button Island, 160 feet high and wooded, lies about 0.8 mile northwestward of **Whaletail Point,** the north point at the entrance to Whaletail Cove. A shoal which bares at half tide lies 175 yards to the eastward of Button Island. A buoy is moored 150 yards northeastward from Button Island.

A small wooded island lies about 0.2 mile to the southward of Button Island. The controlling depth in the channel between the two is 1¼ fathoms, and is obstructed by kelp.

A rock with about ½ fathom of water over it has been reported in the middle of the channel about 4 miles east-southeastward of Anita Point. The rock is about 850 yards 122° from Midchannel Rock Daybeacon and about 500 yards 191° from Double Rock Daybeacon. A buoy is moored about 50 yards 167° from the shoalest part of the rock.

Double Rock, bare about 11 feet at low water, is close to the northern shore, about 0.2 mile west-northwestward from Button Island. A red triangular daymark on a spindle marks the outer higher rock, 0.5 mile southeastward of the deserted village.

A deserted Indian village is on the point on the north shore about 0.5 mile to the westward of Double Rock. Zimovia Strait Light, on a small white house, is on the northern shore of Zimovia Strait, 0.8 mile 109° from the deserted village.

Midchannel Rock, bare 3 feet at low water, is 640 yards south-southeastward of the point. It is marked by a white slatted daymark on an I-beam.

Village Islands, a group of rocks and islands, lie about 0.4 mile off the northern shore of the strait from abreast the deserted village, and extend for about 1.5 miles to the westward. Village Islands Light, on a small white house, marks a rock off the northeast shore of the largest island of the Village Island group. The northernmost rock, awash, is marked by a white slatted daymark on an I-beam on a pyramidal concrete pier.

Village Rock is 0.8 mile to the northwestward of the deserted village and on the northeast side of the channel opposite Village Islands. A spindle surmounted by a red barrel marks the rock.

A small cove, dry at low water, is about 1.8 miles westward of Whaletail Point. Foul ground extends about 700 yards offshore between the point and the cove.

Olive Cove, southward of the Village Islands, is about 0.9 mile long and 0.2 mile wide. A stream of considerable size empties through the flats, which at low water extend 0.5 mile from the head of the cove. Anchorage may be had off the entrance in 10 to 15 fathoms. Just inside the northwest entrance point is a small private float at which is a reported depth of 8 feet.

Chart 8160.—Anita Bay, about 6 miles long and 1 mile wide at the entrance, is deep and clear inshore on both sides, with the exception of the shoal extending eastward about 0.2 mile from the point of the cove on the south side of the bay 3 miles from the entrance. Shoals extend about 200 yards off the entrances to small coves, one on each side, about 0.6 mile from the head of the bay. A depth of 10 fathoms may be obtained 0.2 mile from the head of the bay, but beyond this it shoals rapidly. **Anita Point,** the southern point of the entrance, rounded, wooded, and indefinite, may be passed at a distance of 0.2 mile. The bight in the northwest shore of the bay near the entrance dries about 50 yards offshore. A group of rocks lies in the entrance to the bight in the western shore 1 mile westward from Anita Point. A cabin is on the north shore of the bight. Anchorage may be had near the head of the bay in 13 to 17 fathoms, mud and sand bottom, with swinging room somewhat restricted by flats which make out from the head and sides of the bay.

Turn Island lies close to the Wrangell Island shore northeastward from Anita Point. **Nemo Point** lies about 2.8 miles northward of Turn Island.

The eastern shore of Zimovia Strait, between 2 and 5 miles above Nemo Point, is foul with rocks and islets which extend for 0.5 mile offshore. **Young Rock,** with a depth of 2¼ fathoms over it and not marked by kelp, lies in the center of the strait at its junction with Chichagof Pass.

Chichagof Pass and the town of Wrangell are described later in this chapter.

Chart 8161.—Blake Channel, having its entrance 3 miles northeastward of Point Warde, connects Ernest Sound with **Eastern Passage** and through it with the eastern end of Sumner Strait. Both Blake Channel and Eastern Passage have been examined by means of a wire drag, and the shores have been accurately surveyed. The shoaling at the north end of Eastern Passage, due to deposit from the Stikine River, is reported to have progressed well into what is shown as deep water on the chart. From **Gerard Point** the shoal is reported to have extended southeast about ½ mile to and beyond the next small creek. The current from the South Arm of the river is diverted through the channel off Green Point. It is more than probable that the deep-water passage north of Highfield Anchorage has been narrowed by the encroachment of the shoaling from sedimentation on its northern side.

It is recommended that ships using Eastern Passage favor Sominiof Island, passing a safe distance off.

Currents.—In Blake Channel the flood current sets north-northwestward with a velocity of about 2 knots, and meets the flood current from Eastern Passage in the vicinity of The Narrows. The ebb current sets in the opposite direction with a velocity of about 3 knots.

In Eastern Passage the flood current sets southward with a velocity of about 2 knots. From the vicinity of The Narrows, the ebb current sets both ways, northward through Eastern Passage, and southward through Blake Channel, with a velocity of about 3 knots. The first and last of the ebb is backed into Eastern Passage by the current from the Stikine River.

Blake Island is at the southern entrance, with a narrow channel on each side, both of which have been dragged to a depth of 28 feet.

A pinnacle rock, not marked by kelp, with a depth of 1¼ fathoms, is near the entrance to Blake Channel on the east side of Blake Island, about 200 yards from the Blake Island shore. A 5-fathom spot is westward of Blake Island near the entrance about 150 yards from the Wrangell Island shore. If the western channel is used, avoid the rocks off the point of the cove on the western side of the channel when turning in from Bradfield Canal.

The channel, eastward of Blake Island, passes eastward of a reef of sunken and visible rocks extending northwestward from the northwestern end of Blake Island and terminating in a wooded islet 300 yards long and 250 yards wide at its narrowest point. There are also some rocks along the east side of Blake Island, which a mid-channel course would avoid. The tidal currents have considerable velocity in this vicinity, and a mid-channel course should be followed through either channel.

Neptune Island, about 7 miles north-northwestward of Blake Island, is low and wooded. The lagoon, with entrance to eastward of Neptune Island, shoals up too rapidly for good anchorage. The greater part of the lagoon bares at low water. **Aaron Creek** empties into the head of the lagoon.

Berg Bay, northward of Neptune Island, has depths of 5 to 13 fathoms to near its head, and affords the best anchorage in the passage. Vessels can enter on either side of the island in the mouth, but should give the island a good berth, and avoid a reef extending 200 yards northward of the inner end of the island. The other tributaries of Blake Channel and Eastern Passage shoal up rapidly inside their entrances, and are not good anchorages.

A sunken rock, with 1¼ fathoms over it, lies on the northern side of Blake Channel, 0.5 mile westward of the point on the western side of the entrance to Berg Bay. A wooded islet with a cluster of rocks around it lies off the northern shore of the channel, 0.5 mile northwestward of the sunken rock. A reef, on which are two bare rocks, extends about 0.4 mile eastward of the northern point at the eastern entrance to The Narrows. Between Neptune Island and The Narrows, the southern shore should be favored to avoid the above dangers, all of which lie off the northern shore.

The Narrows, about 1.5 miles long and 250 yards wide at its narrowest part, connects Blake Channel with Eastern Passage. The only dangers are the reef, described above, which lies off the northern point at the eastern entrance, and a rocky area, marked by a buoy, with 3 or 4 feet over it at high water, on the south side of the channel and just westward of the narrowest part of the channel. The northern point at the western entrance is marked by a daybeacon.

Channel Island, about 100 feet high and wooded, lies in mid-channel in Eastern Passage, about 1.2 miles westward of The Narrows. The island can be passed on either side but the channel to northward is more direct. The small cove southeastward of Channel Island is used by very small craft as an anchorage.

Point Madan, on the eastern side of Eastern Passage, about 1.5 miles westward of The Narrows, is 530 feet high and wooded. A 2¼-fathom spot is about 300 yards off

the point. **Madan Bay,** to the eastward of Point Madan, is deep and clear of dangers. If offers excellent anchorage for small craft north of the projecting point near its head on the western side in 7 fathoms, soft bottom. Large vessels may find anchorage in 12 fathoms, soft bottom, farther offshore and near the head of the bay.

Mill Creek empties into the northern side of Eastern Passage about 5 miles above Point Madan where a small modern sawmill is now located. A road leads from the mill to **Virginia Lake,** about 1.2 miles inland.

Point Highfield and Highfield Anchorage are described with Stikine Strait, following.

Chart 8160.—Stikine Strait connects the northern part of Clarence Strait with the eastern end of Sumner Strait and the waters off the mouth of Stikine River. The strait is broad and deep, and is generally used by vessels going to Wrangell, or following the Inland Passage from Clarence Strait to Wrangell Narrows. Both shores of Stikine Strait are free from danger except at a few points, and all dangers are shown on the chart. The strait has been examined by means of a wire drag.

Currents.—In Stikine Strait the flood current sets northward through the strait until met by the current from Stikine River westward of Wrangell Harbor. In the strait the velocity of the current is 1 to 1½ knots on the flood and 1½ to 2½ knots on the ebb. The glacial waters of the Stikine River usually discolor all the water in the vicinity of Wrangell Harbor.

Directions for Stikine Strait are given in Chapter 3.

Quiet Harbor is on the southeast side of Stikine Strait southward of Round Point. Zarembo Island. Anchorage here is not advised as it is wide open to northerly weather,

A cove on the west side of Etolin Island, about 6.5 miles north-northeastward of Quiet Harbor, affords protection for small craft in southeasterly weather.

Round Point, at the southeastern side of Zarembo Island, drops steeply from a high headland, rounding off in an almost perfect quadrant. The shoreline consists of gray and yellowish cliffs rising to heights of about 40 feet. Round Point Light, shown from a small white house, is 24 feet above water and visible 9 miles. The light is obscured between the bearings 018° to 191°.

Meter Bight, 4 miles northward of Round Point, is an open bight with sand flats at the head over a mile in extent, which bare for about 500 yards offshore. Three streams empty through the flats. From the edge of the flats the water deepens rapidly.

South Craig Point, marked by a daybeacon, is about 7 miles northward from Round Point. It has no special characteristics.

Fritter Cove, to the southward of South Craig Point, is an open bight with rocks off the north point of the entrance. No information is available regarding depths inside.

Roosevelt Harbor, northwestward of South Craig Point, is about 0.8 mile long and 250 yards wide and affords anchorage near the head for small craft in depths of 11 fathoms, mud bottom. In entering, the grass-covered rock at the entrance is left on the port hand. The channel to the southward of the rock is reported foul.

Deep Bay, on the Zarembo Island side of the northern end of Stikine Strait, about 1 mile northward of South Craig Point Daybeacon, is about 0.8 mile long in a south-southwesterly direction, and 150 yards wide. It is reported as too deep for anchorage until near the head.

Woronkofski Island, to the eastward of Zarembo Island, is about 5.5 miles in diameter. It rises in a series of peaks to an elevation of 3,305 feet and is timbered to a height of 2,500 feet. The shoreline is generally rocky, with off-lying rocks close-to.

Reef Point is a low wooded point at the southwestern extremity of Woronkofski Island. Rocks and kelp extend offshore for about 300 yards. A rock with ¾ fathom on it lies about 0.6 mile north-northwestward from the point.

Drag Island, about 250 yards in diameter with an elevation of about 150 feet to the tree tops, is separated from Reef Point by a channel about 220 yards wide.

Point Ancon is on the western side of Woronkofski Island and is marked by Point Ancon Light. The light, shown from a small white house, is 20 feet above the water and visible 9 miles. It is obscured from 214° to 014°. A rock, awash, and kelp lie close to the point.

Wedge Point, about 1 mile northward of Point Ancon, is a low, thickly wooded point which shows prominently.

Elephants Nose, near the northern end of Woronkofski Island, is a knob on a ridge about 1,075 feet high.

Woronkofski Point, the northern point of the island, is low and rounding without any marked characteristics. The shore to the eastward of Woronkofski Point should be given a berth of at least 0.5 mile. A daybeacon is on the western end of the point.

Fivemile Island, about 0.2 mile in diameter, is about 1.8 miles northward from Woronkofski Point.

The islands to northward and westward of Fivemile Island are described with Sumner Strait in Chapter 7.

Chichagof Pass, between Etolin and Woronkofski Islands, is about 5 miles long and varies from 0.8 mile to 2 miles in width. It has been examined by means of a wire drag and found clear except for Young Rock, at the eastern end of Chichagof Pass in Zimovia Strait, which has a depth of 2¼ fathoms over it and is not marked by kelp. **East Point,** at the eastern end of Woronkofski Island, is low and wooded. **Circle Bay** is an open bight to the westward of East Point.

Hat Island is at the entrance to Circle Bay, about 0.8 mile southwestward from East Point. It is about 200 yards in diameter, wooded, and about 150 feet high to the tree tops. A rock, awash, is about 80 yards southward of Hat Island. Hat Island Light, shown from a small white house, is on the south point of Hat Island; it is 19 feet above water and visible 6 miles. The light is obscured from 091° to 234°.

Chart 8164.—Highfield Anchorage is at the north end of Wrangell Island, about 1.5 miles from Wrangell Harbor. The anchorage is in 12 to 15 fathoms, muddy bottom, just westward of the line of, and about midway between, **Point Highfield** and **Simonof Island.** Light floating ice from Stikine River is encountered here in the spring, and countercurrents render a vessel very uneasy at times.

The cannery at Point Highfield is abandoned and in a state of decay. The wharf is no longer standing.

City of Topeka Rock, in Highfield Anchorage about 100 yards northwestward of the cannery, is awash at low water.

Wrangell Harbor is on the west side of the northern end of Wrangell Island, 1 mile below Point Highfield; it is a bight formed by **Point Shekesti,** which projects 0.4 mile

in a northwesterly direction from the island. A breakwater 300 feet long has been constructed from the north extremity of Point Shekesti, and affords protection for small craft in the southern part of the harbor. Wrangell Breakwater Light, on the outer end of the breakwater, is shown from a small red house on the pier at a height of 13 feet. A buoy marks the point of a shoal on the south side of the entrance to the harbor.

Wrangell is a post office and port of entry on the north side of Wrangell Harbor. It serves as the ocean terminal for steamers plying the Stikine River to Telegraph Creek, B. C. Wrangell has one cannery and two other sea food companies. Two oil companies maintain stations with private service floats. A relief station of the United States Public Health Service, a Deputy Collector of Customs, and a representative of the Fish and Wildlife Service are in Wrangell.

The recommended anchorage for large vessels is in 18 to 20 fathoms, sticky bottom, with the breakwater light bearing 110°, distant 300 yards. As an anchorage for large vessels Wrangell Harbor affords shelter only from offshore winds. During heavy southeast winter gales Highfield Anchorage is sometimes used for better shelter. Good anchorage in strong southeast weather has been found 0.8 mile off the north end of Woronkofski Island in about 23 fathoms, mud bottom.

Tidal currents in Wrangell Harbor are variable and vessels approaching the wharves should note the way small craft are swinging to anchor, to determine the direction of the current, and should exercise caution in coming alongside.

A Federal project provides for a mooring basin 600 feet long and 400 feet wide within the protected area in the southern part of Wrangell Harbor, an inner basin in the tideflat area east of **Shakes Island**, and a connecting channel to the mooring basin, all at a depth of 10 feet. In June 1948 the controlling depth in the mooring basin was 10 feet except for a small area along the edges. In June 1951 no work had been done on the inner basin.

There are two commercial, one cannery, and two sea food wharves. All are open pile structures. The commercial wharves are privately owned but open to the public on payment of wharfage charges.

The McCormack Dock Company wharf (Pier B), the westernmost wharf of the town, is used principally by C. P. R. R. ships. The wharf has a face 220 feet long, and a least depth alongside of 22 feet at the northwest corner, gradually deepening toward the southeast end. The face of the wharf is marked by lights.

McCormack's wharf (Pier A), the second wharf from the westward, has a face 250 feet long and a least depth alongside of 17 feet at the eastern end, gradually deepening to 34 feet at the western end, muddy bottom. The ends of this wharf are marked by lights.

The city maintains a small float with a landing platform for airplanes eastward of McCormack's wharf. During the winter months the airplane landing platform is removed. The controlling depth at the platform is 10 feet.

The Farwest Alaska Company wharf, formerly known as the sawmill wharf, is on the northeastern side of the harbor. The length of the face of the wharf is about 210 feet with a least depth alongside of 32 feet.

The Reliance Shrimp Company wharf, about 200 yards southeastward of the Farwest Alaska Company wharf, has a face 80 feet long with a controlling depth of 5 feet alongside. A float extends 640 feet in a southeasterly direction from the southeast end of the wharf. It is reported that there is a depth of 10 feet alongside. There is a commercial airlines float at the northwest corner of this wharf used by Ellis Airlines and Alaska Coastal Airlines.

The small wharf at the extreme head of the harbor bares at low water.

The city float is directly back of the breakwater and is open to public use without charge. There are two rows of mooring piles outside the float which furnish additional space where small craft can tie up.

Electricity and fresh water are available. Telephone service is maintained at the float and a good road connects with the town.

The Standard Oil Company has a service station on a float southeastward of the city float. The Union Oil Company has a float about 100 yards northwestward of the Standard Oil Company float. Both companies have wharves inside the inner harbor extending out from its southwest shoreline.

Supplies.—There are several general stores where provisions, fishermen's supplies, and some ship chandlery can be obtained; also gasoline, Diesel oil, and lubricating oil. Fresh water is available on the main wharves and at the Standard Oil Company float.

Repairs.—There are no facilities for repairs of large vessels. There are two companies operating marine ways at Wrangell; the larger of the two plants has two ways and is capable of hauling out vessels up to 65 feet in length and 8 feet draft; the other has one railway and is capable of hauling out vessels up to 60 feet in length and 7 feet draft. There is a well-equipped machine shop where repairs to machinery can be made.

Communications.—There is regular daily air communication south to Ketchikan and north to Petersburg and Juneau both morning and afternoon. Light-draft river steamers make regular weekly trips up the Stikine River from Wrangell during the summer months, and a small local vessel plies to points on the west coast of Prince of Wales Island. There is regular passenger and freight communication with Puget Sound and British Columbia ports, and with all towns in southeastern and southwestern Alaska. The United States Army Signal Corps maintains a cable and radio station with ship to shore services and continual radio telephone service to all Alaska towns and to the States.

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CHAPTER 6

West Coast of Prince of Wales Island

Chart 8152

THIS portion covers the outer coast between Dixon Entrance and Sumner Strait, and includes the inlets and bays on the west coast of Prince of Wales Island, and the off-lying islands with the connecting bodies of water. This area affords a protected inside passage for small vessels between Dixon Entrance and Sumner Strait. The main passages have been well surveyed, but there are several inlets and bays which have not been surveyed.

There are many canneries, mines, and villages in this area, the most important settlements being at Hydaburg, Craig, Klawak, and Shakan. Provisions, fishermen's supplies, some ship chandlery, gasoline, and oil can be obtained at Craig. Some supplies can be had at the other settlements and many of the canneries operate general stores during the season.

The principal settlements and many of the canneries have communication with Wrangell and Ketchikan by regular mail launch. The radio stations at Craig and View Cove operate throughout the year. Many of the canneries operate radio stations during the season.

Chart 8145.—Cape Chacon and Clarence Strait, lying eastward of Cape Chacon, have been described in Chapter 5.

Bean Island is wooded and has a number of rounded, steep-sided, rocky knobs from 400 to 600 feet high. From the westward it shows a rounded hill which stands well above the general level of the island. A rock is 120 yards off the southwest point of the island. Off the southeast point is a small wooded island from which sunken rocks extend.

Point Nunez and Nunez Rocks have been described in Chapter 5.

Nichols Bay, about 4 miles long in a northwesterly direction with a greatest width of about 0.6 mile, is about 2.5 miles westward from Cape Chacon. Three islands divide the entrance into two channels. From the southern extremity of the southern island, irregular bottom with 2- and 2½-fathom spots extends across the entrance of the southern channel to a 4¾-fathom spot about 0.4 mile to the northeastward of Point Nunez. During severe southerly gales seas pile up heavily at the entrance and are reported to break entirely across it at times. Nichols Bay Entrance Daybeacon, 40 feet above the water, is on the eastern side of the entrance.

There are two anchorages in the bay, one in each of the two bights on the southwest shore. In entering the first bight keep well off the northwestern end of the northern

island to avoid rocks. Anchor in 16 fathoms, mud bottom, 250 yards offshore. The second anchorage is to the northwestward of the peninsula, in depth of 15 fathoms, 300 yards offshore.

Nichols Lake, a large fresh-water lake, empties into the head of the bay through a stream. Small boats anchor off the flats at the mouth of this stream.

Directions.—When about 1 mile from the entrance, bring the bay wide open and head 317° for the center of the channel; this brings a low wooded shoulder in range with the middle of the narrow part of the channel. Stand in on this course between the kelp patches, leaving on the starboard hand a rock about 5 feet high, and on the port hand a 2½-fathom spot. Favor the north point at the entrance, and then follow mid-channel courses. The narrowest part of the channel, about 75 yards wide, is 1 mile within the entrance, where the least depth is 7 fathoms.

The south channel is used by small craft. A large gray rock, about 20 feet high, lies about 270 yards off the northeast shore of Bean Island. Reefs extend 400 yards to the northward of the rock, to the northward of which is a channel about 300 yards wide, with depths of 5 to 20 fathoms. There is a 2½-fathom spot on the north side of the channel. The channel leads to the southward of the islands. Fishing craft anchor in the lee of the rock and in the channel between the islands.

Bert Miller Cutoff is the passage to Nichols Bay westward of Bean Island. It forms a bight at each end, narrowing at the center to a channel about 30 yards long and 10 yards wide. There is a depth of about 1 fathom in the narrow part of the channel, and there are sunken rocks in the bight at the northern end. At times, the current through the channel is very swift.

An inlet, about 1 mile long in a northerly direction, and 0.2 mile wide lies about 1.2 miles eastward from Surf Point. It is too deep for anchorage and is open and exposed. Foul ground extends about 0.2 mile off the point on the east side of the inlet.

Surf Point lies about 2.5 miles westward from Point Nunez. It rises rapidly to a knob 900 feet in elevation and to higher ground to the northward. There is a prominent rock close to the point. A sunken rock lies about 0.4 mile southward from the point with deep water inshore. Tide rips, severe for small craft, are found in the vicinity.

Brownson Bay, about 2 miles northeastward of Point Marsh, is narrow, and at its entrance, is somewhat obstructed by islets and rocks. It affords indifferent anchorage in about 15 fathoms, 0.2 mile southward of the rock, awash at high water, near the head of the bay. In entering, favor the western side of the bay, taking care to avoid a rock, bare at low water, that lies about 0.6 mile northeastward of the western point at the entrance.

Little Brownson Bay affords an anchorage for small craft. The bay is entered from the southward, but local knowledge is required; the northern passage can only be used by very small boats. Williwaws sweep across the bay during southeast gales.

Point Marsh has been described in Chapter 5. Excellent anchorage for small craft can be had in **Minnie Bay,** a small bight in the main shore back of Point Marsh.

Chart 8152.—Cordova Bay has its entrance on the northwest side of Dixon Entrance between Cape Muzon and Point Marsh and extends about 18 miles in a northerly direction from between Dewey Rocks and the southeast end of Long Island. The bay has a clear channel 3 miles wide between Barrier Islands and Long Island, and an average width

of 3 miles from Ship Islands to Lime Point. From the head of Cordova Bay at Lime Point, Hetta Inlet extends in a general northerly direction for about 15 miles to Sulzer.

The best entrance to the bay is between Barrier Islands and Long Island, but Eureka Channel, eastward of Barrier Islands, is sometimes used by vessels with local knowledge, calling at Hunter Bay. From Cordova Bay and Hetta Inlet, Tlevak Strait and Sukkwan Strait extend northwestward and afford through channels to Bucareli Bay. Small craft ply from Ketchikan to Cordova Bay, Hetta Inlet, and other points on the west coast of Prince of Wales Island.

Chart 8145.—The **Barrier Islands** are an extensive group of wooded islands 200 to 250 feet high, lying between 2 and 6 miles north-northeastward of Dewey Rocks. There is considerable kelp in the passages between the islands. Eastward of Barrier Islands and between them and the mainland is Eureka Channel.

Dewey Rocks are small in extent and consist of one large rock 12 feet above high water, and several smaller ones which go bare at various stages of the tide. There seem to be no outlying dangers.

Round Islands, lying 2 miles north-northwestward of Dewey Rocks, consist of four wooded islets about 150 feet high. Kelp patches are found for 0.8 mile southeastward of the islands. Round Islands Light is shown from the top of a small wooden house on the southwest shore of the western island of the group. The light is 56 feet above water and visible 11 miles. The light is obscured on its eastern side between the bearings 149½° to 327°. A red sector covers Dewey Rocks, southeastward of Round Islands Light, between the bearings 327° and 346°.

Egg Rock, 20 feet high and bare, lies about 0.5 mile northward of Round Islands, with extensive areas of kelp between. One mile northward of Egg Rock is a wooded islet 60 feet high, with a rock awash, midway between it and Egg Rock.

Boat Rocks, two in number, bare and the larger about 15 feet high, lie about 2.5 miles northward of Round Islands, and are the northwesternmost dangers of this group. Eastward of a line from Round Islands to Boat Rocks are numerous dangers.

Mexico Point, at the southeastern end of Eureka Channel, about 3 miles northwestward of Point Marsh, is an island 170 feet high, bluff and wooded, with several high rocky islets extending about 0.3 mile off it.

Hessa Inlet, northeastward of Mexico Point, is about 3.5 miles long and comparatively deep. It is frequented by small fishing craft with local knowledge. In the narrow entrance tidal currents attain a maximum velocity of 5 to 6 knots.

Eureka Channel affords a short cut to Hunter Bay and is suitable for moderate-sized craft with local knowledge; large vessels should use the passage westward of Dewey Rocks and Barrier Islands. The depths in Eureka Channel are good, but it is narrow and has several dangers, which, however, are generally marked by kelp in summer.

Far Point, on the west side of Eureka Channel and at the southeastern extremity of Barrier Islands, lies about 1.5 miles north-northwestward of Mexico Point.

Center Island is a small round island with a few trees, about 1.2 miles north-northeastward of Far Point, and 0.4 mile southward of **Leading Point.** It is fairly steep-to on all sides, and can be approached closely. A rock, awash at high tide and marked by a daybeacon, lies 350 yards westward of Center Island.

For about 0.6 mile northward of Leading Point is the narrowest part of Eureka Channel, **The Narrows,** which has a least width of 125 yards. Good depths are found

from shore to shore through The Narrows. About 250 yards northward of the northwest point of The Narrows is a rock with 1½ fathoms over it. **Guide Rocks,** marked by a daybeacon, lie about 0.5 mile north-northeastward of the northern end of The Narrows. They are gray in appearance and can be seen, except at high water, when coming through The Narrows.

Directions through Eureka Channel to Hunter Bay are given in Chapter 3.

Currents are tidal and are estimated to reach a strength of 1 to 2 knots. The currents through The Narrows set fair with the channel, and but few swirls and eddies were noted. To the southward of Eureka Channel on the ebb, strong currents set out from Hessa Inlet. Flood sets to the northward, ebb to the southward.

Wallace Rock, with ¾ fathom over it and marked on its western side by a buoy, is about 2.3 miles northeastward of Boat Rocks. It is marked by kelp, but not readily discernible. Vessels going to Hunter Bay usually pass well northward of it.

Tah Bay, northeastward of Guide Rocks, has depths of 12 to 20 fathoms. It connects through a 5-fathom channel with an arm which runs in a northwesterly direction. In the western entrance to Tah Bay, about 330 yards off the southeastern shore, is a small wooded islet 650 yards from which, in a northeasterly direction, is a ledge. Temporary anchorage may be had eastward of the islet in 17 to 20 fathoms, hard bottom; also on the shoal area which makes out about 0.5 mile in a westerly direction from the islet, in depths of 9 to 15 fathoms.

Chart 8120.—Turn Island is about 3 miles northward of the northern end of Eureka Channel, and is the easternmost of a number of small islands. It is bare except for a small stunted growth of trees, which give it the appearance of a building. It is bold-to on the western and southern sides, but foul ground extends about 400 yards north-northeastward. A daybeacon is on the southern side of the island.

Turn Point is about 1 mile north-northeastward of Turn Island and consists of a number of small, low, grassy rocks. It is at the extremity of a low peninsula which has a long wooded ridge extending northeastward from about 1 mile eastward of the point. It is not wooded for about 300 yards back from the point.

Hunter Bay makes in for a distance of about 2.5 miles eastward of Turn Point. The entrance of the bay is about 0.5 mile wide and is obstructed on its northern side by a number of islets, but the channel close around Turn Point is comparatively clear. About 1 mile above the entrance the bay contracts to a width of 275 yards, with a small grassy islet, marked by a daybeacon, lying in the middle; the best channel is on the northern side of the islet. Eastward, about 0.4 mile distant, is an arm making north-northeastward about 2 miles. The depths are shallow and the tidal currents are strong in the narrowest part. Only small boats can go to its head.

There is good anchorage in Hunter Bay about 2 miles eastward from the entrance in 10 to 15 fathoms. The anchorage, however, is subject to strong williwaws with winds from the east meeting those of equal force from the west. Velocities up to 90 miles have been experienced here. Nearby, off the south shore of the bay, is an islet surrounded by a flat of considerable extent. About 0.2 mile beyond the anchorage the bay contracts and is foul.

On the north shore of Hunter Bay at its entrance is the site of **Klinkwan,** a Hyda Indian village occupied from 1905 to 1911, at the same time as the Hunter Bay Cannery.

There is no evidence of the village remaining. Back of the old village site is a prominent conical mountain 2,400 feet high, the top of which is bright green in summer.

Chart 8147.—Klakas Inlet joins Cordova Bay westward of the entrance to Hunter Bay. It has not been examined, and little is known about it. The inlet is reported to be clear in mid-channel. **Max Cove,** on the eastern side about 1 mile inside the entrance, offers good anchorage in 5 to 16 fathoms, mud bottom. Good anchorage is reported in the southern bight of the cove where the stream from **Klakas Lake** empties.

Bird Rocks, about 30 feet high, have a gray appearance with a rounded white pinnacle which forms the highest point. A ledge, about 80 yards wide, extends about 250 yards to the northward. About 200 yards to the eastward is a group of rocks which cover at high water and are marked by kelp.

Shipwreck Point lies about 1.8 miles west-northwestward of Bird Rocks. The point is low and timbered and rises to a knob, 605 feet high. A low rocky islet lies about 300 yards off the point. An island, about 160 feet high, lies westward from the point, close-to. **Ship Islands,** 50 to 120 feet in height, with outlying rocks and ledges, lie about 0.5 mile offshore. Small craft from Turn Point pass northward of Bird Rocks and between Shipwreck Point and the island close-to. There is a sunken rock in the channel, which is narrow. The pass to the westward of the inner island is preferable, avoiding the rock in the middle of the entrance.

Kassa Inlet has its entrance a short distance northward of the northernmost of the Ship Island group. It is about 0.5 mile wide at the entrance and extends some distance northeastward. Good anchorages for small craft can be found on either side of the inlet about 2 miles inside the entrance. The inlet should be entered with caution, as it has not been closely examined; numerous rocks are known to exist.

Point Webster, about 6 miles northwestward of Shipwreck Point, is a small projection where the eastern shore of Cordova Bay changes direction. There are a number of outlying rocks and reefs in the vicinity of the point, and this shore should be given a berth of 0.5 mile.

Hassiah Inlet, on the eastern shore, about 2.5 miles northward of Point Webster, is about 2 miles long to the head of its northeast and east arms, the latter being a landlocked anchorage known as **Mabel Bay. Mabel Island,** about 0.6 mile long, lies on the south side of the entrance. It is wooded, with a low place in the center giving the appearance of two islands. **Helen Island,** about 0.2 mile in diameter, lies in the south arm. It is low, wooded, and has rocky beaches on the north and west shores and sandy beaches on the east and south shores.

To enter Mabel Bay pass northward and eastward of Mabel Island, giving it a berth of 0.2 mile, and steer for the eastern end of Helen Island. Follow a careful mid-channel course, passing northeastward of Helen Island, and anchor about 0.2 mile from the islet at the head in 10 to 12 fathoms.

Nutkwa and **Keete Inlets** have not been surveyed. Both are used extensively during the fishing season. Rocks have been reported about 0.5 mile westward of the unnamed point lying between the two bays. There are uncharted dangers in Keete Inlet and it should be entered with caution.

The eastern shore of Nutkwa Inlet and the bay at its head on the eastern side have uncharted dangers. The western shore of the inlet is clear and should be favored when entering.

Chart 8146.—Kaigani Strait is described later in this chapter.

Long Island forms the western side of Cordova Bay for a distance of about 12 miles. The eastern shore of the island is rugged and broken, with a number of outlying islets and rocks within a distance of 0.5 mile. There are also a number of indentations and some anchorages.

A shoal area which ends in a sunken rock with 1¼ fathoms over it and marked by kelp extends for 0.5 mile off the southern point of Long Island. This point is marked by a very prominent landslide about 0.3 mile inshore. The points at the southern and southeastern parts of the island should be given a berth of not less than 0.8 mile.

South Rocks, lying about 0.3 mile off the southeastern point of Long Island, consist of two large rocks, 28 and 29 feet high, and several smaller rocks.

Coning Inlet, on the eastern side of Long Island about 4.5 miles from the southern end, is about 2 miles long and 1 mile wide at the entrance. It is open to eastward and does not afford good anchorage. An unsurveyed lagoon is at the head of the inlet to which it is connected by salt water rapids.

Nina Cove, on the south side of Coning Inlet at the entrance, affords secure anchorage for small craft in 3 to 4 fathoms, sticky bottom. The anchorage is about 200 yards in extent and lies southward of the small islet in the center of the cove at its head.

Coning Point, the north point at the entrance to Coning Inlet, is low and wooded. A conspicuous black rock 40 feet high lies about 0.2 mile off the point.

Natoma Bay, on the eastern side of Long Island about 6 miles from its southern end, is about 1 mile in diameter and open to eastward and southeastward. Partially protected anchorage can be had in the northern part of the bay in 12 to 20 fathoms, mud bottom. The entrance is on either side of the two wooded islets in the middle of the entrance. The shores of the bay are foul and should be given a good berth.

Natoma Point, low and wooded, is the northern point at the entrance to Natoma Bay. A large, wooded, high-water islet lies close off the point to southward. Rocks and reefs lie from 350 to 500 yards eastward of the point and islet.

Chart 8147.—Elbow Bay, on the northeastern side of Long Island, is partially protected by two wooded islands, connected at low water, in the entrance. A sunken rock, with ¾ fathom over it, not marked by kelp, is in the middle of the bay near its head. Good anchorage for small vessels can be had in the southeastern arm in 13 fathoms, mud bottom. The anchorage is about 250 yards wide. A large lagoon extends southward from the western end of the bay, to which it is connected by a narrow rocky channel. This channel is impassable, except at high water, on account of rapids. It has not been surveyed.

To enter Elbow Bay, pass in mid-channel southeastward of the wooded islets in the entrance, avoiding the reefs making off to southward of the islets. The sunken rock in the middle of the bay can be passed on either side, the western side giving the best water.

Dova Bay, on the northern side of Long Island, appears to be well protected at its head, but due to the configuration of the surrounding hills, southeasterly and northwesterly winds draw across it with considerable force. The shores are lined with small islets and rocks.

Tlevak Strait has its entrance on the western shore of Cordova Bay between Long and Jackson Islands. It is described later in this chapter.

Shoe Rock, about 15 feet high, 40 feet across, lies about 160 yards northward of the most easterly of a group of small islands at the junction of Tlevak Strait and Cordova Bay.

Tlevak Strait Light is described later in this chapter.

Jackson Island, off the southern end of Sukkwan Island, is 1 mile long, 525 feet high, and has prominent cliffs on its southern side. About 300 yards southwestward of these cliffs is a kelp-marked rock which bares at lowest tides. The channel between Jackson and Lacey Islands is clear, so far as known, with the exception of the rocks mentioned under Lacey Island.

Jackson Passage, the channel westward of Jackson Island, is clear, but there is a rock with 1 fathom over it about 200 yards southward of the western point at the southern entrance. A 6½-fathom spot lies slightly to the westward of mid-channel near the northern entrance.

Lacey Island comprises three small wooded knolls close together joined by bare spits, and lies about 0.8 mile eastward of the southeast end of Jackson Island. Foul ground extends 200 yards northwestward and southeastward from the island. A rock, bare at low water, lies 400 yards northeastward, and 0.5 mile southwestward of the island are a group of rocks, covered at high water.

Mellen Rock, a bare rock about 50 feet in extent and 12 feet high, is about 0.8 mile off the western shore of the bay, about 3 miles to the northeastward of Jackson Island. Mellen Rock Light, shown from a white wooden house on brown skeleton structure, is 34 feet above water and visible 9 miles.

Directions through Cordova Bay and Tlevak Strait and through Cordova Bay and Sukkwan Strait are given in Chapter 3.

Hetta Inlet extends 5 miles northward from Lime Point to the entrance of Sukkwan Strait, and has a width of about 2 miles. Then it trends in a general north-northwesterly direction for 11 miles to Gould Island, above which it is navigable for small craft only. Above Sukkwan Strait, the width of the inlet decreases gradually from 1.2 miles to 0.5 mile and less in places, there are apparently no outlying dangers. Considerable fishing for salmon is done in the inlet in season and boats may be found in all of its parts, including Portage Bay at the head.

Lime Point is the dividing point between Cordova Bay and Hetta and Nutkwa Inlets. It shows white from bird lime and is prominent from southward. Three bare rocks lie about 0.2 mile southeastward of the point, with other rocks, sunken and awash, between.

Mud Bay, the small cove 2 miles north of Lime Point on the east shore of Hetta Inlet, is used extensively for anchorage during fishing season. The anchorage has a depth of 4 to 10 fathoms with mud bottom.

Alder Cove, the small cove 1 mile north of Mud Bay, is used by small craft for anchorage in 4 to 8 fathoms, mud bottom, during fishing season. There are no known dangers in either Mud Bay or Alder Cove.

Copper City, on the eastern shore 5 miles above Lime Point, was at one time the site of an active mining settlement. It is now abandoned and there is no remaining evidence of the village.

Eek Inlet, on the west side of Hetta Inlet, at the northern side of Sukkwan Strait entrance, has not been surveyed. Deep water is reported in the channel, with a depth of 10 fathoms at the anchorage, about 0.5 mile above the north end of the entrance island.

Hetta Point, on the eastern side of Hetta Inlet, about 7.5 miles above Lime Point, is bold, rocky, and heavily wooded. The bight about 0.8 mile southward of the point,

in which are two wooded islets, affords temporary anchorage. The cove eastward of the point affords anchorage for small craft.

Copper Harbor, on the eastern shore, 10 miles above Lime Point, is about 1 mile long and 0.3 mile wide. A mid-channel course leads to the head of the harbor, where there is anchorage in 20 fathoms. **Coppermount,** at the head of the bay, is the location of an abandoned mining project. Few signs remain of the salmon cannery, formerly located on the northern shore of the bay.

Simmons Point is the south point at the entrance to Copper Harbor. About 1.5 miles above Simmons Point on the eastern shore, is the abandoned **Corbin Mine.**

Deer Bay, on the western shore about 2 miles above Copper Harbor, is about 0.8 mile long and 600 yards wide at its widest part inside the entrance. It affords good anchorage in 5 to 16 fathoms and a mid-channel course is clear. A flat extends nearly 0.2 mile from its head.

Jumbo Island, in the middle of the inlet about 2.5 miles above Copper Harbor, is about 0.4 mile in diameter and wooded. The channels on either side are about 300 yards wide, but the better channel is eastward of the island.

Dell Island, about 1.2 miles above Jumbo Island and close to the eastern shore, is 100 yards in diameter and wooded.

Sulzer, on the northwestern shore of Hetta Inlet, at one time a thriving mining settlement, is now entirely abandoned and no part of it remains. Anchorage can be obtained about 250 yards off what was once the village site in 14 to 16 fathoms.

Gould Island practically closes the inlet for a distance of 1.5 miles above Sulzer. **Gould Passage,** southward of the island, runs dry at about half tide. **Sulzer Passage,** northward of the island, is navigable for small craft, but foul for 1 mile above Sulzer, and the tidal currents have considerable velocity.

Portage Bay, that part of the inlet above Gould Island, is about 1.5 miles long, with depths of 9 to 27 fathoms. From its head there is a trail to the head of Cholmondeley Sound, about 3.5 miles.

Chart 8152.—Sukkwan Strait is entered by vessels of considerable size as far as the village of Hydaburg. Sukkwan Narrows is used by small craft, from Sukkwan Strait to Tlevak Strait, northward of Sukkwan Island. From Hetta Inlet the strait extends 7 miles west-northwestward to Sukkwan Narrows with good depths and few dangers. Thence it is divided into two parts known as South Pass and North Pass. **South Pass** (Chart 8151) extends 4 miles southward to Tlevak Strait and has good depths in a tortuous channel between numerous rocky shoals and dangers. **North Pass,** on the north side of Goat Island, has not been surveyed, but it is known that it goes bare at lowest tides and has strong currents at other times.

A good anchorage in Sukkwan Strait can be had in 10 to 15 fathoms, mud bottom, about 0.2 mile northward of **Saltery Point.** Small craft can find good anchorage in South Pass in the small bay on the southeast side, about 2.2 miles south-southwestward of Sukkwan Narrows. Directions are given in Chapter 3.

Chart 8151.—Sukkwan Narrows has a least depth of 3¼ fathoms in a narrow channel with rocky shoals on both sides. The maximum current is about 2 knots and sets northward with the flood and southward with the ebb.

A buoy marks the northwestern side and another buoy the southeastern side of the Narrows at the northern entrance. The southeastern point is marked by Sukkwan Narrows Light shown from a white wooden house. The light is 14 feet above water and visible 6 miles; it is obscured from about 252° to 019°.

A white square daymark on a pile dolphin is on the east side of the channel off Hydaburg, 950 yards 074° from Sukkwan Narrows Light. A pinnacle rock with a depth of 2½ fathoms over it has been reported to be 410 yards 189° from the beacon; it is marked by a buoy.

Hydaburg is a native village with a wharf and post office on the northeastern shore of Sukkwan Narrows. There is a general store where limited supplies can be obtained. The Hydaburg Cooperative Association wharf, at the southeastern end of the village, has a face 140 feet in length, with a depth of 22 feet alongside. A salmon cannery, crab cannery, and cold storage sea food plant are operated from the wharf. Fresh water is piped to the wharf. Fuel oil, Diesel oil, and gasoline are stocked for the use of the cannery; there is a small machine shop.

There is a sunken rock south-southeast of the wharf 1,180 yards 098° from Sukkwan Narrows Light.

A buoy, moored in 24 feet, marks the shoal with a rock awash, 1,600 yards 146½° from the Hydaburg wharf.

Scrag Islands, two wooded islands about 75 feet high, lie on the east side of South Pass about 1 mile to the southward of the Narrows and are separated from Sukkwan Island only at high water. A reef with two bare rocks extends about 100 yards from Scrag Islands into the pass; it is marked by a buoy and kelp. A reef with 1¼ fathoms of water over it, marked by kelp, is about 0.3 mile northward of Scrag Islands; it is marked by a buoy. A kelp patch marks a 1½-fathom shoal about 600 yards to the north-northeastward of Scrag Islands. Depths of 6 to 11 fathoms are found around this shoal.

Lone Spruce Rock, on the southerly side of the southwest entrance to South Pass, is about 0.2 mile westward of a 75-foot island. It is a low, grass-covered islet about 50 yards in diameter. A rock with two knobs lies close-to to the westward. A 2-fathom spot is about 300 yards westward of the rock.

Goat Island Light, on a white wooden house, marks the south point of **Goat Island,** the northwest point of the southwest entrance to South Pass. The light is 21 feet above water and is visible 6 miles; it is obscured from 093° to 161°.

Turn Rock, about 5 feet high and 20 yards in diameter, marked by a daybeacon, is on the northern side of the southwest entrance to South Pass, at the southeast edge of the reef which makes out from the small islet 115 feet high.

Chart 8152.—Kaigani Strait is the passage extending from Dixon Entrance to Tlevak Strait and separating Long Island and the group of islands extending northwestward from Dall Island. Howkan Narrows is the narrow part of the passage from American Bay to above Channel Islands; it is endangered by several unmarked shoals and reefs. Ships from Dixon Entrance, bound through Tlevak Strait, should preferably use the broad channel through Cordova Bay eastward of Long Island and enter Tlevak Strait between Long and Jackson Islands.

Directions.—Southward of American Bay, the strait is clear of dangers along a mid-channel course and may be navigated easily with the aid of the chart. Northward of Ameri-

can Bay the channel is tortuous, narrow, and complicated by strong currents, and, in the absence of aids to navigation, is not recommended for use by large vessels.

From southeastward, enter the strait in mid-channel to avoid the foul ground off Kaigani Point and the Datzkoo Islands, and hold in mid-channel until abreast American Bay.

The channel through Howkan Narrows opposite the deserted village of Howkan is about 250 yards wide and lies between a reef off Howkan, which bares 5 feet at low water, and a reef off the western shore which has a depth of ½ fathom. The currents are strong here having a velocity of about 3 knots. They are greatly affected by strong winds.

From abreast American Bay a course of **336½°**, heading for the opening between the two Channel Islands, leads through the center of the channel off Howkan. When the southern entrance point to Mission Cove is abeam, haul westward to head for the opening between the western shore and the island westward of the Channel Islands off that shore, with Howkan astern, course about 287°. When the east tangent of the west Channel Island is abeam, haul northwestward to bring the tangent of the southwest shore of Kaigani Strait, northward from American Bay, astern on course **332½°**.

The currents here are strong and careful navigation is required. The last course will lead clear of Pond and West Mill Rocks. After passing **Keg Point** the course may be shaped as desired, being guided by Chart 8148.

Chart 8146.—Cape Muzon has been described in Chapter 5.

Off the eastern end of Cape Muzon is a group of small islands and rocks, inside of which, on the main shore, is a sandy beach where landings can be made in good weather. This area was occupied by the Hyda Indian tribe at the time they migrated north from British Columbia and Puget Sound territory. All that remains now to mark the site of their village of **Kaigani** are a few graves. Rather severe tide rips are experienced off the cape. Along the south shore of the cape, close in, are several large rocks. The shoreline in this section is rocky, precipitous, and marked by light-colored cliffs. A breaker is about 0.2 mile off the south shore of the cape. Vessels in passing should give the cape a berth of at least 1 mile.

The north side of Cape Muzon trends west-northwestward for about 3 miles, forming the southern side of **McLeod Bay.** Temporary anchorage in 11 fathoms, exposed to all easterly winds, may be had in this bay, about 0.5 mile westward of a green landslide. The chart and the lead are the best guides, as landslides frequently occur, and there are several besides the one mentioned. At the head of the bay is a small stream of fresh water and a sand and gravel beach that bares for a couple of hundred yards. **Little Daykoo,** a small boat harbor, is about 0.5 mile to the northward. Rocks and islets are off the narrow entrance. A rock is in the center of Little Daykoo, southward from two shacks on the north shore.

Daykoo and **Datzkoo Islands** extend 2 miles in a northerly direction from McLeod Bay at a greatest distance offshore of about 1 mile. A rock with a least depth of ¾ fathom, is 0.7 mile eastward of the north point of the south Datzkoo Island. This rock and other dangers in the vicinity of these islands are marked by kelp.

The southern point of Long Island has been described under Cordova Bay.

Kaigani Point, low and wooded, is about 0.6 mile westward of the southeast end of Long Island. A large rock, 18 feet high, is 0.7 mile northwestward of Kaigani Point and about 0.2 mile offshore.

Datzkoo Harbor, on the eastern side of Dall Island about 4.5 miles north-northwestward of Cape Muzon, is about 1.5 miles long and 0.3 mile wide in the central part. The entrance channel is clear and lies northward of two wooded islands. Anchorage can be had in 15 to 20 fathoms, soft bottom. A mud flat fills the head of the harbor.

Kaigani Harbors are two indentations in the eastern side of Dall Island, extending in a northwesterly direction. They are about equal in size, 1 mile long and 0.3 mile wide. The south side of the entrance to South Kaigani Harbor is marked by Kaigani Harbor Entrance Light. The light, shown from a small white house, is 45 feet above the water and visible 9 miles. It is obscured from 313° to 134°. **South Kaigani Harbor** has a cove on the south side near the head. Two privately maintained daybeacons mark the entrance channel. Two fish-buying scows and trading posts are anchored here throughout the year. Supplies for fishermen, including food, gasoline, oil, and fresh water are available. Five hundred feet of mooring floats for small craft are anchored in 4 to 6 fathoms of water. **North Kaigani Harbor** is entirely exposed to southeasterly weather and the ocean swell, and is of no use as an anchorage.

The small bight about 0.8 mile northward of North Kaigani Harbor has an entrance difficult even for small vessels. Good anchorage may be had here in 5 to 10 fathoms. Very small vesesls may anchor near the head in about 3½ fathoms. Two daybeacons mark the entrance channel.

Pond Bay is on the southwest side of Kaigani Strait, and is about 1.5 miles long and 0.5 mile wide. A wooded island is halfway toward the head of the bay with a clear channel on the north side. Anchorage may be had west of this island in desired depths up to 20 fathoms, soft bottom. However, a strong wind blows up the bay in southeasterly weather and, due to the danger from any dragging, it is not recommended for anchorage.

Bolles Inlet is a narrow inlet on the northeast side of Kaigani Strait, about 0.5 mile in length, whose entrance is 0.5 mile north-northeastward from a wooded islet 90 feet high. The entrance is very narrow and rapids occur here, with currents estimated to be at least 8 knots. It is reported that a logging camp was once located in the inlet and small craft used the entrance at high-water slack.

American Bay is on the west side of Kaigani Strait about 12 miles north-northwestward of Cape Muzon and 1 mile southward of Howkan. The bay extends 1.5 miles in a westerly direction and has a width of about 0.5 mile. Good anchorage may be had a little northward of mid-channel and about 400 yards 238° from the group of islands which lie on the north side of the entrance and are known as **The Bay Islands.** Small craft may find good anchorage in 5 fathoms near the north shore in the cove just eastward of the group of islands.

Howkan, on the eastern shore of Kaigani Strait, was at one time the largest village of the Hyda Indians in the area. All that remains to mark the site is some evidence of clearing. The Indians moved from this area to Hydaburg.

Mission Cove is the small bight just northward of Howkan on the northeast side of Kaigani Strait. Small craft can anchor here in 6 to 8 fathoms, though there is considerable kelp in the cove and a rock, awash at the lowest tides, at the head.

Howkan Reef, bare at half tide and surrounded by kelp, extends 300 yards southwestward from the shore at Howkan; at the southeastern end of the reef is a small island with Indian graves. There is deep water close to the reef.

An extensive kelp patch, about 600 yards in diameter, is on the west side of **Howkan Narrows,** its eastern edge about 300 yards southwestward of the end of Howkan Reef.

There is a rock, awash, on the eastern edge of the reef, marked by this kelp patch. The channel is 300 yards wide between this kelp patch and Howkan Reef; there is no safe channel between this kelp patch and the west shore. **Mill Reef** shows at high water and lies between this kelp patch and the shore westward of it.

Chart 8148.—Channel Islands, about 0.5 mile northwestward of Howkan, are two wooded islands joined by a bare spit. A shoal with kelp extends about 250 yards southward from the east end of Channel Islands, and there is kelp a short distance off its western end. There is a rock with a least depth of 2¼ fathoms in mid-channel, 550 yards southward from the western end of these islands. The main channel is southwestward of the island. The channel northeastward of Channel Islands is used by small craft going to and from Howkan, but is narrow in places between kelp patches. A large kelp patch on a reef, bare at lowest tides, lies about 0.5 mile northward of Channel Islands.

Ham Cove, on the west side about 0.6 mile westward of Channel Islands, has a very narrow entrance and can be entered only by small craft.

Pond Rock, awash at low water and marked by kelp, lies 0.4 mile northwestward of the western end of Channel Islands, and 0.5 mile east-northeastward of the entrance to Ham Cove. There is another rock, awash at low water and marked by kelp, about 0.3 mile north-northeastward of West Mill Rock and nearly 1 mile northwestward of the west end of Channel Islands. **West Mill Rock** is the eastern one of two islets close to the shore about 1 mile northwestward of Channel Islands. There is a 4-fathom spot 0.3 mile north-northeastward from West Mill Rock. One-half mile north-northwestward of West Mill Rock is a grassy islet from which a reef makes off about 0.2 mile.

Kelp extends about 200 yards off the southwest side of **Shoe Island** close to the northwestern extremity of Long Island.

From the northwest end of Long Island, a group of islands and rocks extends about 5 miles north-northwestward, two of the larger ones being **Aston** and **Grand Islands**. A small timbered islet, 50 feet high (ground elevation), lies about 0.9 mile northwestward from Grand Island; to the westward of this islet, about 0.3 mile, is a cluster of rocks about 15 feet high. To the westward of these rocks, distant 0.4 mile, is a 1-fathom spot with a 3-fathom spot close to the northward; the latter is marked by a buoy.

Square Island, so called from its appearance, is the westernmost of a group of rocks and islets which lie to the westward of Grand Island.

Grace Harbor, on the western side of Kaigani Strait, near its northern end, about 3.5 miles northwestward of Channel Islands, is about 1 mile long in a westerly direction. Rocks lie off the eastern point of the entrance. The outermost, awash at low water, lies 0.3 mile 090° from the point.

When entering, give the northwest point at the entrance a berth of over 0.2 mile to avoid the rocks extending southeastward from that point, and then stand in for the inner bay or basin in mid-channel. Anchor near the middle of the basin in 10 to 15 fathoms, soft bottom, taking care to avoid a ledge which extends 150 yards from the northern shore.

A flat makes out 150 to 200 yards from the mouth of the creek. Sunken rocks lie about 175 yards from the northeast point of the mouth of the creek. Southwest winds seem to draw through a low divide from the ocean.

Vesta Bay, on the western side of Kaigani Strait, near its northern end, about 4.5 miles northwestward of Channel Islands, is about 1 mile long in a westerly direction and appears to be clear in mid-channel. A 2¾-fathom spot lies about 200 yards off the southern

shore of the bay, 0.5 mile southwestward from the northern point of the entrance. The anchorage near the head of the bay is in 15 to 20 fathoms, soft bottom, with scant swinging room. **Bushy Island,** small and wooded, lies close to the headland between Vesta Bay and Rose Inlet.

Chart 8120.—Rose Inlet is on the western side of Kaigani Strait, near its northern end, westward of Grand Island. It is about 2 miles long, 0.5 mile wide, and has two groups of islands in the entrance, with a channel between. There are three patches of light-colored cliffs on the north point of the entrance. The larger and more southerly patch is roughly triangular in shape. Rose Inlet Light, shown from a white wooden house on the east point of the outermost island, is 23 feet above the water and visible 6 miles. The light is obscured from 358° to 139°. A daybeacon marks the eastern point of the western group of islands.

There is a wharf at the head of the bay on the north shore; the face of the wharf is 175 feet in length with 30 feet alongside. There is fresh water, but no fuel or other supplies are available. Only the warehouse of the buildings adjacent to the wharf remain.

Large vessels make a starboard landing; small vessels usually round the buoy-marked shoal off the wharf and make a port landing. A shoal makes out to southwestward from the wharf. A rock, bare at lowest tides and marked by a buoy, is 240 yards southward from the wharf. A ledge extends 200 yards westward from the rock; the western end of the ledge is marked by a buoy. A rock, awash at low water springs, is about 50 yards southeastward of the prominent point on the north shore about 0.8 mile eastward of the cannery.

Directions for Rose Inlet are given in Chapter 3.

Chart 8152.—Tlevak Strait and Narrows separate Sukkwan and Prince of Wales Island from Dall Island and from the group of islands northward of Long Island, extending from Cordova Bay to Ulloa Channel. From Cordova Bay, the main channel of Tlevak Strait trends northwestward for about 10 miles to McFarland Islands and then northward for about 14 miles to Tlevak Narrows; the width of the strait varies from 1.5 to 4 miles. Islands are numerous and the shores are much indented.

Directions, Tlevak Strait and Narrows.—Courses and distances from Cordova Bay through Tlevak Strait to Guide Island, and from Guide Island through Tlevak Narrows are given in Chapter 3.

From Kaigani Strait courses are continued from the directions given in that section. From Keg Point abeam, distant 400 yards, continue on course **332½°** for 4.6 miles until abeam of Rose Inlet Light. Then steer **347°** for 5.5 miles until View Cove Entrance Light is abeam, distant 0.5 mile.

The group of islands extending 5 miles northwestward from the northwest end of Long Island is described with Kaigani Strait.

Chart 8147.—Shoe Inlet, the northwestern part of Long Island, is about 2 miles long and 0.2 mile wide. The inlet is clear except near the shore. Anchorage for small vessels can be had near its head. **Touchit Cove** is a foul bight on the northeastern side of Shoe Inlet just within the entrance.

Cleva Bay is an open bight on the northwestern end of Long Island and is of no importance as an anchorage.

Tlevak Strait Light, shown from a white wooden house, marks the northeastern end of the wooded island lying westward of Shoe Rock at the south side of the southeastern

entrance to Tlevak Strait. The light is 20 feet above the water and visible 9 miles; it is obscured from 317° to 115°.

Lacey and Jackson Islands, on the north side of Tlevak Strait at the entrance from Cordova Bay, have been described previously in this chapter.

Kasook Inlet, making into the southern shore of Sukkwan Island, 2 to 3 miles northwestward of Jackson Island, has a cluster of small, wooded islands in its entrance, with a good, clear channel on either side. Just inside the islands the inlet divides. The northwestern branch is about 1.5 miles long in a northerly direction and a mid-channel course is clear, except at a point about midway of its length, where a ledge projects from the east side three-fourths of the way across the inlet. On the northeast side, at the head of the inlet, good anchorage can be had in about 12 fathoms, soft bottom. The other branch has a northeasterly direction for about 0.8 mile to a bay about 0.6 mile in diameter, from which a short arm extends southeastward. There is a good anchorage in about 10 fathoms, soft bottom, just inside the entrance to the short southeasterly arm, favoring the southerly shore to avoid a rock with 1 fathom of water over it.

Chart 8148.—McFarland Islands are a group of large and small islands 3.5 miles in extent, on the eastern side of Tlevak Strait, about 5 miles northwestward of Kasook Inlet. The southernmost island is nearly 2 miles long, bluff, high, and prominent. There are passages and fairly well-sheltered anchorages among the islands for small launches.

The passage just eastward of the largest of the islands is narrow in places but easily navigated. Water is fairly deep throughout. A small kelp patch is about 40 yards offshore from the eastern shore of the largest of McFarland Islands in the second narrow place coming from the south. This kelp patch should be avoided by favoring the steep shores of an island eastward of the larger one. For further directions consult the chart.

Dunbar Inlet, to the eastward of McFarland Islands, is about 2 miles long in a northeasterly direction and from 0.5 to 0.2 mile wide. Numerous rocks and islets are at the entrance but a clear channel with 5 to 6 fathoms is about 0.2 mile wide. The passage into Dunbar Inlet has not been wire dragged. Any anchorage in the inlet is well protected. In the passage between Dunbar Inlet and Island Bay is a good anchorage for small craft.

When coming from the south enter in mid-channel, southeastward of the McFarland Islands, on course **014°** and continue for about 1.2 miles, then steer **030°** for about 1.2 miles until the north tangent of the northernmost of two islands bears 253°. From this position, steer **124°** for about 0.8 mile until a small grassy islet with a large cone-shaped tree bears 000°. This course is about mid-channel between two islets, and the water is fairly deep, but shoals when approaching the shores.

Then steer **036°** for about 550 yards until a small low wooded islet is abeam on the starboard hand, distant about 250 yards. This course heads for the south tangent of an island in range with a rock which is bare at high tides. From this position, steer **053°**, heading for a small shack at the head of the inlet. Anchorage may be had at any desired depth, sticky bottom.

There is a passage northward of the islands, off the entrance, but it is recommended only to small fishing vessels as the channel at that point is very narrow. A ledge extends about 120 yards westward from the point to the north.

When approaching from the southward via Tlevak Strait, the southwest shores of Sukkwan Island should be left about 700 yards on the starboard hand; then steer **014°** for about 1.2 miles, heading for the eastern tangent of a small wooded island, the southern-

most of two. This course clears a rocky shoal with 3¼ fathoms by about 300 yards on the port hand.

Continue this course until a small wooded islet, which lies westward of a larger one, is on the starboard quarter and then steer **030°** for about 1.1 miles until the north tangent of the northernmost of the two islands bears 270°. This course should head about midway between a group of rocks and the northern tangent of the island northeastward of the rocks. A course made good should clear a reef which bares at low tides by about 275 yards on the starboard hand, and a rocky shoal with 1 fathom on it, about 350 yards on the port hand.

From this position, steer **347°** for about 1.5 miles, until the north tangent of the northernmost of McFarland Islands is abeam. On this course all shoals and banks are about 350 yards on the starboard hand.

Then steer **331°** for about 1.3 miles, heading for the southernmost of the Corlies Islands. This course clears a rock which bares at half tide by about 600 yards on the starboard hand.

When abeam of Profit Island, distant about 0.85 mile, steer **002°** for about 1.1 miles, heading for the southern point of a small island. When the small prominent islet disappears behind the southernmost of the Corlies Islands, change course to **324°**, which is about mid-channel between two islands and leads into Sukkwan Strait. The area covered by these courses has been wire-dragged and found to be free of obstructions.

The shore of **Sukkwan Island** just outside Dunbar Inlet and opposite the McFarland Islands is very irregular and very foul. With the aid of a chart small craft can navigate the deeper parts of this area.

Island Bay is the deep bight just northward of Dunbar Inlet. Entrance from the westward was wire-dragged. Anchorage can be secured in 6 to 7 fathoms, sticky to hard bottom. Swinging room is rather limited and vessels of over 2,000 tons would probably have to anchor farther off shore in greater depths. The bay is well protected from all winds except westerly, and they are seldom severe.

Two miles northward of Island Bay is a second bight with a small island to the northwestward. An indifferent anchorage is about 0.2 mile offshore and the same distance 120° from the south point of the island in depths of 8 to 12 fathoms, sticky bottom, but rather poor protection. The entrance leads close to several rocks and shoals and should only be attempted with local knowledge.

Profit Island is a small prominent island, 75 feet high, about midway between the McFarland Islands and the Corlies Islands.

Baldy Bay is on the west side of Tlevak Strait opposite the McFarland Islands and is easily approached when coming from Cordova Bay. The bay is over 2 miles wide at its entrance between High Point and Reef Point. It has two large arms known as View Cove and Coco Harbor. **Reef Islands** are a small group of low wooded islands about one-third the distance from High Point to Reef Point. They are steep-to along the northern shore. **High Point,** the southern point of the entrance to Baldy Bay, is bold and rounded, and rises to an elevation of 1,710 feet. **Reef Point,** the northern point of the entrance, is a long projecting point, 410 feet high at its outer end and a little over 800 feet about 0.5 mile back. A rock, bare at half tide, about 0.5 mile southeastward of Reef Point, is marked by View Cove Entrance Light. The light, shown from a white wooden house, is 35 feet above water and visible 9 miles.

View Cove, the northerly arm of Baldy Bay, extends nearly 5 miles inside Reef Point and is practically free of obstructions. The shores are generally steep-to. There are

some off-lying rocks about the south and east shores of Clam Island, and about a mile from the head of the cove on the south shore is a small rather prominent island with foul ground between it and shore. When passing from View Cove into Coco Harbor, there are numerous rocks and small islands off the peninsula separating the two inlets.

View Cove has been wire-dragged from Tlevak Strait to just beyond Clam Island, including the large bight southwestward of Clam Island.

A large stone quarry and rock crusher with a loading wharf are on the north shore of View Cove about 2 miles from Reef Point. Limestone is shipped to Seattle for use in making cement. The wharf has a face 354 feet long with a least depth alongside of 26 feet. This shoalest depth is close-in off the loading elevator and there is much deeper water elsewhere. Lights mark the ends of the wharf. A radio station is kept in operation here during the entire year.

Clam Island, extending off the southern shore of View Cove about 2.5 miles inside Reef Point, divides the head of View Cove into two parts. View Cove Harbor Light, on a white wooden house, marks the eastern point of the island. The light is 23 feet above water and visible 6 miles.

Northward of Clam Island an arm extends over 2 miles farther inland; southward of the island is a large circular bight about 0.8 mile in diameter. Eastward of Clam Island is a small cove offering fair anchorage for small boats.

Green Inlet is a small narrow inlet on the south shore of View Cove. It offers good anchorage, with sticky bottom, for small craft, but the entrance is shallow, running dry on minus tides, and large mud flats extend a long distance from the head; also, there are heavy williwaws.

In View Cove are three rather indifferent anchorages. In the bight southwestward of Clam Island, anchor about 0.3 mile from the head of the bight in 18 to 19 fathoms, rather hard bottom, with the western end of Clam Island bearing 034°, distant 0.5 mile. Off Clam Island, anchor in 13 to 14 fathoms, sticky to hard bottom, with the large bare rock off the island bearing 270° and distant 450 yards. At the head of the long arm, anchor about 0.3 mile offshore in 16 to 18 fathoms. At the head of the long arm the winds seem to blow harder than outside, which is especially true for southeasterly winds. Opposite Clam Island, although apparently an exposed position, is fair protection for larger vessels, although the swinging room is restricted. For large vessels the best anchorage is in the bight southwestward of Clam Island, where there is fair protection and good swinging room.

Coco Harbor, the western arm of Baldy Bay, extends about 4 miles to the westward of Reef Island. Off the entrance to the main reach is a rather large island, **Entrance Island,** with a restricted passage to the north and south. Off this island are numerous rocks and islets which must be avoided when entering Coco Harbor. When past these obstructions the channel is clear and deep to the head of the inlet.

About the head of Coco Harbor are anchorage depths of 12 to 20 fathoms, soft bottom, but heavy williwaws prevail.

Windy Cove is a long narrow inlet clear and deep but the entrance is scarcely 100 yards wide with about 1 fathom at low water. Strong tidal currents prevail through this entrance.

Southward of Reef Islands and just inside High Point is a small inlet with two arms at the head. The western arm is rather deep and clear but the anchorage area is suitable only for small vessels; it is rather exposed to williwaws. The eastern arm offers fairly good anchorage for small vessels. The entrance is very narrow. Anchor in a central

position in 4 fathoms, sticky bottom. A rock with 2 feet over it is 600 yards 005° from the entrance.

Sukkwan Strait (South Pass) has been described earlier in this chapter.

Chart 8151.—Corlies Islands are a group of low wooded islands about 1.8 miles in extent, on the northeastern side of Tlevak Strait, southward of the entrance to Sukkwan Strait. There is much foul ground among the islands and to the southward of them. There is a good channel through about the middle of the group; only small craft with local knowledge should attempt the other passages among the islands.

A small-boat passage between Sukkwan Island and Corlies Islands is used by small fishing vessels. The entrance is easily approached from the south. The western shores of Sukkwan Island should be favored in order to clear the numerous rocks and small islets eastward of Corlies Islands, and when up to the northernmost of the Corlies Islands, great care should be taken to avoid the thick kelp patches, steering mid-channel courses.

A rock awash at low water is at the western edge of a large kelp patch, westward of Sukkwan Island, about 175 yards offshore, and eastward of the northernmost Corlies Island.

Nichols Islands, 6 miles northward of Reef Point, are a group of wooded islands which extend in a northeasterly direction for 2 miles. The western island has an elevation of 430 feet. **Fort Islet,** small and wooded, is the most northerly of the group. A boulder-covered shoal, with 3½ fathoms on it, is about 1.2 miles 327° from the islet. A 4½-fathom spot is about 1 mile 160° from Fort Islet.

The Sentinels, a scattered group of five small wooded islets and rocks which cover, are about 1 mile north-northwestward of Nichols Islands. A rock with 3 fathoms over it is 3 miles 329° from the southwest point of Nichols Islands and slightly westward of a line from this point to Guide Island. This rock is light in color and bare of sea growth and can be seen on extreme low tide. It is large in extent and surrounded by deep water. There is no kelp marking the area.

Breezy Bay is on the west side of Tlevak Strait abreast Nichols Islands; it is 2 miles wide between Eolus and Boreas Points. It is divided into two arms, and there are several small islands and numerous rocks in the bay. It does not appear to afford an anchorage. **Eolus Point,** on the southeast side at the entrance, is high, steep, and rocky, and is joined to the shore by a narrow neck, thinly wooded. A wooded island is close to **Boreas Point.**

Farallon Bay is on the west side of Tlevak Strait, about 9 miles above McFarland Islands, and is about 1 mile long in a southwesterly direction. Enter in mid-channel, taking care to avoid the large rock, covered at half tide, about 300 yards eastward of the northwest point at the entrance. The bottom is rocky and very broken; southeasterly winds draw through it, and it is not recommended as an anchorage. Just eastward of the southeast entrance point of the bay is a high-water islet which shows from southward.

Halibut Nose is the promontory on the northeast shore of Tlevak Strait opposite Farallon Bay. It is irregular in outline and not so high and prominent as some of the other headlands in Tlevak Strait.

North Bay lies on the western side of the strait, about 10.5 miles above McFarland Islands and 2.8 miles southward of Tlevak Narrows. It is about 1.5 miles long in a west-southwesterly direction and about 0.3 mile wide. **Hassler Point,** the northwest point of the entrance, is timbered and rises to a height of 835 feet 0.4 mile from the beach. A reef extends off the point for about 150 yards. **Cayman Point,** the southeast point of the

entrance, is low at the extremity and rises to a knob 620 feet high 0.4 mile from the beach, which is separated by a very low saddle from a ridge, 1,120 feet high, to the southward.

When entering North Bay, favor the southeast side. Anchor near the head of the bay in 12 to 15 fathoms, soft bottom, with the high-water islet at the head, bearing about west. Southeast winds draw around Cayman Point and blow directly into the bay with hard squalls and williwaws.

An open bight lies on the northerly side of Hassler Point. It has depths of 38 fathoms at the entrance, shoaling to 16 fathoms about 250 yards from the head. The northern side of the bight is formed by a wooded island, 120 feet high, between which and the main shore is a cove with depths of 2 to 4 fathoms.

Guide Island, about 0.8 mile eastward of Cayman Point, is small, 130 feet high, and wooded; there are a number of covering rocks for 0.3 mile to the northward, and there is kelp around it.

Lively Islands are about 1.2 miles in extent, 175 feet high, and wooded. There are several outlying rocks, 100 to 200 yards off the islands, marked by kelp and mostly covered at high water. Two rocks, awash at low water and marked by kelp, with deep-water channels between, lie 0.4 and 0.6 mile northwestward of the northern Lively Islands. The currents have considerable velocity around the Lively Islands group, and swirls occur in places.

Lively Islands Light is shown from a white house on the western point of the southern island. The light, 18 feet above water and visible 9 miles, is obscured from 156° to 334°.

In passing Lively Islands the channel westward of them is considered the main channel, favoring the Dall Island shore slightly. The channel northeastward of Lively Islands is deep and safe and is largely used by small craft bound northward, but is has two dangers that must be avoided. The first is a rocky patch, bare at extreme low water and marked by kelp, which lies 0.6 mile eastward of the southeasternmost of the Lively Islands group. The second danger is a rocky patch, bare at extreme low water and marked by kelp, which lies 240 yards 102° from the northern extremity of the northernmost large island of the group.

Round Island, about 0.5 mile eastward of the northernmost large island, is a large grass-covered rock about 20 feet high, with a small clump of trees near its southwest end. It is steep-to on all sides.

Soda Bay lies on the northeast side of Tlevak Strait, to the northeastward of the Lively Islands. It has not been surveyed.

Midway Island is a small wooded islet in the middle of the strait about midway between the northernmost of the Lively Islands and Block Island. Midway between it and Lively Islands, and about 0.3 mile from the west shore of Tlevak Strait, is a large kelp patch around a rock that uncovers. From this rock, scattered kelp parallels the shore northwestward to a patch lying south of Midway Island. The channel between these kelp patches and the west shore is about 0.2 mile wide and has deep water.

Block Island is about 200 yards in diameter, 160 feet high, and heavily wooded; the south side of the island is bold-to. The narrow passage northward of the island is foul, and the currents are unusually strong in it. Block Island Light, on the southwest side of the island, shown from a white wooden house, is 22 feet above water and visible 9 miles. The light is obscured from 164° to 284°.

Turn Point, at the northwestern extremity of Dall Island, is a bluff, wooded knoll, 316 feet high. Foul ground extends 300 yards southward and 125 yards northward from the point.

Tlevak Narrows, locally known as **The Skookum Chuck,** is a narrow and comparatively deep passage between Block Island and Turn Point, and connects Tlevak Strait and Ulloa Channel. A ½-fathom shoal 0.4 mile 300° from Turn Point is marked on its south side by a buoy which is reported to tow under during the large tides. The channel southward of the buoy is the one generally used.

Good anchorage for small craft can be had in 4 fathoms, soft bottom, in the small cove on the north side of Tlevak Narrows, the entrance to which is about 0.5 mile northward of Turn Point.

Currents in the vicinity of Tlevak Narrows run very strong during the large tides; in the narrowest part the average velocity at strength is from 4 to 5 knots. Soon after passing through the narrows, the current is greatly diminished in strength, and beyond Guide Island and Meares Island it is almost imperceptible.

With the large tides there is very little slack, while with the small tides, slack water lasts from 10 to 30 minutes, and there is not much current for 1 hour on either side. For predicted times and velocities the *Current Tables, Pacific Coast* should be consulted.

Northeast of Lively Islands it is reported that the current sets constantly northwestward, being stronger when the main stream west of the islands is setting northwestward. Small craft bound northward usually pass northeastward of the Lively Islands in order to take advantage of this constant set.

The current setting northwestward divides into two parts off the eastern end of Ulloa Island, one part setting northward of the island and the other setting with considerable strength into Meares Passage.

Ulloa Channel is 9 miles in length from Tlevak Narrows to Bucareli Bay. For a distance of 3 miles from Tlevak Narrows it leads between the islands at the northern end of Meares Passage and has a width of about 0.3 mile. It then leads between Suemez and Prince of Wales Islands, where its width is about 0.3 mile at its eastern end and 1.2 miles at its western end at Cape Flores, where it joins Bucareli Bay.

For predicted times of slacks and times and velocities of strengths of the current in Ulloa Channel see the *Current Tables, Pacific Coast.*

Ulloa Island, close to the western end of Tlevak Narrows, is about 0.6 mile long and wooded. The main channel is close southward of the island.

Anchorage in 10 to 15 fathoms, soft bottom, near Tlevak Narrows, can be had in Ulloa Channel, at the entrance to a small passage which is on the northwest side of the largest island north of Ulloa Island, between it and the main shore of Prince of Wales Island. A kelp patch is reported a short distance westward of the west point at the entrance. Ulloa Island, and the island 160 feet high to the westward, can be passed on either side.

Bush Islets are about 0.8 mile westward of Turn Point and consist of two rocks with a single tree. A rock, with 1½ fathoms over it and marked by kelp, is about 0.4 mile northwestward of Bush Islets.

Meares Island, about 1.8 miles westward of Tlevak Narrows, is the largest island in Ulloa Channel. The main channel is northward of the island, the north side of which is bold-to. A rocky islet is 275 yards southeastward of Meares Island, with rocks and kelp between.

Meares Island Light is shown from a small white house on the northern point of the island. The light is 15 feet above the water and visible 9 miles; it is obscured from 294° to 103°.

Meares Passage is described later in this chapter.

Ridge Island, off the eastern extremity of Suemez Island, is 0.5 mile long, 290 feet high and wooded, and is joined to Suemez Island by a sandy neck, awash at high water. Off the south side of the island is a wooded islet, connected with the island by a spit, bare at half tide.

Waterfall, on the northeast side of Ulloa Channel about 0.4 mile northward of **Point San Antonio,** has a cannery and store at which some fishermen's supplies, gasoline, and fuel oil can be obtained. The cannery wharf has a face 250 feet long, with a depth of 24 feet alongside. Fresh water is piped to this wharf. The Standard Oil Co. wharf, southward of the cannery wharf, has a face 70 feet in length and a depth of 28 feet. Vessels make a port landing at the cannery wharf and either a port or starboard landing at the oil wharf. There is a marine railway, maximum capacity 125 tons, where small fishing boats and launches may be hauled out. Temporary anchorage may be had in 10 fathoms on the shoal westward of the cannery. Waterfall has radio communication during the canning season.

Port Refugio is a large bay, having two arms, on the west side of Ulloa Channel opposite the cannery at Waterfall. Its southeast arm, inside of **Point Bocas,** is 1 mile long, 0.2 mile wide, and near its head affords anchorage for small craft in about 12 fathoms. **Point Verde,** the northwestern point of the entrance, is wooded and rises to an elevation of about 270 feet with higher ground to the westward. A reef, bare at low water, extends from the small islet close to the point to a grass-covered rock 8 feet high.

A large shoal, marked by thick kelp, obstructs the southern half of the entrance to the southwest arm. The least depth of ½ fathom on this shoal lies 0.4 mile 180° from the grass-covered rock off Point Verde. A 2¾-fathom pinnacle rock, surrounded by a shoal area of small extent, lies 0.3 mile 105° from the same point.

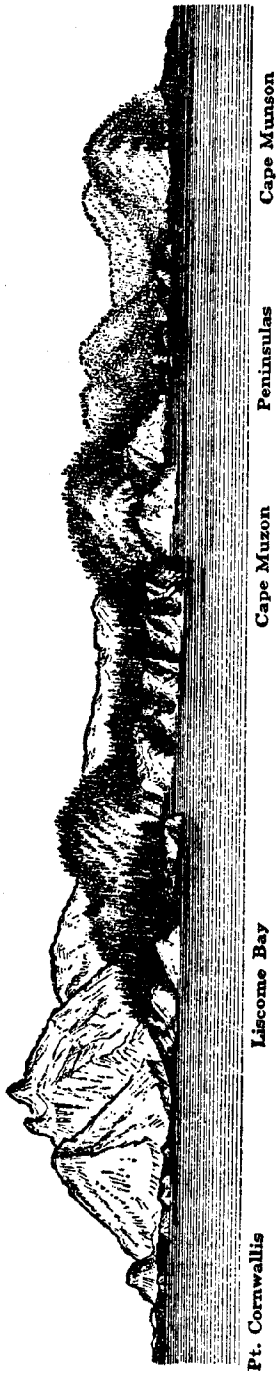
Anchorage for steamers may be had between the east shore of the southwest arm of Port Refugio and the island at its head, in 12 to 20 fathoms, sand or mud bottom. This anchorage and its approach channel, which leads between the north shore of the port and the obstructions mentioned above, have been examined with the wire drag.

San Adrian Island, 130 feet high and connected by a reef which bares at low water, lies about 0.8 mile northward of Point Verde. A rock, grass-covered and about 10 feet high, lies 0.3 mile southward from the island. A kelp-covered reef extends northwestward from the rock.

Adrian Cove, on the west side of Ulloa Channel, at its northern end, is open to northward and is of no importance.

Cape Flores, on the east side of Ulloa Channel at its northern entrance, is the northwestern point of **Joe Island,** about 0.4 mile long and wooded. Rocks bare at low tide and foul ground, marked by kelp, extend 0.2 mile northward of Cape Flores. The channel on the northeast side of Joe Island is largely used by small local craft. A lighted buoy marks the northwestern extremity of the foul ground extending northward of the cape.

Port Estrella and Bucareli Bay, the northeastern end of which forms a part of the protected route on the west coast of Prince of Wales Island, are described later in this chapter. Directions are given in Chapter 3.



South end of Dall Island bearing NNE, distant 2 miles

Cape Muzon bearing NW, distant 1.5 miles
(From a Sketch by Geo. Davidson, Asst., U.S.C.&G.S., 1867)

Chart 8152.—The west coast of Dall Island from Cape Muzon to Meares Passage, a distance of about 40 miles, is rugged with prominent partially wooded peaks ranging in elevation to 3,000 feet. Numerous bays and inlets indent the coast.

Chart 8146.—Cape Muzon has been described in Chapter 5.

Chickwan Bight, about 2.5 miles westward of Cape Muzon, indents the shore for a distance of about 0.5 mile and is about 0.8 mile wide. It is open and exposed and has depths of 30 fathoms at the entrance, decreasing to 12 fathoms near the head.

Wolk Harbor, about 4 miles westward of Cape Muzon, is about 1.5 miles long in a northeasterly direction, 0.5 mile wide, and is deep throughout. Mid-channel depths range from 30 to 40 fathoms. It is open and exposed. There are tide rips off the point between Chickwan Bight and Wolk Harbor.

Liscome Bay, about 5 miles westward of Cape Muzon, is a little over 1 mile long in a northerly direction and 0.2 mile wide. A sunken rock lies about 100 yards off the eastern shore, about 0.8 mile within the entrance, where the bay narrows. A small rock lies about 100 yards off the eastern shore, about 230 yards northward from the sunken rock. Favoring the western shore, depths of 40 fathoms at the entrance to 23 fathoms in the vicinity of the rocks may be carried. Depths of 8 to 16 fathoms are found at the head of the bay. It affords an anchorage for small vessels but is exposed to southeast weather and swell.

Point Cornwallis, about 7 miles westward of Cape Muzon, is a prominent headland. At the extremity is a projecting rocky point, 195 feet high, on the northerly side of which, close-to, is a similar point, 131 feet high, near which are two small rocks. Immediately back of the point is a round-topped hill, 440 feet high, and farther inland is a peak 1,925 feet high. **Stripe Mountain,** 2,285 feet high, marked by a prominent slide on the west side, lies about 1.3 miles northeastward of the point.

Security Cove, 3 miles northward of Point Cornwallis, is about 2 miles long in an easterly direction, 200 yards wide at the entrance, and 0.4 mile wide inside. A rock which bares and usually shows as a breaker, lies 325 yards off the southern shore at the entrance. Depths at the entrance are deep but irregular; in the narrow part, depths of 11 fathoms are obtained. Depths of 26 to 40 fathoms are found inside. In the bight on the north side, close inside the narrowest part of the entrance, small craft have found temporary anchorage; depths vary from 6 to 22 fathoms. A small lake, about 0.5 mile inshore, at an elevation of 950 feet, empties into the head of Security Cove.

Essowah Harbor is about 1.5 miles north-northwestward from Security Cove. The entrance channel is about 0.3 mile long and 30 yards wide; there are two rocks near the entrance. **Essowah Lakes,** one about 0.8 mile long and 0.5 mile wide, and the second about 1.3 miles long and 1 mile wide, empty into the head of Essowah Harbor. A small lake 0.5 mile south of Essowah Lakes, empties near the entrance to Essowah Harbor.

Parrot Rock is about 0.8 mile westward from **Essowah Point,** the point south of the entrance to Essowah Harbor, and lies about 440 yards offshore.

Port Bazan is about 16 miles from Cape Muzon and 9 miles northwestward of Point Cornwallis. It lies between two prominent mountain peaks. The northwestern mountain, the top of which is a small bare tip, is 2,505 feet high; the southeastern mountain is 1,950 feet high, roughly the shape of a rounded cone, and is heavily wooded to the top. Often when the tops of the mountains are enveloped in fog or low clouds, the latter

mountain stands out clear. Port Bazan is about 3 miles long, and averages 1 mile in width; there are a number of islands within the port.

Dolgoi Island, lying in the entrance to Port Bazan, is about 1.5 miles long, 0.8 mile wide, and 756 feet high. It is mound-shaped and wooded (with the seaward side rocky and bare of vegetation) to heights of 50 to 100 feet. There are through channels to the northwestward and southeastward. Westward from Dolgoi Island, on the southern side of the entrance to the north channel, is a group of four islets close together, the outermost of which on its western side, is a precipitous sharp pointed rock, light brown to white in color, 125 feet high; the eastern portion is lightly wooded. The next larger islet is lightly wooded; the other two are small and bare. About 60 yards off the western extremity of the largest islet is a rock which bares at low water. A sunken rock lies 190 yards off the southerly side of this islet.

A shoal with a depth of 4 fathoms, and probably less, lies about 900 yards 308° from the highest part of the sharp rocky point.

Port Bazan affords good anchorage northward and northeastward of the islands which stretch across the eastern part of the bay. The anchorage is well protected from the swell and is generally free from williwaws. It can be entered either southeastward or northwestward of Dolgoi Island, but the northwest entrance is more often used. In entering the northern channel, a **069°** course for the middle of the narrow entrance, passes southward of the 4-fathom shoal, while a **119°** course, heading for the eastern end of the larger outer islet, passes northward of it. In the main channel, the distance from shore to shore is 210 yards, while in places the distance between 10-fathom curves is only 25 yards and between 5-fathom curves, 75 yards. At low water the channel is fairly well defined. Rocks which cover lie a considerable distance from the shores of the narrow channel, presenting elements of danger to those who lack local knowledge. The known dangers are shown on the chart.

In the North Channel, steer a general **069°** course, avoiding the dangers as shown on the chart, until up to the eastern end of the narrows; then steer **078°** for about 0.9 mile, heading for the channel between two islands. When abeam the west side of the northern island, course may be changed to **068°**, which passes between the two islands over a 6- to 7-fathom shoal, on the southern end of which, about 250 yards from the southern island, is a 3¼-fathom spot. This shoal may be avoided by passing through an 11-fathom channel northwestward of the shoal, 115 yards from the northern island. A narrow 8-fathom channel lies to the southward of the 3¼-fathom spot; the south side of this channel is formed by a shoal, which extends 150 yards off the south island.

Anchorage may be had northeastward of the islands in 15 to 18 fathoms, mud bottom, or in the bight northward of the north island in 11 to 13 fathoms. A rock, bare at low water, lies close to the northeast end of the north island. A small 6-fathom shoal lies 0.2 mile northeastward from the northern island.

In the South Channel, a **056°** course carries through the narrow part of the channel. Two rocks, bare at low water, lie 165 yards off the southerly shore, 460 yards from the entrance. A 7-fathom spot was found 260 yards within the entrance. After passing through the narrow channel (a distance of about 0.6 mile), when abeam the bight to the westward of the small island on the southeasterly shore, change course to **064°** with the southern shore of Dolgoi Island astern; this course should head for the channel between the Dall Island shore and the eastern point of Dolgoi Island. Shoals extend off this point for about 150 yards. When abeam this point, a sharp turn to **038°** for 110 yards, passes

through a 5- to 6-fathom channel, 40 yards wide, to deep water. A small 7-fathom patch lies 220 yards to the south-southwestward of the small islet in the center of the bay. The bight to the northward may be entered by passing on either side of the 7-fathom patch and on either side of the island, though to the southward and eastward of the island is preferable; then through the channel to the eastward of the large island, giving the island a berth of not less than 130 yards at the narrowest part of the channel. The small bight at the head of the bay is foul.

Tides and Currents.—The ordinary tide range is about 9 feet while the diurnal range, i. e., the range from mean lower low water to mean higher high water, is about 11 feet. Tidal currents are reported seldom to exceed 1 knot.

A bay, about 1.5 miles long, 1 mile wide, divided into two parts by a chain of islands, lies about 2.5 miles northwestward from Port Bazan. The western part of the bay is deep but open and exposed; the eastern part is foul and has numerous rocks and kelp patches.

Chart 8148.—Gooseneck Harbor, about 4 miles northwestward of the northwest entrance point to Port Bazan, is 2 miles long in an easterly direction and is identified by a black rock, 65 feet high, south of and close to the entrance. The harbor is about 0.1 to 0.3 mile wide. A small rock, and two rocks awash, lie 100 yards off the north shore at the entrance. A rock, awash at extreme low water, lies near the middle of the entrance 200 yards westward of a small islet off the southeast shore. A rock, bare at low water, lies almost in mid-channel, about 0.8 mile inside the entrance. In entering, follow the north shore at a distance of about 250 yards. Anchorage for small boats may be had 100 yards off the north shore, 1.5 miles within the entrance, after rounding the point on the northwest side. The head of the bay is foul.

Gold Harbor, 6 miles northwestward of the northwest entrance point of Port Bazan, is almost 3 miles long in an easterly direction, 0.4 mile wide, and reported clear in mid-channel. On the north side of the bay is a peak 2,130 feet high, on the southerly side of which is a very prominent landslide, 110 yards wide and 350 yards long, with its top at an elevation of 1,560 feet. About 2 miles from the entrance and about 0.6 mile from the northern shore are **Twin Peaks** about 550 yards apart, the western peak having an elevation of 2,622 feet and the eastern 2,603 feet. The peaks are bare above an elevation of 1,700 feet.

On the northern side of the channel, sunken rocks extend offshore for about 350 yards for a distance of about 0.8 mile from the entrance point. On the south side of the channel at the entrance are 4 rocks which show. About 0.9 mile from the entrance, to the southward of mid-channel, is a small island. In the bight to the eastward of this island is a 1¼-fathom spot. A mid-channel course passing northward of the island leads to the head of the bay, where depths of 23 to 30 fathoms are found. The small cove westward of the northwest point of the entrance to Gold Harbor is foul.

Waterfall Bay, about 9 miles northwestward of the northwest entrance point to Port Bazan, is about 3.5 miles long in an easterly direction and 0.2 to 0.8 mile wide. The entrance is distinguished by a bold, bare point on the southeast side and by a wooded islet, **Gourd Island,** with off-lying rocks in the middle. Near the head of the bay are extensive deposits of marble on the slopes of Twin Peaks, two prominent bare summits which lie about 0.6 mile eastward of the head of the bay. Inside the bay, about 1 mile from the entrance, are two small islands, one close to the northern shore, the other about

in mid-channel. A small rock, and two rocks awash close by, lie about 0.3 mile westward from the northern island. Dangers, shown on the chart, lie eastward of the southern island. A reef projects 275 yards from the point on the south shore of the bay, about 1 mile eastward from the southern island. There are two prominent waterfalls in the bay; one, at the head, the other, on the northern shore, close to the north island.

The bay may be entered northwestward or southeastward of the entrance island. A narrow area with 8 fathoms on it extends from the northern shore of the bay to within 270 yards of the north side of the entrance island. A channel about 120 yards wide, with depths of 21 to 38 fathoms, lies between this area and the rocks and kelp which extend off the northern side of the island for about 100 yards.

The channel between the two islands within the bay has depths of 11 to 34 fathoms. The channel to the southward of the southern island has depths of 25 to 48 fathoms, with an 8-fathom spot, marked by kelp, 350 yards to the southward of the island. If this channel is used, round the island at a distance of about 180 yards, leaving the 3¼-fathom spot to the eastward. A shoal area extends 120 yards eastward from the north point of the island.

Anchorage may be had near the head of the bay in 26 fathoms, sticky bottom. Westerly winds draw into the bay with considerable force and with southeast winds, williwaws are severe. Small craft anchor in 10 fathoms on the northwest side of the bay, westward of the small islands, 1.5 miles inside of the entrance. There is anchorage for small craft, 50 feet in length or under, in 5 fathoms, mud bottom, in the small bight at the extreme head of the bay.

Cape Augustine, at the northwest side of the entrance to Waterfall Bay, has several bare black rocks close-to, and rises boldly to a height of 500 feet, from which point it slopes eastward to a summit 1,790 feet high.

Augustine Bay, northward of Cape Augustine, is a small bay about 0.8 mile long, 0.5 mile wide at the entrance, narrowing to less than 0.2 mile at the head. The northwest point of the entrance is marked by a group of rocks surrounded by kelp and sunken rocks extending offshore 0.3 mile. Kelp and rocks extend off the shores of the bay. Depths of 8 to 16 fathoms are found near the center of the bay. The bay is open and exposed and is unsuitable for anchorage.

Welcome Cove, about 1.5 miles northward from Cape Augustine, is almost 0.5 mile long, about 70 yards wide near the entrance, widening to about 200 yards near the head. Off the entrance the ground is foul, but there is a narrow channel into the cove, where anchorage may be had for small boats in 4 to 6 fathoms, mud bottom. Without local knowledge the entrance should not be attempted.

Camp Cove is about 2.5 miles northward from Cape Augustine. Off the entrance is a rock, 15 to 20 feet high, with foul ground extending in a northerly direction to the shore. The southern shore of the cove is foul. In the center is a reef marked by kelp with a channel on either side. The western channel is wider. The following courses carry through this channel: From a point 200 yards to the southward of the rock at the entrance, steer 054° until the reef is abeam; then change to 091°. In the bight northeastward of the reef, depths of 8 fathoms, shoaling to 2 fathoms at the head, are obtained. The place is of little value as an anchorage and should only be entered by those having local knowledge.

Devil Lake empties to the northward of **Devil Island,** about 0.5 mile to the northwestward of Camp Cove. The channel at the entrance is very narrow. The lakes extend at least 3 miles in a northeasterly direction and are unsurveyed.

Fisherman Cove, about 4.5 miles northward from Cape Augustine, is about 0.5 mile long and 0.2 mile wide. At the entrance is a small island on which are a few scattered trees. In entering, pass the southern point of this island at a distance of about 100 yards and steer for the left or west edge of the sand beach at the head of the cove. The anchorage is about 170 yards wide, with depths of 3 to 6 fathoms, mud bottom, and is large enough for four or five small fishing vessels.

Sakie Bay, about 7.5 miles north-northwestward from Cape Augustine, is 2 miles long in an easterly direction and 0.5 mile wide. Rocks and reefs extend 0.6 mile offshore in a southwesterly direction from **Sakie Point,** the southern point of the entrance. The outermost rock is 20 feet high. **Table Rock,** about 8 feet high, is the most prominent of the rocks which extend about 320 yards off the northern shore at the entrance. The channel, about 300 yards wide, lies to the southward of Table Rock. Foul ground extends from the southern point of the entrance northward for almost 0.4 mile to the south side of the channel. Tide rips, severe for small craft, are experienced at the entrance. **Middle Island** lies near the center of the bay; there are several dangers off its northern and eastern shores. An islet, with sunken rocks 110 yards westward from its western end and shoal water off its eastern end, lies northward of Middle Island. Near the head of the bay and about 450 yards off the northern shore, is a group of small islands and rocks.

Bring Middle Island to bear 120° and steer for the left tangent of the island. The course will favor the Table Rock side of the channel. When 400 or 500 yards from Middle Island, change course to pass close to the southern side of the island and then head for the sandy beach at the head of the bay. This course will clear a rock, which is reported to bare at low water, 75 to 100 yards off the eastern end of Middle Island. Anchor in 6 to 8 fathoms, sticky mud bottom. The bay has not been thoroughly surveyed.

Cape Lookout is a prominent headland about 1 mile northward of Sakie Bay. From the cape, extending in a southeasterly direction, are four prominent peaks. **Cone Mountain,** 0.6 mile from the extremity of the cape, is a symmetrical, timbered cone 2,150 feet high. **Bear Mountain,** 2,820 feet high, 1.4 miles from the cape, is round-topped, and timbered to an elevation of 1,800 feet. **Thunder Mountain,** 3,010 feet high, the highest peak on Dall Island, 2.8 miles from the cape, has a bare, rugged summit.

Sea Otter Harbor, on the north side of Cape Lookout, is about 4 miles long and 0.8 mile wide for a distance of about 1 mile from the entrance, where it divides into two branches, each about 0.5 mile in width.

Entrance Island, a prominent rock, lies 0.6 mile northwestward of Cape Lookout and a little to the southward of the middle of the entrance to Sea Otter Harbor. From Entrance Island, rocks extend 400 yards in a northerly direction, 0.5 mile in a westerly direction, and kelp patches extend to a breaker 0.8 mile in a southerly direction, about 0.4 mile off Cape Lookout.

Juel Point, the headland on the north side of Sea Otter Harbor, is rugged and rocky. Foul ground extends offshore for almost 0.4 mile. From the point the land slopes eastward for 1.3 miles to a summit, 1,100 feet high.

Inside the entrance to Sea Otter Harbor, about 0.5 mile from Cape Lookout, rocks and reefs extend off the south shore of the bay for a distance of 0.4 mile. Within the

entrance, 1.5 miles from Entrance Island, a group of rocks extends 400 yards off the northern shore of the bay. The largest and southernmost rock of this group is known as **Gate Island. Clear Point** is the western extremity of the headland which divides the bay into two arms. To the southward of this point, two islands, known as **Nellag Islands,** with off-lying rocks close-to, extend in a westerly direction.

In entering Sea Otter Harbor, small boats frequently use a channel to the eastward of Entrance Island, passing close to Cape Lookout. A sunken rock, reported to be 525 yards 121° from Entrance Island, is left on the port hand. The channel is unsurveyed and is used only by those having local knowledge.

Hook Arm, the northern arm of Sea Otter Harbor, is well protected from wind and sea. Anchorage may be had anywhere in the arm in 21 to 26 fathoms in the center, 17 to 19 fathoms at either end, mud bottom. Small vessels can anchor in 8 to 15 fathoms at the head of the arm or in the bight northward of Channel Island, avoiding the sunken rock off the northern shore of Channel Island. A small sand and gravel beach is at the head of this bight.

Camp Island, small and rocky, lies close to the western shore of Hook Arm, about 0.5 mile northward of Clear Point. Sunken rocks lie 250 yards eastward of the island.

Channel Island, separated by a very narrow passage from the western shore of Hook Arm, lies about 0.8 mile northward of Clear Point. It is about 0.5 mile long, averages 170 yards in width, and is wooded. **Low Rock** and a rock awash close to the eastward, lie 200 yards off the southern shore of Channel Island. Rocks extend about 50 yards off the northerly point of the island. A rock, covered by 4 feet of water, lies 120 yards off the northern shore of the island, midway between the northeast end of the island and the southern point of the bight which the island forms with the western shore of the arm.

Two small rocky islets lie near the head of Hook Arm; the outermost is 240 yards from the north shore.

To enter Hook Arm, leave Entrance Island 0.35 mile on the starboard hand, head **096°** for Nellag Island; round Gate Island, and head on a **065°** course for the small bight near **Way Point.** When abeam the west end of Channel Island, change course to **052°.** When abeam the northeast end of Channel Island, head into the anchorage. The west end of Nellag Island should be given a berth of at least 100 yards. The rocks off Camp Island and Low Rock, and the rock awash, are the principal dangers in the channel.

Manhattan Arm, the southeast branch of Sea Otter Harbor, is exposed to the force of the wind and sea and is too deep for secure anchorage. A rocky islet, with off-lying sunken rocks, is in the middle of the arm. Rocks, visible and sunken, extend 200 yards southward of the eastern end of large Nellag Island.

Foul Bay, about 2.5 miles northward of Cape Lookout, is 1.5 miles long, 1 mile wide at the entrance, narrowing to less than 0.2 mile at the head. In the center of the bay near the entrance is a cluster of sunken rocks. Foul ground extends off the north and south entrance points for about 500 yards. The shores of the bay are foul where the bay narrows; reefs extend from either shore almost to mid-channel, leaving a narrow passage 50 to 100 feet wide through which very small boats pass to a secure anchorage in 5 to 6 fathoms near the head of the bay. It is not advisable for those without local knowledge to enter the bay.

Chart 8152.—Forrester Island lies about 14.5 miles off the Dall Island shore and about 30 miles west-northwestward from Cape Muzon. It is 4.5 miles long in a northerly direction, 1 mile wide, and wooded. The northern half of the island is a ridge with distinctive summits; the southern summit is 1,408 feet high, rounding, relatively flat with a ragged tree line; the next peak to the north is 1,128 feet high and is sharp; the third is 992 feet and rounding; the north peak shows flat, with two knobs 827 feet and 800 feet high. The southern part of the island is a wooded flat, 400 to 500 feet in elevation, with a knob, 553 feet high, on the eastern side. At the southern end of the island is a detached knob 375 feet high, which from east and west directions appears as a separate island.

Forrester Island is a National Wildlife Refuge under the jurisdiction of the U. S. Fish and Wildlife Service.

Forrester Island from the South and West

(From a Sketch by E. P. Herendeen before 1883)

There are no secure anchorages off Forrester Island. During the summer months small craft anchor in four different places: namely, at Wood Cove, Eagle Harbor, the north end, and the bight on the western side near the north end. Anchorage is close to the beach at the edge of the kelp in about 10 fathoms, rocky bottom. There is a small fresh-water stream in Eagle Harbor.

Wood Cove and **Eagle Harbor** are on the east side of the island, 1.4 miles and 0.8 mile, respectively, from the north end.

Petrel Island lies about 1 mile southward from Forrester Island. It has two wooded summits 308 and 304 feet high. From a distance, these appear as two islands.

South Rock, 168 feet high, close to the south end of Petrel Island, is not very prominent. Between South Rock and Petrel Island is a rock, 73 feet high, and several smaller rocks.

Northward of Forrester Island for 3 miles there are, in succession: **Sea Lion Rock,** 117 feet high, with a flat and grassy top; **Cape Horn Rocks,** 148 feet high, with steep sides and grassy tops; **Lowrie Island,** 291 feet high, wooded; and **North Rocks,** 15 to 25 feet high, a group with outlying rocks and breakers.

Breakers are numerous around the Forrester Island group, but for the most part are close to shore or are readily discernible. One is 750 yards westward from the southern point of the bight on the northwest end of Forrester Island; inshore from this, about 300 yards, is another breaker. **Butler Rock,** 20 feet high, is 500 yards westward from the point on the north side of this bight. Northward from Butler Rock, 325 yards, is a breaker which does not show during ordinary summer weather; 115 yards southward from Butler Rock, a breaker is reported to show at low water during heavy weather. The breaker between Sea Lion Rock and Lowrie Island is reported to break at low water springs with a moderate swell. During unusually fair seasons, this locality has been marked by kelp.

The pass between Forrester Island and Petrel Island is used by fishermen. At times, the currents are severe, and during heavy weather it is dangerous. The channel around

the north end of Forrester Island and south of Sea Lion and Cape Horn Rocks is reported clear; that between Sea Lion Rock and Cape Horn Rocks is seldom used. There is a channel between Lowrie Island and North Rocks, but the locality of North Rocks is reported foul. The passes are used only by small fishing craft and should only be attempted by those with local knowledge.

Wolf Rock, 13.5 miles 005° from the highest summit of Forrester Island, is small in extent, 30 feet high, and bare of vegetation; it is surrounded by foul ground to a distance of over 0.5 mile.

Offshore breakers.—A 16-fathom spot, surrounded by depths of 60 to 80 fathoms, lies 5.6 miles 090° from the highest summit of Forrester Island. A 16-fathom spot, surrounded by depths of 60 to 70 fathoms, lies 8 miles 162° from Wolf Rock. Both spots are of small area, apparently of pinnacle formation, and until wire-dragged, there is no certainty that shoaler depths do not exist.

A breaker which shows only during a heavy swell and then breaks heavily, lies about 6.5 miles 101° from Wolf Rock. The appearance of the break would indicate a pinnacle formation. The water in the vicinity is deep (Chart 8148).

A breaker lies 3.4 miles 281° from Cape Lookout (Chart 8148).

A 2½-fathom spot, which breaks, lies 2.8 miles 295° from Cape Lookout (Chart 8148).

Currents.—A few observations made during June, 1917, at times when the sea and air were calm, between Dall Island and Forrester Island, show a northeasterly to northwesterly set varying from 0.3 to 1.3 knots. Westward of Lowrie Island at the 100-fathom curve, a northeasterly to northerly set of 0.1 knot to 0.8 knot was observed. Near the 1,000-fathom curve, a slight southerly set was experienced during calm weather.

The currents have considerable strength in the vicinity of the rocks and islets off Forrester Island, and are irregular in direction, but generally have a northerly set during flood. Slack water is reported to occur about 1½ hours after the time of high and low waters at Sitka. Tide rips are usually found around Forrester Island and in the passages between the rocks.

Chart 8151.—Meares Passage is at the northwest end of Dall Island, between it and Suemez Island, and affords passage from the sea to Tlevak Narrows and the eastern part of Ulloa Channel. The approach to Meares Passage from westward is foul in places for 2 miles from the Suemez Island shore.

Suemez Island, approximately 8 miles in diameter, is west of and separated from the northern end of Dall Island by Meares Passage, 0.6 mile wide at its narrowest part. The island is mountainous; the peaks are generally rounded, wooded, except near the summits, and range in elevation to 2,400 feet. The shoreline is rocky, fringed by small rocky islets and kelp, and indented by numerous bays and inlets.

Arena Cove is a small open bight in the southern shore of Suemez Island westward of **Lontana Point,** the southeastern extremity of the island. It has depths of 17 fathoms near the entrance, shoaling to 6½ fathoms near the head. A rock with a depth of 4¼ fathoms is in the entrance to this cove.

Diver Islands, off the eastern shore of Meares Passage, are prominent when approaching from seaward. The westerly island is 230 feet high and wooded; the easterly island is 120 feet high and has a lone tree on its summit. The passage eastward of the islands

is narrow and its shores are marked by heavy kelp. Most small craft coming from the south use this passage when the weather permits.

Diver Island Light, 125 feet above the water and visible 11 miles, is shown from a small white house on the western side of the westerly island. The light is obscured from 202½° to 005°.

Diver Rocks, two in number and bare at half tide, are about 0.2 mile westward of the west point of the islands. A kelp patch extends 300 yards outside of them.

Diver Bay, on the southeastern side of Meares Passage at its entrance, extends eastward from Diver Islands. The bay is about 2.5 miles long, 0.4 to 0.8 mile wide, and clear except for a kelp-marked rock with ½ fathom over it, which lies 650 yards from the north shore nearly in mid-channel. Small craft can find excellent anchorage in the **Hole In The Wall,** an indentation in the northern shore; the entrance is narrow, but has a least depth of 4¼ fathoms. Pass either side of the ½-fathom rock in entering.

Bobs Bay, the entrance to which is northeastward of Diver Islands, is an irregularly shaped bay extending 3 miles in a northeasterly direction. The entrance is obstructed by a chain of reefs and islands, the largest one having an elevation of 285 feet. The bay is divided into three arms, the middle one of which is foul and not navigable except by small boats. The easternmost arm affords good anchorage for moderate sized craft in 6 to 10 fathoms, soft bottom. Enter Bobs Bay 0.2 mile or more southward of the largest outer island, and follow the east side of the island at a distance of about 250 yards. Pass in mid-channel southward of the high island off the entrance to the east arm.

Millar Rocks are a clump of numerous bare rocks, with a greatest height of 36 feet, which lie about 1 mile northward of Diver Islands. A rock, which covers at one-quarter flood, lies 300 yards southeastward of the highest point. The passage northward of the rocks is foul to the main shore, although there are deep passages between; in heavy weather the whole area appears to be covered with breakers.

In the northern part of Meares Passage, about on a line from **Eagle Point** to the summit of Ridge Island, and at distances from Eagle Point of about 0.6 mile, 1 mile, and 1.5 miles, there are several rocky kelp-marked patches with deep water between, all of which should be avoided.

Directions, Meares Passage.—Pass 0.8 mile westward of Diver Islands, 0.4 mile eastward of Millar Rocks, and 0.2 mile westward of Eagle Point. Then, if going to Ulloa Channel, keep westward of a line from Eagle Point to the summit of Ridge Island until nearing the island. If bound to Tlevak Narrows, round Eagle Point at a distance of 250 yards and head for Bush Islets.

For predicted times of slacks and times and velocities of strengths of the current in Meares Passage see the *Current Tables, Pacific Coast.*

Chart 8152.—Bucareli Bay is a large arm of the sea making northward and northeastward about 22 miles, from between Cape Felix and Cape Bartolome, with a width of 2 to 5 miles. Bucareli Bay was the first landfall of Captain Alexie Ilich Chirikof, of the Bering expedition, on the ship *St. Peter* in 1741. He was unable to make a landing in the bay.

For predicted times of slacks and times and velocities of strengths of the current in Bucareli Bay see *Current Tables, Pacific Coast.*

Chart 8158.—Cape Felix, at the south end of Suemez Island, rises to a height of 2,400 feet. The depths off the cape are comparatively regular and good, but to the eastward, foul ground extends almost 2.5 miles offshore. Cliffs well up on the mountain side, and a steep light-colored cliff a little to the northeastward of the cape, are the most prominent landmarks. Northeastward of the cape is a small section of cliff of columnar formation, somewhat unusual for this section of Alaska. From the cape the shoreline trends in a northerly direction, forming the east side of Bucareli Bay.

Baker Island, forming the western side of the southern end of Bucareli Bay, is 12 miles long in a northerly direction and averages about 4.5 miles in width. It is cut up by numerous bays and inlets. The shore is generally rocky; that along the outer coast is precipitous and marked by ragged ledges and deep clefts. The interior is rugged and mountainous, with summits ranging from 1,080 feet to 2,500 feet in elevation, generally thickly wooded, with spruce and some cedar on the lower slopes and scrub growth at the higher elevations.

Cape Bartolome, at the southern extremity of Baker Island, has several storm-swept rocky islets, some partly wooded, lying off the main shore. The southernmost wooded islet, 300 feet high, slightly higher than those close to the cape, shows prominently from offshore. The cape rises rather sharply to an elevation of 750 feet then gradually to 1,750 feet. A small rounded peak, 1,130 feet high, 2 miles northward from the cape, with higher peaks on either side, shows prominently when other peaks are clouded. In rounding the cape, the outer wooded islet should be given a berth of about 1 mile.

The rocks and cliffs northwestward of Cape Bartolome are black in color, while those southeastward are whitish gray, and it is reported that this characteristic is of considerable assistance in identifying the locality when making the coast in thick weather.

Cape Bartolome Light is shown from a small white house on the south point of an island off the cape. The light is 163 feet above the water and visible 10 miles; it is obscured from 136° to 269°.

The west coasts of Baker and Noyes Islands are described later in this chapter.

Fortaleza Bay, on the west side of Bucareli Bay, about 4.5 miles from Cape Bartolome, is a small open deep-water bight. Shoal water extends 400 yards in a northerly direction from the south shore at the entrance. **Lake Fortaleza,** with an elevation of about 12 feet, empties into the bay.

Thimble Cove, about 0.8 mile to the northward of Fortaleza Bay, is a small exposed bight.

Port San Antonio, on the western side of Bucareli Bay, about 6.5 miles from Cape Bartolome, is 2 miles long in a northwesterly direction, 0.5 mile wide, with two arms at the head; one extends in a northerly direction for 0.9 mile, the other in a southerly direction for 1.2 miles. The mid-channel is clear, but a rocky shoal which bares 7 feet is 650 yards 242° from **Point San Roque,** the north point at the entrance. Depths decrease from 30 fathoms at the entrance to about 14 fathoms at the head. Small craft can find anchorage in the north arm in 5 to 7 fathoms, and in the south arm in 10 fathoms, sand bottom. The north arm of the bay has a low shoreline with gravel beach.

A fish-buying scow is anchored at the head of the north arm from May 1 to September 15. Supplies for fishermen including provisions, gasoline, fuel oil, and fresh water are available. There are 250 feet of mooring float for small craft. Radio communications are maintained with Alaska Communications System.

Port Asumcion, on the west side of Bucareli Bay 9 miles from Cape Bartolome, offers protected anchorage in 17 to 21 fathoms, sand bottom, near its head. Foul ground extends 300 yards off the north shore, 0.5 mile from the entrance. The mid-channel is clear.

Chart 8120.—Port Santa Cruz, on the east side of Bucareli Bay 5 miles northward from Cape Felix, is about 2 miles in length in an easterly direction, 1 mile wide at the entrance, and 0.4 mile wide at the head. The north shore is steep and rocky, with detached rocks close-to, while the rest of the shoreline is generally low, with rocky, gravel, or sand beaches. A fish-buying scow anchored at the head of the port operates from May 1 to September 15. All fishermen supplies including provisions, gasoline, fuel and lubricating oil, and some gear are available. There is 200 feet of mooring float for small craft. Fresh water can be obtained at the float. Radio communications are maintained with Alaska Communications System. **Labandera Rock,** a kelp-marked shoal 300 yards in extent, with a depth of 1½ fathoms, lies midway between **Point Rosary** and **Point San Jose,** the two points at the entrance. A rock which bares at low water is about 0.7 mile east-northeastward from Point Rosary and 250 yards off the small islet fronting **Point Isleta.** With a moderate swell, the breakers on this rock can frequently be seen at night.

In entering, round Point Rosary or Point San Jose at a distance of 0.2 mile and head for the point on the north side of the bay 1 mile inside the entrance. Round this point at a distance of 200 yards and select anchorage as desired in 14 to 17 fathoms, mud bottom. Anchorage with more swinging room may be had to the southward of the point in 17 to 19 fathoms, mud bottom. The channel to the northward of Labandera Rock is preferable.

Chart 8158.—Point Arboleda is a low point about 2.2 miles northward of the entrance to Port Santa Cruz. Several outlying islets and rocks make it necessary to give the cape a berth of 0.5 mile in rounding it. **Point Quemada** is midway between Point San Jose and Point Arboleda.

Point Fula, Point Remedios, and **Point Barrigon** are points and headlands on the northwest shore of Suemez Island.

Port Dolores is on the easterly side of Bucareli Bay, 2 miles north-northeastward of Point Arboleda. It has generally broken bottom, with a sunken reef, 300 yards in extent, in its center about 0.4 mile inside the entrance. Its use is not recommended for any except small craft, and they can find anchorage in about 12 fathoms 0.4 mile from the head. The anchorage is exposed to westerly winds.

Point Arucenas, the headland on the north side of Port Dolores, is wooded, has an elevation of about 260 feet, and has a low, steep, rocky shoreline.

Point Cangrejo, about 1.6 miles eastward of Point Arucenas, is wooded, rises to an elevation of about 500 feet 0.5 mile from the point, with higher ground to the southward. There is a group of bare rocks off the point. Foul ground extends about 0.5 mile northward from the point and about 0.2 mile offshore for 0.8 mile to the westward.

Cabras Islands are a small, wooded group, with a greatest height of 180 feet, lying about 1.5 miles northeastward of Port Dolores. A reef, bare 5 feet at low water and marked by kelp, lies nearly 0.5 mile southwestward from the group.

St. Ignace Island, on the north side of Bucareli Bay about 11 miles from Cape Bartolome, is 1,520 feet high, bold, and wooded. The eastern and northeastern shores are mostly rocky, while the west and northwest shores are gravel. St. Ignace Rock Light,

20 feet above the water, is shown from a small white house on the southerly side of the small islet on the northern end of St. Ignace Island.

Port Mayoral, the passage between St. Ignace and Baker Islands, has depths of 6 to 12 fathoms, with irregular bottom. **Cristina Island,** small, wooded, 110 feet high, forming a cluster of high-water islets, lies to the westward of mid-channel at the entrance, with a deep-water passage on either side. Foul ground extends 300 yards off the southern end of the island and for 550 yards off **Canal Point.** The northern entrance is obstructed by the Santa Rita group of islands between which and the St. Ignace Island shore is a narrow channel less than 50 yards wide. The channel between Santa Rita and Baker Islands is passable at high water by rowboats and similar craft.

Port Real Marina is described later in this chapter.

Chart 8155.—Point Miliflores, bold and wooded, is the southeastern point of San Juan Bautista Island. **San Juanito Island** lies close off the point. The island is wooded and from north and south directions shows clear of San Juan Bautista Island and is a prominent landmark. Deep water extends close to the point and island.

San Juan Bautista Island is described later in this chapter.

Ulloa Channel and Cape Flores have been described earlier in this chapter.

Port Estrella, eastward of Cape Flores, is about 1.8 miles long and from 0.2 to 0.5 mile wide. Foul ground extends for about 0.2 mile southward of **Point Providence,** the north point of the entrance. In entering steer **130°** about midway between Point Providence and Cape Flores. This course passes about 350 yards from the shoal patches off Cape Flores. When abeam the shack on the narrow low neck on the starboard hand, with Point Providence slightly past the beam, change course to **086°.** Anchor near the head of the bay in 7 to 9 fathoms. Caution is necessary on entering, as shoal water makes out from each side of the bay.

Tranquil Point, Point Batan, and **Point Lomas** are headlands without any prominent features on the southeastern shore of Bucareli Bay, to the eastward of San Juan Bautista Island.

Port Caldera, about 4.5 miles northeastward of Cape Flores, about 1 mile long in a southerly direction and 0.8 mile wide at the entrance, is open to the northward. It affords anchorage for small craft. A 6½-fathom spot is in the center near the entrance. Foul ground extends about 300 yards off **Point Iphigenia,** the northeast headland at the entrance.

Trocadero Bay, locally known as **Big Harbor,** extends about 9 miles eastward from the head of Bucareli Bay, with a greatest width of 3 miles. In the entrance is a group of islands, of which the largest is **Madre de Dios Island,** 1.5 miles long, 550 feet high, and wooded. The islands are bold-to, with a few outlying rocks, and the passages between them are mostly of good depth. Near the head of Trocadero Bay islands and rocks are numerous and the channel becomes more difficult. An abandoned copper mine is on the north side of the bay 3 miles from its head. From the head of the bay is an easy portage to Twelvemile Arm, Kasaan Bay, on the east side of Prince of Wales Island. In entering Trocadero Bay Chart 8155 is the guide.

The **Ladrones Islands** are a group of small wooded islands, the highest with an elevation of 350 feet, in the entrance to Trocadero Bay.

Toti Island, a small wooded island 320 feet high, is 0.5 mile northward of Madre de Dios Island.

Port St. Nicholas, northward of Trocadero Bay, is about 4 miles long in a northeasterly direction, with an average width of about 0.8 mile, except near the head, where it narrows. **Coronados Islands,** a group of wooded islands, lie midway in the entrance, and rocks and reefs, with two channels between, extend to the northward. **Rancheria Island** is southward of and close to **Point Miraballes;** a 3½-fathom shoal is about 0.2 mile southwestward of the island. To enter, leave the northwest point of Rancheria Island about 200 yards on the starboard beam on a **026°** course. Depths and shoals within the bay are shown on the chart. Northwestward of Port St. Nicholas is a peak 2,940 feet high and of a light-green color in summer, which shows conspicuously from northward and southward.

Klawak Inlet extends in a northerly direction from the head of Bucareli Bay for about 6 miles to the entrance of Big Salt Lake. It is from 0.5 to 1 mile wide. The towns of Craig and Klawak are on the eastern side of the inlet. The inlet has two entrances—the entrance from Bucareli Bay is southward of Fish Egg Island; the entrance from San Alberto Bay is northward of Fish Egg Island. Directions for Klawak Inlet are given in Chapter 3.

Cape Suspiro is the low wooded point on the eastern side of the southern entrance to Klawak Inlet. **Port Bagial,** a small cove on the east side of Cape Suspiro, has depths of 4 to 5 fathoms to the westward of the islands on the east side.

Fish Egg Island, at the southern end of Klawak Inlet about 1.8 miles long in a northerly direction and about 0.9 mile wide, is low and wooded. Shoals extend off the southern end of the island to the Ballena Islands. **Fish Egg Reef,** which extends for 350 yards southeastward of the southeastern point of the island, is marked by a lighted buoy at its outer end. **Cole Island,** a low, wooded island, is in the bight in the northeast side of Fish Egg Island.

Craig Shoal, marked by a lighted buoy, is a sunken rock with 1 fathom over it, about 0.6 mile northward of the cannery at Craig. The channel eastward of the shoal is deep; the channel to westward has a least depth of 4½ fathoms in mid-channel.

Craig, a town on the island at the south end of Klawak Inlet southeastward of Fish Egg Island, is a customs port of entry; marine documents are not issued. The town has a post office, a cannery, a sawmill, a radio station, several general stores, a hotel, two oil wharves, and a machine shop equipped to handle ordinary repairs to small craft. The latter is on the east side of the island where boats are beached on the sand flats for repairs. Small craft tie up to a float here and to two floats off the town; vessels of deep draft go to the cannery wharf. Craig has regular communication by mail launch with Wrangell and Ketchikan, and with the other settlements on the west coast of Prince of Wales Island. There is regular airplane service daily throughout the year.

A Federal project provides for a mooring basin in **South Cove,** on the east side of the island, 11 feet deep, 225 feet wide, and about 700 feet long, including an entrance channel of the same depth over a width of 100 feet. In July 1951 no work had been done on the project.

The Libby, McNeill and Libby cannery wharf has a face 146 feet long with a least depth of 20 feet alongside. This wharf is somewhat difficult to approach on account of a reef off the corner of the dock. The reef is marked by a buoy. Large vessels approach from northward and make a port landing. It is reported that the flood current sets toward the wharf and the ebb current sets off the wharf. Fresh water is available. The marine

railway of the cannery is capable of hauling a vessel of 75 gross tons with a draft of 5 feet forward and 6 feet aft.

The Standard Oil Company wharf has a depth of 16 feet; the Union Oil wharf has a depth of 12 feet.

Craig has a Coast and Geodetic Survey **chart agency.**

Clam Island is a low wooded island about 1 mile northward of Fish Egg Island. **Klawak Reef,** the southern end of which is marked by a lighted buoy, consists of four groups of rocks, extending in a southwesterly direction from the west end of Clam Island.

A channel, about 200 yards wide, with depths of 11 to 20 fathoms, separates the reef from the shoals off Fish Egg Island. A buoy marks the west end and the lighted buoy the east end of the north side of the channel. Two rocks, bare at half tide, lie to the southward of the channel. A 2-fathom spot lies about 0.3 mile northward of Cole Island.

Entrance Point is a low wooded point about 0.3 mile eastward of Clam Island. A channel leads between Entrance Point and Clam Island into the bay southward of the Alberto Islands. It is clear except for a reef extending northeastward into mid-channel from the southeast point of Clam Island, and two small shoals off the north side of the island.

Klawak Island, about 0.8 mile long in a northerly direction and 0.2 mile wide, is near the head of Klawak Inlet and is separated from the eastern shore by **Klawak Harbor.** A 2-fathom spot, marked by a lighted buoy, is about 0.2 mile westward from the southern end of the island. The harbor is said to freeze over at times during the winter months.

The approach to Klawak Harbor is rocky and narrow. A ledge, the extremity of which is marked by Klawak Island Light, extends about 125 yards north-northeastward of Klawak Island. The light is shown from a red davit on spindle on concrete pier at an elevation of 20 feet above water and is visible 9 miles. The channel, about 200 yards wide, is between the ledge and a reef which makes out from a point to the northward, the south end of which is marked by a daybeacon. Another daybeacon marks the edge of a shoal which makes out from the opposite shore to the eastward of the light. A small anchorage is in the bight southward of the village, from the south end of which is a high-water pass to Klawak Inlet for canoes.

Klawak is a native village and post office on the eastern shore of Klawak Harbor. Two general stores, a sawmill, and two canneries are here. Klawak has regular communication by mail launch with Wrangell and Ketchikan, and with other settlements on the west coast of Prince of Wales Island. There is daily air communication with Ketchikan.

The wharves of the Klawak Oceanside Packing Company are the most northerly on the east side of the harbor. The larger and main one is 225 feet in length with a face of 85 feet. There is a controlling depth of 16 feet at the face. The wharf of the West Coast Packing Company farther south on the eastern side of the harbor has a 60-foot face and a controlling depth of 17 feet alongside.

The head of the inlet consists of a series of irregular flat islands broken by a great number of intricate channels. Beyond these is **Big Salt Lake,** which is separated from the inlet by an island, on both sides of which are narrow channels obstructed by ledges. These serve to dam the waters of the lake. The flow of water into the inlet from the lake at the lower stages of the tide is reversed near high tide. A slack water occurs about 2 hours before and after high water at Klawak, at which times a draft of about 8 feet

can be taken into the lake. The passages above Klawak are intricate and foul in places, and should not be attempted without local knowledge. Guides can be obtained at Klawak.

A large amount of fresh water discharged from the lake causes severe ice conditions in the colder months of winter. There are times each winter when the harbor cannot be used by small craft. At these times, outside communication with Craig is by the highway extending between the two settlements.

Chart 8155.—San Alberto Bay extends 7 miles northward from Bucareli Bay to San Christoval Channel. The principal channels have been closely surveyed. San Alberto Bay has numerous shoals and broken areas, as shown on the chart.

Directions.—Pass between San Juan Bautista and Balandra Islands, favoring the former, on a course of about **333°**. When Balandra Island is a little abaft the beam, steer **018°** for 1.2 miles, with the 1,990-foot summit of San Juan Bautista astern and Alberto Island ahead. When midway between the buoys marking Balandra Shoal and Ballena Islands Shoal, steer **359°** for 3.8 miles, with the west end of Balandra Island astern and The Witnesses ahead. When 1 mile past Parida Island, steer **300°** for San Christoval Channel, with Alberto Island astern. Continue with courses and distances given in Chapter 3.

San Juan Bautista Island, in the southern part of San Alberto Bay and separating it from Bucareli Bay, is 4 miles long in a northerly direction, densely wooded, and has two prominent summits each about 2,000 feet high.

Agueda Point, at the northeastern end, and **Diamond Point,** at the southwestern end of the island, have no special features as landmarks. A shoal is 0.5 mile westward from Agueda Point. It has been reported that a submerged rock or shoal which has been seen at a minus tide exists near the 8-fathom shoal about 1.2 miles northwestward of Diamond Point. Large vessels which pass north and west of San Juan Bautista Island should give this position a wide berth.

Point Miliflores and San Juanito Island have been described earlier in this chapter.

Balandra Island, small, 115 feet high, and wooded, lies about 0.6 mile eastward of Agueda Point, at the junction of Bucareli Bay and San Alberto Bay. Foul ground extends 250 and 100 yards off the east and west ends, respectively, and a 2½-fathom spot lies 0.2 mile northeastward of the island. The channel between Balandra Island and San Juan Bautista has been carefully surveyed, but is has not been examined by means of a wire drag; the least depth found was 4½ fathoms.

Ballena Islands, two in number, 120 feet high, and wooded, lie about 1.2 miles northeastward of Balandra Island and about the same distance southwestward of Fish Egg Island. Between Ballena Islands and Fish Egg Island the bottom is foul. A reef, with a least depth of 1½ fathoms, lies 0.4 mile southwestward of the western Ballena Island, with an extensive kelp patch between.

Ballena Island Shoal, with a least depth of 1¾ fathoms, lies 0.6 mile westward of the western Ballena Island. It is marked on its western side by a lighted buoy.

Balandra Shoal consists of two small areas 0.2 mile apart, having a least depth of 1 fathom on the northern area and ¾ fathom on the southern area, and with deep water between the two. It lies about 1 mile westward of the western Ballena Island. The shoal is not marked by kelp. The northerly area is marked by a buoy on its eastern side. The usual course in passing Balandra Shoal leads eastward of it, between the buoys marking it and Ballena Island Shoal.

San Fernando Island, on the west side of San Alberto Bay and on the northeast side of Portillo Channel, is about 6.5 miles in diameter, with low rocky shores cut up by numerous small indentations and bights. The island is covered with timbered hills and ridges without any prominent features.

Ursua Channel separates San Fernando and San Juan Bautista Islands and connects Bucareli Bay and San Alberto Bay. Mid-channel depths are good. The principal dangers are the shoal ground which extends almost 0.5 mile southward from **Amargura Point,** the southern point of San Fernando Island, and the shoal ground which extends about 0.4 mile off **Point Eugenia,** the middle point on the northwestern side of San Juan Bautista Island. From this point to the shoal spot, 0.5 mile westward of Agueda Point, the San Juan Bautista Island shore should be given a berth of at least 0.4 mile. Irregular bottom, with shoal spots, extends about 0.6 mile off the San Fernando Island shore, near the northern end of the channel. The channel eastward of San Juan Bautista Island is more generally used.

Fern Reef, about 1.5 miles northwestward of Balandra Shoal and about 1 mile off the San Fernando Island shore, shows two rocky heads 0.2 mile apart, bare at low-water springs. The reef is marked by some kelp. **Fern Point** lies on the eastern side of San Fernando Island.

A shoal area, on which there is a least charted depth of 5½ fathoms, lies 0.8 mile eastward of **Point Cuerbo.**

Parida Island stands out prominently in the middle of San Alberto Bay. It is 0.2 mile in diameter, 110 feet high, and wooded.

Parida Island Reef lies 0.5 mile southward from Parida Island. One head bares at low-water springs. A depth of 4 fathoms is found 0.5 mile southeastward of this reef; the depth may be less.

Klawak Reef and the entrance to Klawak Inlet northwestward of Fish Egg Island are described earlier in this chapter.

Alberto Islands lie northward of Fish Egg Island and Klawak Reef. The southernmost island is about 1.8 miles northward of Fish Egg Island and the same distance north-northeastward of Parida Island; it is 130 feet high and wooded.

Alberto Reef extends 0.4 mile westward from the southernmost Alberto Islands; its highest point is bare 5 feet at low water. A 5-fathom channel separates this reef from Alberto Island; the deepest water is found 100 yards off the island.

Wadleigh Rock lies 0.5 mile eastward of Alberto Island and consists of two reefs about 100 yards apart. The west reef bares at ½ tide and the east reef at low tide. The shoal is about 0.2 mile long in a northerly direction, steep on the west side, and can be passed 100 yards off.

Three rocky patches, covered by about 5 feet at low water, lie about 1 mile north-northwestward of Parida Island. They are marked by a lighted buoy off the northernmost patch. These rocky patches are usually marked by kelp but not at all times. The range of the southwest end of Parida Island and the northeast end of San Juan Bautista Island passes a little northeastward of the patches.

The Witnesses, locally known as **Hour Islands,** are two wooded islets 1.8 miles northward of Parida Island.

Witness Rocks, about 0.9 mile westward of The Witnesses, have no trees, and are nearly covered at high water.

Abbess Island, at the north end of San Alberto Bay, about 0.5 mile westward of **Wadleigh Island,** is surrounded by foul ground and off-lying islets. A winding, unmarked channel lies between Abbess Island and Wadleigh Island. This channel has many dangers and is only suitable for small craft with local knowledge.

Shinaku Inlet makes off from the northern end of San Alberto Bay and connects with Big Salt Lake and Klawak Inlet. There is much foul ground in the inlet, and the passages leading to Big Salt Lake and Klawak Inlet are only good for small craft with local knowledge.

Chart 8157.—San Christoval Channel is the passage leading westward from San Alberto Bay to the Gulf of Esquibel. There are numerous islands, reefs, and shoals with three passages between them, all of which present difficulties for vessels of any size, owing to the narrowness of the passages and the strength of the currents. San Christoval Channel has been closely surveyed, but not with a wire drag, and the dangers are shown on the charts. The dangers are mostly marked by kelp in summer, but this is not an invariable rule. Directions for San Christoval Channel are given in Chapter 3.

Catalina Island, near the eastern end of San Christoval Channel 0.5 mile off the southerly shore, is small, 140 feet high, and wooded. Rocks and foul ground extend nearly 0.4 mile off the northern and eastern sides of the island.

Piedras Island, 0.6 mile northward of Catalina Island, is a wooded islet 75 feet high. Kelp extends 200 yards northward from the island. A buoy is moored in 5 fathoms of water 220 yards northward of the island.

Cruz Islands are a group 1.2 miles long, level, and wooded, close to the south shore of the eastern end of San Christoval Channel, with deep water between them and shore. A 2-fathom spot is 350 yards northward of the northern extremity of the islands.

Cruz Pass, between Cruz Islands and San Fernando Island, affords a passage for small craft through San Christoval Channel. This pass is seldom used as the passage northward of Rosary Island is more direct and less difficult to navigate.

Hermanos Islands, four in number, small and wooded, are about 0.5 mile northward of Piedras Island. Range daybeacons mark the two northern islands.

Point Ildefonso is the low wooded point of the island eastward from the Hermanos Islands.

San Christoval Rock, with 1 fathom over it and marked by a lighted bell buoy off its southeast side, is about midway between Piedras Island and the easternmost Hermanos Island. The rock is surrounded by a heavy bed of kelp which, however, tows under when the current is running strong.

Rosary Island is the largest island of the group which lies near the northerly shore of San Christoval Channel at its narrowest part. All the islands of the group are low and wooded.

The channel on the north side of the Rosary Island group is almost invariably used by small craft. They follow the general trend of the main shore at a distance of about 250 yards.

Larzatita Island is 115 feet high and wooded. It is the westernmost of the islands near the middle of San Christoval Channel, and there is a good channel on either the north or south side.

Tuft Rock lies 400 yards southeastward of Larzatita Island; it is small and bare, and covers only at extreme high water.

A rocky patch, with 3¼ fathoms over it and marked by a buoy on its east side, lies about 350 yards eastward from Tuft Rock.

A rocky patch, with 4 fathoms over it, lies 600 yards east-northeastward from Tuft Rock.

Larzatita Island Reef, marked by kelp and awash at half tide, is 300 yards northward of Larzatita Island. Its northern extremity is marked by a light. Larzatita Island Reef Light, shown from a skeleton steel tower on concrete pier, is 22 feet above the water and visible 9 miles.

Point Santa Lucia is the eastern of four points at the northern extremity of San Fernando Island, westward of Cruz Islands. Foul ground extends about 0.2 mile northward from the point. A small open cove, with depths of 8 to 24 fathoms, is westward of the point.

Palisade Island, a low wooded island about 0.5 mile long in an easterly direction, is separated from San Fernando Island by a channel about 100 yards wide, with depths of 1½ to 2½ fathoms. Foul ground extends to the northward and northwestward of the island for about 400 yards. **Palisade Point,** the extremity of the small island close to and northward of Palisade Island, shows prominently from westward. Shoal spots are about 0.5 mile northward of the point.

Point San Pasqual and **Point Santa Rosalia** are low wooded points on the northern shore of San Fernando Island. A small open cove, with depths of 15 to 19 fathoms, is between the points.

Gulf of Esquibel is described later in this chapter.

Chart 8158.—Portillo Channel connects Bucareli Bay at its northern part with the Gulf of Esquibel. It is of irregular width, about 2.5 miles across the entrance and about 1 mile wide halfway between the ends. There are many islets in the channel, the southern part of which is shoal; the bottom is irregular, and there are numerous kelp patches. The northern half is comparatively clear.

Portillo Channel may be used by small craft, but local knowledge is desirable for safe navigation. Enter from Bucareli Bay. After passing St. Ignace Rock Light, bring it astern on course **347°**, head for Point Espoda Light until abeam south tangent of Reef Point and 0.6 mile from Point Espoda Light. Change course to **334°**, heading for Arboles Island. When 0.4 mile from that light change course to **north.** When Point St. Thomas is abeam change course to **317°**.

In Portillo Channel the currents flow east on the ebb and west on the flood. The maximum velocity is estimated to be about 2½ knots. The tide starts ebbing 2 to 2½ hours before high water at Sitka and flooding 2 to 2½ hours before low water there.

Bucareli Bay is described earlier in this chapter.

Reef Point, on the Lulu Island shore, is low and inconspicuous.

San Clemente Island, about 1.5 miles from the southern entrance close to the shore of San Fernando Island, is wooded and about 108 feet high. The channel to the eastward is shoal, and numerous rocks and reefs extend to the northward.

Point Espada Light, shown from a small white house on the westerly side of San Clemente Island, is 16 feet above the water. The light is obscured from 163° to 345°.

Arboles Islet, near the Lulu Island shore about 1 mile northwestward of San Clemente Island, is 90 feet high and wooded.

Snail Point, the western extremity of **Caracol Island** off the eastern shore, is 80 feet high, wooded, and conspicuous.

Point Delgada, on the Lulu Island shore about 1.5 miles from the northwest entrance, is a gravel spit, grass-covered inshore and conspicuous from the eastward.

Abreojo Rocks lie almost midway between the two points of the northwest entrance; the highest is 6 feet. **Quitasueno Rock,** 12 feet high, is about 0.4 mile eastward of Abreojo Rocks. A 4-fathom spot is about 0.5 mile westward, and a 3-fathom spot is about 0.5 mile northward of Abreojo Rocks.

Animas Island, close to **Point Animas,** is a small wooded island 118 feet high. Foul ground extends in a northerly direction parallel with the San Fernando Island shore.

Point Santa Gertrudis, the northern extremity of Lulu Island, is a low wooded point at the northwest entrance to Portillo Channel.

Port Real Marina, the passage on the north side of Baker Island, connects Bucareli Bay with Siketi Sound and thence with the Pacific Ocean. It is about 1 mile wide, but its use is not recommended for any except small craft. The western entrance is constricted. The bottom is very irregular and has not been examined with a wire drag.

In entering from the Pacific, pass the south end of Cone Island at a distance of about 0.5 mile, avoiding the foul ground which extends off the Baker Island shore. Pigeon Island may be rounded on the northward side through Paloma Pass or through the pass to the southward. In Paloma Pass shoal water extends for 180 yards in an easterly direction from the north end of Pigeon Island. Halfway from either end of the pass rocks awash extend for 200 yards from the Lulu Island shore. At this place the channel, about 40 yards wide, favors the Pigeon Island shore. Near the southern end of the pass is a 3½-fathom spot on the west side of the channel.

The pass to the southward of Pigeon Island gives a more direct route, passing between two small islets, the westerly one of which is in about mid-channel. Favor the eastern islet in passing through. The pass is about 40 yards wide and has a depth of 3½ fathoms. To the westward of the western islet is a narrow channel with 3 to 3½ fathoms. Coposo Island may be passed on either side at a distance of about 300 yards. The southern channel appears preferable. In approaching the island, favor the north shore of the bay to avoid Sola Rock. The eastern end of Port Real Marina is largely obstructed by Rana Reef.

Bucareli Bay and Port Mayoral have been described earlier in this chapter.

Santa Rita Islands, lying between St. Ignace and Baker Islands, form a group of five low, irregularly-shaped, wooded islands. The elevation of the largest is 250 feet. Rocky shores predominate.

Anchorage, reported to be the best in the vicinity, may be had in 12 fathoms in the bight between the largest Santa Rita Island and St. Ignace Island.

Lulu Island, less than 1 mile northward of Baker Island, from which it is separated by Port Real Marina, is a large irregularly-shaped wooded island 4.5 to 6 miles in diameter, mountainous, with summits ranging from 800 to 1,618 feet in elevation.

Coposo Island, about 0.5 mile northward from the large Santa Rita Island, is a small wooded islet 120 feet high, which shows prominently from easterly and westerly directions. Foul ground extends 150 yards in a westerly direction from the island. A sunken rock with about 1 fathom over it is reported to lie 250 yards 268° from the center of Coposo Island.

Sola Rock, 0.5 mile southwestward from Coposo Island, is a pinnacle rock which bares 4 feet at low water.

Rana Reef extends about 0.6 mile in a northerly direction from **Point Gorda,** the northwest point of St. Ignace Island, almost to **Point Arrecife,** the southeast point of Lulu Island. There are several rocky heads on the reef, the two highest of which are about 8 feet above high water. There is a channel at each end of the reef, but the one to the southward appears to be the better, giving the St. Ignace Island shore a berth of 200 to 400 yards.

Pigeon Island, between Baker and Lulu Islands, off the northwest end of Baker Island, is 230 feet high and wooded. A small wooded islet, 190 feet high, is close to its southeast shore, and a group of small rocky islets and sunken rocks are off its southern shore.

Paloma Pass is between Pigeon Island and Lulu Island. This pass and the pass southward of Pigeon Island have least depths of 3½ fathoms in mid-channel, but the channels are winding and lined with dangers.

Cape Bartolome, the southern extremity of Baker Island, has been described earlier in this chapter. About 3 miles northwesterly from the cape is a low headland with a pinnacle rock, 50 feet high, close to the beach. There are several dangers in the vicinity, the outermost of which is about 500 yards offshore. All are shown on the chart.

Cape Chirikof, a prominent headland with a group of rocky islets close-to, is about 4.8 miles northwestward from Cape Bartolome. A small bay about 1.4 miles long in a northerly direction and 0.5 mile wide at the entrance, is eastward of the cape. At the west side of the entrance are two small rocky islets. A rock, bare at low water, is 285 yards 200° from the southern islet. The head of the bay is shoal for nearly 0.4 mile. Small vessels find temporary anchorage in 6 fathoms, about 1 mile from the entrance, but the southwest swell makes in heavily.

Granite Point, about 0.8 mile northward from Cape Chirikof, is a rocky point with light-colored cliffs and ledges. From Granite Point the shore trends northeastward for about 1.4 miles to a small cove 0.5 mile long in an easterly direction and 0.2 mile wide. At the entrance are two rocks; the outer one, almost in mid-channel, bares 4 feet at low water. A 3-fathom spot, usually marked by kelp, is 300 yards from the easterly shore at the entrance. A 13-fathom channel is between this spot and the outer rock. A rock which bares 3 feet at low water is northward of the entrance about 700 yards offshore and about 1.9 miles northeastward of Granite Point. Depths of 6 to 13 fathoms are found within the bay. Shoal water extends 250 yards from the head of the bay.

Veta Bay, an open bight 3 miles northeastward from Granite Point, with depths of 7 to 13 fathoms, is too exposed for safe anchorage. At the head of the bay is a group of small rocks, awash at high water. Close to **Veta Point** on the northwest shore of the bay are two small islets off which kelp extends for 350 yards. To the eastward of Veta Point several low-water ledges project about 200 yards offshore.

From Veta Point the shoreline trends in a westerly direction for about 1 mile, then northward for 0.3 mile, forming the headland, the northern extremity of which is Outer Point. **Arcada Rock,** known locally as **Arch Rock,** 130 feet high, is close to the southern end of the headland. At times kelp extends about 0.6 mile southwestward from Arcada Rock.

Outer Point, about 3.5 miles northward from Granite Point, is a projecting rocky point, 0.2 mile to the eastward of which is a prominent knob 500 feet high, separated by

a divide from high land to the eastward. Foul ground extends 0.6 mile north-northwestward from the point. A bank of considerable area, with depths of 12 and 14 fathoms, lies 2 miles westward from the point. Although closely developed, lesser depths may exist.

Gaviota Rock, about 40 feet high, is the largest of a group of rocky islets lying about one mile northward of Outer Point. Breakers are found 0.2 mile northward of the islets. The bottom is shoal and irregular for about 0.6 mile from the islands. Foul ground lies between the islets and the point to the eastward.

Cone Island, 2.5 miles northward from Outer Point, is about 2.1 miles long in a northeasterly direction and averages 0.6 mile in width. It is heavily wooded and has several summits; the highest, centrally located, is 1,120 feet in elevation. The southern end of the island is clear of off-lying dangers. Kelp extends for 200 to 300 yards off the northwestern and eastern shores. From the northern point of the island shoal water extends in a northeasterly direction for 0.5 mile. Cone Island is on the northwestern side of the Pacific entrance to Port Real Marina and on the southeastern side of the entrance to St. Nicholas Channel. **Siketi Point** is at the southwestern extremity of Cone Island.

Siketi Sound, lying between Cone Island and Baker Island, is the Pacific Ocean entrance to Port Real Marina. The southern part of the entrance is obstructed by the **Gaviota Islets;** the rest of the sound is clear. At the northwestern end of the sound a narrow channel leads to St. Nicholas Channel, passing close along the Lulu Island shore to avoid the extensive reefs which make off from the northern end of Cone Island. The coves on the southeastern side of the sound, eastward of Gaviota Islets, have not been surveyed.

Port Real Marina has been described earlier in this chapter.

St. Nicholas Channel is described later in this chapter.

Noyes Island, about 6 miles northwestward from Baker Island, is approximately 10 miles long and 4 to 6 miles wide, with rugged steep cliffs along the west shore. The island is mountainous. **Noyes Peak,** a triple headed peak with summits, 2,167 feet, 2,445 feet, and 2,602 feet in elevation, on the northern part of the island, is a very conspicuous landmark and during clear weather has been seen from 50 miles offshore.

St. Nicholas Point, the southeastern extremity of Noyes Island, lies about 5.5 miles eastward from Cape Addington. The shoreline between the cape and the point forms a large open bight, from the head of which kelp extends about 0.3 mile offshore. The shoreline is fringed with rocks. From St. Nicholas Point the shoreline turns northward, forming the west side of St. Nicholas Channel.

Cape Addington is the southwestern extremity of the narrow tongue of land which for 2 miles is less than 0.5 mile in width and which forms the southern end of Noyes Island. The extremity of the cape is a rocky knob, 65 feet high, cut by deep crevices, to the northward of which are two timbered knobs, distant 150 and 250 yards, with respective elevations to the tree tops of about 125 and 135 feet. From offshore, the knobs appear as islets, the tops of the wooded knobs showing flat. The cape rises to a rocky steep ridge, with jagged, serrated sky line, approximately 735 feet high. This ridge and the knobs at the extremity of the cape serve as good landmarks.

Two rocky islets, with sunken rocks in between, bear 295° from the cape. The outermost is about 0.2 mile offshore. Heavy tide rips form immediately to the westward of these islets.

Shaft Rock, 1.1 miles northward from the cape, is 128 feet high, conical in shape, of a light-brown color, and from the southward and northward, shows prominently.

Between the cape and Shaft Rock, ledges extend offshore for about 0.3 mile. The cape should be given a berth of at least 0.8 mile in rounding.

Four miles northward from the cape, on the west coast of Noyes Island, is a small bay, 0.5 mile long in a southeasterly direction and 0.4 mile wide. Sunken rocks and kelp are off both entrance points. In calm weather, small boats find anchorage in 5 to 8 fathoms, near the head of the bay.

Roller Bay, 7 miles northeastward from Cape Addington, is 1.5 miles long in an easterly direction and 1 mile wide. It is open and exposed and is not recommended as an anchorage. At the head of the bay a tongue of land projects which, from offshore, appears as a wooded island. A small rocky islet lies close to the south shore of this tongue. The inner part of the bay is shoal. Two sunken rocks lie about 0.3 mile to the southward of the tongue of land. Depths of 6 to 15 fathoms are found in the outer part of the bay.

The head of the bay is the western end of a divide which extends across the island. From westerly directions, it is a conspicuous means of identifying the locality. The headland at the north entrance point of the bay rises to a prominent flat-topped mountain, 1,510 feet high. At the westerly slope of the peak near the shore, pinnacle rocks over 100 feet in elevation, are formed by deep clefts.

Cape Ulitka, locally known as **Snail Point,** is a neck of land which projects about 0.6 mile in a northerly direction from the northwest end of Noyes Island. A long rounding ridge, 110 feet high (approximately 170 feet to the tree tops), and a pinnacle rock at the extremity of the point, give it an appearance, from easterly and westerly directions, which accounts for its local name.

Cape Ulitka Light, shown from a small white house on the northern end of the cape, is 115 feet above the water and visible 9 miles. It is obscured from 309° to 055°.

Arriaga Passage is described later in this chapter.

St. Nicholas Channel, connecting the Gulf of Esquibel with the Pacific Ocean, is 8 miles long in a northeasterly direction, 0.5 mile wide at the southern end, and 2.5 miles wide at the northern end. Noyes Island forms its western and Cone and Lulu Islands its eastern shores.

Landmarks.—The 1,618-foot grassy hill at the southwestern part of Lulu Island is prominent from northerly directions, appearing rather sharp, grass- and brush-covered, with a steep slope to the northeast and a gradual slope to the southwest. The hills to the westward appear as rounding hills. The 1,401- and 1,245-foot peaks at St. Nicholas Point and the 940- and 1,120-foot peaks on Cone Island are prominent.

Directions.—Pass between Noyes and Cone Islands, about 0.3 mile off St. Nicholas Point, on a **040°** course, with the west shore of Marabilla Island ahead. When abeam Point St. Isidor, distant 0.5 mile, change course to **020°**, with the 940-foot peak astern. When abeam Twin Rocks, distant about 0.3 mile, change course to **047°**, with Point Santa Gertrudis ahead.

Pass Point San Francisco at a distance of about 0.4 mile; when 0.6 mile beyond the point, change course to **359°**, with San Francisco Island and the 1,618-foot peak astern.

Currents.—The current floods northward and ebbs southward. During large tides strong tidal currents are experienced. Heavy tide rips sometimes occur near the entrance, extending from St. Nicholas Point to Cone Island, which when viewed from northward, appear as breakers.

St. Nicholas Point, at the southern entrance of St. Nicholas Channel on the Noyes Island shore, is high, rising rather sharply to 1,245 feet. **Point Santa Theresa,** on the same shore about 1 mile from St. Nicholas Point, presents no prominent features. **Point St. Isidor,** at the western extremity of Lulu Island, is low, with a gradual rise to **Isidor Hill,** rounded and 830 feet high. Foul ground extends 0.2 mile offshore from the point and from the shore northward of it. **Twin Rocks,** 1.5 miles from Point St. Isidor, slightly to eastward of mid-channel, show two rounded knobs, each about 6 yards in diameter. A small timbered island, 47 feet high, is about 0.8 mile eastward from Twin Rocks. A 1-fathom spot is 300 yards off the north end of the island. A group of rocks, awash at high water, is 500 yards eastward from this island.

Kelly Cove, 150 yards long, 100 yards wide, on the west side of St. Nicholas Channel, 0.6 mile from Point Santa Theresa, affords anchorage for small craft in 6 to 9 fathoms, rocky bottom. A fish-buying scow is moored here during the season from May 1 to September 15. All necessary supplies for fishermen including fresh water are available. There is 150 feet of mooring float with suitable depths alongside. Radio schedule is maintained with Alaska Communications System.

San Francisco Island, three high-water islands 3 miles from the northern entrance and about 0.4 mile from the Lulu Island shore, is 108 feet high. The southern side is a sheer rock bluff, inconspicuous on account of its dark color. Westward of San Francisco Island 0.4 mile is a 4½-fathom spot to the northward of which 0.2 mile is a 7-fathom spot.

The bight southward of San Francisco Island affords anchorage for small craft in about 10 fathoms, sand and gravel bottom. The gravel beach at the head of the bight makes well offshore. Anchorage for small vessels may be had in 8 to 18 fathoms, sand and gravel bottom, in the bight eastward of San Francisco Island; here the gravel beach at the head of the bight makes well offshore.

Point San Francisco, on the west side of the channel 2 miles from the north entrance, is a low sandy point, with sand and grass near the high-water line. It shows prominently and may be distinguished by its light color. A rock about 10 feet across, which bares 9 feet at low water, is 1 mile 221° from Point San Francisco. A ledge with ¾ fathom of water on it, marked by kelp, is approximately halfway between the rock and the western shore. There is deep water between the rock and the ledge and between the ledge and the shore.

Marabilla Island, 0.8 mile from the north entrance, about 180 yards off Lulu Island, is about 0.3 mile long, 54 feet high, and wooded. Rocks and reefs extend off the southern end for 0.4 mile and for a distance of 0.1 mile off the western and northern shores.

Point Santa Gertrudis, described earlier in this chapter, presents no special features. A 2¾-fathom spot is 1 mile 247° from the point. From Point Santa Gertrudis southward for 1 mile and extending 250 to 800 yards offshore, the bottom is rocky, depths are irregular, and there are kelp patches.

Chart 8157.—Arriaga Passage, the channel northward of Noyes Island and separating it from the Maurelle Islands, is 4 miles long in an easterly direction and from 1 to 1.8 miles wide.

Directions, Arriaga Passage.—Entering slightly northward of mid-channel, continue on 089° course until Point Incarnation is abeam. If bound for San Christoval Channel,

change course to 077°. If bound northward, change course and give the Maurelle Islands a berth of about 1 mile.

Current.—In general, the current floods eastward and ebbs westward. Only at the west entrance has the tidal current any noticeable effect. Drifting kelp is frequently found in mid-channel abeam the entrance to Sonora Passage.

Cape Ulitka, the northwest point of Noyes Island, previously described, and the south point of the west entrance, shows prominently at night from easterly and westerly directions. The cape is marked by a light. The point 2.2 miles eastward of Cape Ulitka shows well at night from the western entrance. Rocks extend off this point for about 0.2 mile. From the point, 0.6 mile 343°, is an 11-fathom bank, usually marked by kelp. The shoreline between this point and Cape Ulitka should be given a berth of at least 0.4 mile. **Steamboat Point,** 2.8 miles eastward from Cape Ulitka, is rounding and indefinite.

Ulitka Bay, eastward of Cape Ulitka, affords fair-weather anchorage for fishing boats in depths of 6 to 8 fathoms. The head of the cove should not be approached too closely as the shores are foul.

Point Incarnation, 3.6 miles eastward from Cape Ulitka, is the northern extremity of a low wooded islet. Rocks and kelp lie off the point, close-to. From the point, 8- and 9-fathom spots extend in a northerly direction for 0.8 mile. Point Incarnation Light, shown from a small white house, is 19 feet above water and visible 9 miles. The light is obscured from 320½° to 064½°.

Chart 8158.—Steamboat Bay, the entrance to which is between Steamboat Point and Point Incarnation, is about 1.5 miles long in a southerly direction, 0.8 mile wide at the entrance, and 0.2 mile wide at the head. A 6-fathom spot, marked by kelp, is just within the entrance, slightly westward of mid-channel, abeam the bight to the southward of Point Incarnation.

A cannery with a 285-foot wharf is on the western shore of Steamboat Bay near the head. The face of the wharf is 136 feet long and has a depth of 18 feet alongside. The Union Oil Company wharf, northward of the cannery wharf, has a depth of about 13 feet at its face. In making a port landing at the wharf, care must be taken to avoid the sand and gravel beach which extends at low water several hundred yards from the head of the bay. Large vessels make a starboard landing. Fresh water can be obtained on the wharf. The cannery operates a general store during canning season and a radio station the year around. Diesel oil, gasoline, and lubricating oil can be obtained at the wharf. The marine railway of the cannery is capable of hauling vessels of 50 gross tons, draft 7 feet. There is a small machine shop.

Good anchorage in 18 fathoms may be had about 250 yards from the wharf. The bottom is sand with a rather hard crust, through which a heavy anchor sinks into softer and better holding ground. During heavy southeasterly weather the wind draws through with considerable force. Small boats anchor closer to the head of the bay. The bay is open to the northward and during northerly blows probably affords but little protection. It is reported that the ocean swells enter the bay. At night deep shadows are cast by the mountains and the entrance cannot always be readily distinguished. During the fishing season the lights at the cannery can usually be seen when abeam the entrance.

Chart 8157.—St. Joseph Island, at the northwest end of the channel, is about 1.8 miles long in a northerly direction and about 1 mile wide. It has a number of timbered knobs 400 to 500 feet in elevation. The west coast is rocky and foul, and the northwesterly portion should be given a berth of at least 1 mile. Rocks and irregular bottom extend off the northerly coast for about 0.4 mile. The east and southerly coasts are in general rocky shelves which drop off rapidly. A 10-fathom spot is 0.4 mile 220° from the south point of the island.

San Lorenzo Islands, at the northeastern end of the channel, consist of two timbered islands, each less than 1 mile long, separated by a narrow channel. This channel is known locally as **Hole in the Wall** and two or three fish-buying scows anchor in the wider part of it each summer from May 1 to September 15. All necessary supplies for fishermen are available here. There are long mooring floats for fishing craft at the different scows. Fresh water is available.

A mid-channel course through the very narrow eastern entrance is safe but inside the northern side of the channel should be favored when passing the vertical bluff on that side. A submerged rock is about 150 feet off the southern shore, opposite the vertical bluff which covers 4 feet. This danger was marked by a small red buoy locally maintained. A depth of 3 fathoms can be carried past the rock on its northern side.

Sonora Passage, between St. Joseph Island and the San Lorenzo Islands, connects Iphigenia Bay with Arriaga Passage. It is about 2 miles in width, but has very irregular bottom. Foul ground extends almost 0.5 mile off the islands northwestward of the San Lorenzo Islands. If used, a mid-channel course is to be followed, but the use of Arriaga Passage is considered preferable.

The **Maurelle Islands** are a group of islands, rocks, reefs, and breakers on the eastern side of Iphigenia Bay, covering an area about 12 miles long in a northerly direction and about 9 miles wide.

Caution.—Navigation among these islands, except in small craft and unless possessed of local knowledge, is dangerous. The survey shows all of the dangers discovered by the surveying party, by lead, or by observing breaks in heavy weather. The bottom is extremely irregular, and until the area is dragged there is no certainty that other dangers do not exist.

From Timbered Islet to the Wood Islands is a line of breakers which shows in a moderate swell. In heavy weather, breakers may be seen for about 800 yards around the rock which lies 0.8 mile 209° from Emerald Islet. The body of water between the two groups of rocks which lie about 0.8 mile northwestward and about 0.5 mile westward from the western shore of little Dome Islet, breaks in heavy weather.

About 550 yards from Feather Rock, in range with Gull Islet, is a small area marked by kelp which is dangerous in heavy weather.

About 0.5 mile westward of the Wood Island group is an extensive area of rocks and breakers, kelp-marked. Near the southern end of this patch is a low, bare, round-topped rock.

Tide rips, heavy for small craft, were observed in the vicinity of Timbered Islet, the north end of St. Joseph Island, and Feather Rock.

Timbered Islet, very prominent from offshore, the westernmost of the group, is 198 feet high and wooded. The shores are sheer cliffs and ravines, brown in color. There are several rocks close by, and a breaker lies about 100 yards northward from the north

shore. A barren, gray-colored island, slightly smaller, 90 feet high, lies just south of Timbered Islet.

Twocrack Island, on the south side of Bocas de Finas, is nearly 0.4 mile in diameter, 277 feet high, wooded, and has two prominent crevices extending through it which, however, can be seen only from the northward and southward. The island shows up dark against Heceta Island.

Bushtop Islet, about 0.8 mile southeastward of Twocrack Island, is 45 feet high and conspicuous from Bocas de Finas; 100 yards eastward of it is a small bare rock.

Dome Islets are two small wooded islands close together, about 0.5 mile 227° from the southerly end of Twocrack Island. **Feather Rock,** 5 feet high, lies 2.4 miles 260° from Twocrack Island.

Anguilla Island, one of the largest of the group, is timbered and rises to an elevation of 630 feet. From offshore, the summit may be recognized, appearing rather sharp, its sky line to the westward and southeastward appearing lower and somewhat flat. **Anguilla Bay,** on the south side of the island, is foul at its head.

Esquibel Island, Turtle Island, Sonora Island, Twin Islands (Princesa and **Favorita Islands**) and the unnamed islands are generally wooded, rise to the elevations shown on the chart, and have no characteristics of marked interest to the navigator. The largest and highest of the **Wood Islands** (group of three) is wooded and rises conical-shaped to a height of 280 feet; it is somewhat prominent from offshore.

Anchorage.—There is an anchorage for small craft in the west side of **Nagasay Cove,** on the north side of Esquibel Island, in 4 fathoms, mud bottom. There is a small house on the shore which serves as headquarters for the caretaker of a concern which has leased Anguilla and Esquibel Islands for fox raising. In the bight on the eastern side of the channel, between the San Lorenzo Islands, is an anchorage for small craft in 5 fathoms, hard bottom. This place is known locally as the **Hole in the Wall.**

Channels.—Sonora Passage affords the only ship channel among the islands. The known dangers are shown on the chart. The channels used by small boats are numerous but have many dangers, mostly indicated by kelp.

The channel between the San Lorenzo Islands is narrow and is reported clear except for rocks off the points at the northern end of the channel. After passing through the channel steer **008°** to **010°**; pass 0.2 mile off **Beta Rock,** 8 feet high, and avoid the sunken rock close to it; change course to **333°**, heading for the outer rocks eastward of Princesa Island, the eastern Twin Island. When **Lambda Rock,** 30 feet high and 0.6 mile southward of Princesa Island is abeam, change course to **007°**, giving the westerly Dome Islet a berth of about 0.2 mile on the starboard beam. Proceed to Bocas de Finas.

There is a channel to the eastward of Wood Island. Favorita Island, the western Twin Island, should be left about 0.3 mile on the starboard hand on a **004°** course. This course clears the breaker, westward of Favorita Island, by about 250 yards. When almost abeam the northern end of Wood Island, change course to **022°**, passing about 250 yards westward of the westernmost rock off **Hendida Island** (200 feet high), westward of **Pesquera Island,** and about 0.3 mile eastward of the rocks and reefs southward of Feather Rock. A rock, which covers at half tide, lies 0.9 mile 316° from the westerly Dome Islet. This is to be left about 900 yards on the starboard hand in passing.

Launch Passage, between Anguilla and Esquibel Islands, is frequently used. In making passage from the Gulf of Esquibel, keep southward of the two rocks, awash at half tide, just inside the entrance. When abeam the inner rock, change course to pass

close to and just north of the two islands in mid-channel. Small launches may pass southward of the two islands in the pass at high water. Keep close to the islands. From here the channel is clear to an anchorage in Nagasay Cove, on the north side of Esquibel Island.

To the northwestward of the anchorage are numerous islands. The channel between these and the Anguilla Island shore is used. In passing northward, favor the islands, passing westward of two rocks in mid-channel, almost awash at one-quarter tide. When past these rocks, the Anguilla Island shore is favored. Near the north end of the channel are shoal spots. There is a rock, awash at low water, 250 yards westward of the northwestern island. The two islands off the southerly shore of Anguilla Island should be given a berth of at least 0.2 mile. Deep water was found on all sides of the rock, awash at one-half tide, 0.3 mile 312° from the north end of Turtle Island.

There is a launch channel northward of the San Lorenzo Islands, just southward of **Escurial Island** which is 225 feet high. Enter on a **290°** course, passing 120 yards off the west end of the island.

Currents appear to be entirely tidal; the strongest are reported to occur around Timbered Islet and the north end of St. Joseph Island but do not exceed 2 knots. Between Timbered Islet and the Wood Islands and to the southwest, also to the northward of St. Joseph Island, currents run northeasterly in flood and southwesterly in ebb; between Emerald Islet and Feather Rock, the current runs easterly on flood and westerly on ebb. Southwestward of Emerald Islet and Gull Island, flood sets southeastward and ebb northwestward. In the vicinity of Lambda Rock, southward of Twin Islands, the flood runs easterly, the ebb westerly. In the area between this rock and the San Lorenzo channels, little, if any, current was observed. In the small passage eastward of Wood Island, the flood runs north and the ebb south.

Bocas de Finas is the passage from the junction of Gulf of Esquibel and Tonowek Bay to Iphigenia Bay, and lies between Heceta Island on the north and Anguilla and Twocrack Islands on the south. Its width is about 1.4 miles at the eastern end and 0.8 mile northward of Twocrack Island.

Currents have a maximum velocity of about 2 knots between Emerald Islet and Dead Tree Point.

Directions, Bocas de Finas to Cape Lynch.—Courses and distances are given in Chapter 3.

From Twocrack Island to Cape Lynch, the passage is exposed to the swell from seaward; during and after gales, vessels using the passage are confronted with a disagreeable beam sea which breaks furiously over the rocks on both sides.

Caution.—Too much reliance should not be placed on the position of the buoys, especially after severe storms.

Heceta Island shows up prominently from the westward. The southern end is rocky, rugged, and mountainous, and the western shore is formed by light-colored cliffs; the northern part of the island is lower and more heavily timbered. **Bald Mountain**, 2,780 feet high, has several bare summits and is a prominent landmark near the southern end of the island. **Timber Knob**, centrally located on the southern part of the island, is lower than Bald Mountain, is timbered, and has moderate slopes; from a considerable distance offshore to the westward, it may be recognized over the coast ridges. **Cone Peak,** 975

feet high, shows from the westward over long, wooded ridges, as a low wooded cone. The 1,050-foot peak to the northward shows prominently from offshore.

A rock, barely covered at low water and surrounded by kelp, lies 0.3 mile southeastward of **Point Desconocida,** the southern point of Heceta Island. It is marked by a buoy on its southeast side. Between the rock and the shore, the ground is broken.

The Heceta Island shore in Bocas de Finas is steep, and stands out prominently from either direction. There are no outlying dangers. Off the south shore of Bocas de Finas, the bottom is foul for nearly 0.3 mile, and should be avoided.

There is a secure anchorage in the western bight on the north side of Anguilla Island about 0.5 mile southward of Bushtop Islet. When entering, pass about 200 yards eastward of Bushtop Islet and stand in on a southerly course. Anchor in 12 to 15 fathoms, soft bottom. There is kelp and broken ground on the western side of the anchorage.

From Bocas de Finas to Cape Lynch the coast is rugged, with numerous outlying islets and reefs, most of which show above water. The main passage follows the general trend of the shoreline at a distance off, varying between 0.2 and 0.5 mile.

White Cliff, on the Heceta Island shore, is a precipitous wooded point with white cliffs 100 feet high. Three-fourths of a mile southeastward of White Cliff is a conspicuous landslide extending down to the water from near the summit of the ridge. A lighted bell buoy, 0.6 mile westward of White Cliff, marks the outer limit of dangers on the east side of the passage at this point.

Emerald Islet, 45 feet high, flat, with several clumps of stunted spruce, shows up green. There is a very small sand beach on the southeast side. The ground in the vicinity of this island is foul. A buoy, 0.5 mile northward of Emerald Islet, marks the outer limit of dangers on the south side of the passage.

Dead Tree Point juts out from the higher land of Heceta Island and is low and wooded, with bare cliffs at the water. Opposite Dead Tree Point, and distant 0.6 mile, is a large bare flat rock, and 0.8 mile northwestward of this rock is a smaller one.

Gull Islet, 87 feet in elevation, is light-colored, grassy, covered at the top, somewhat flat, and has rather steep shores. Rocky islets and foul ground extend in a northerly direction for about 1.5 miles. To the eastward for about 0.4 mile, the ground is foul.

Losa Island, about 2 miles westward of Cape Lynch and 1.5 miles north-northwestward of Gull Island, is only 5 feet high, and is the westernmost of the chain of islands and reefs lying southward of Heceta Island. Foul ground extends for 0.2 mile northwestward of Losa Island.

Cape Lynch is at the western end of Heceta Island. A kelp-marked ledge, with 2 to 4 fathoms over it, extends 0.6 mile northwestward from the cape. Cape Lynch Light, on a small white house, at an elevation of 50 feet, visible 9 miles, is on the islet at the south end of Cape Lynch. The light is obscured from 188° to 310°.

Cone Bay, northeastward of Cape Lynch, is open and exposed to the westward. The bottom is irregular. Kelp from the ledge off Cape Lynch extends well into the bay along the southern shore.

The **Gulf of Esquibel** is 8 miles long from Noyes Island to Tonowek Bay and 6 miles wide from San Fernando Island to the Maurelle Islands. It is clear of islands and connects by several passages with the sea.

Directions.—The navigation of the Gulf of Esquibel presents no difficulty. The waters are generally deep except near the shores. The known dangers are shown on

the chart; the principal one, Curacao Reef, is marked by a buoy. Small craft with local knowledge pass close northwestward of the 105-foot and 260-foot Blanquizal Islands, and thence inside all islands of the St. Philip and Culebra groups. In the Blanquizal Islands group, the channel has a least depth of 11 feet at low tide, but great care is required to avoid several rocks which show at some stage of the tide. A rock, bare at low water, lies 300 yards southeastward of the 130-foot island off the southeast end of St. Philip Island.

Courses and distances are given in Chapter 3.

Arriaga Passage, St. Nicholas Channel, Portillo Channel, and Maurelle Islands have been described earlier in this chapter.

The **Hermagos Islands** are a group of low wooded islands northward of Garcia Cove about 0.3 mile offshore from San Fernando Island. A small island, with a prominent evergreen on its northern side, lies halfway between the group and San Fernando Island. There is a small-boat channel on either side of this island.

Point Garcia and **Point Aguirre** are low, wooded points on the northwestern end of San Fernando Island. Foul ground extends offshore for 0.5 mile in a northwesterly direction.

Garcia Cove is a small cove at the northwest end of San Fernando Island. A small wooded islet lies off the western point of the entrance, and there is a group of small islets on the eastern side of the cove at the entrance, to the southward of which is a small rock 9 feet high. In the center of the bay is a rock 9 feet high. Two rocks, awash at three-quarter tide, near the entrance, are left on the starboard hand in entering.

Enter on a **150°** course, heading between the rocks, 9 feet high, leaving the rock in the center of the bay about 60 yards on the starboard hand. When abeam the rock, change course to about **205°** and anchor in 9 fathoms, mud bottom, about 150 yards from the rock. Swinging room is restricted.

Aguirre Bay is an open bight southward of Point Aguirre. Rocks awash extend across the entrance.

Blanquizal, St. Philip, and **Culebra Islands** are three groups of islands and rocks in the eastern part of the Gulf of Esquibel close to the Prince of Wales Island shore, distant 3, 5, and 6 miles, respectively, northwestward of San Christoval Channel. They are comparatively low and heavily wooded. At the south end of St. Philip Island is an old Indian village, known locally as **Bobs Place.** Fair anchorage for moderate sized vessels can be had in mid-channel off the village.

A dangerous rock, bare at low water and marked by kelp, lies 0.5 mile off St. Philip Island at a point 1.4 miles 311° from the west point of Blanquizal Islands.

Curacao Reef lies 0.8 mile westward of the south end of Culebra Islands, with deep water between. The reef has a least depth of ½ fathom, is small in extent, and is marked by a buoy off its western extremity.

Tonowek Bay extends northeastward for about 6 miles from the Gulf of Esquibel to Tonowek Narrows and forms the eastern side of Heceta Island. With the exception of **Kabanof Rock**, awash at high water, which lies near mid-channel about 0.9 mile southward of the 1,085-foot hill on Heceta Island, the survey shows the mid-channel to be clear, but it has not been examined with a wire drag.

Warm Chuck Inlet, on the northwest side of Tonowek Bay, has considerable foul ground, as indicated on the chart. A rock, with ½ fathom over it at low water and marked

by a buoy, lies in mid-channel, 0.5 mile eastward of a well-defined point on the southwest shore. One-half mile eastward of the former cannery site is a group of wooded islets; rocks, bare at one-quarter ebb, lie 150 yards southward of the group.

Salt Lake Bay, on the southeast side of Tonowek Bay, is about 2 miles northeastward of the Culebra Island group. The bay is about 1.8 miles long in a northeasterly direction and 0.3 mile wide. The entrance is choked by a group of wooded islands. Two channels are used, one northward of the group with a depth of 1½ fathoms, the other southward of the group with a depth of 2½ fathoms. The northern and southern ends of the bay are shoal; depths of 7 to 11 fathoms are found in the center. A number of fresh-water streams, emptying into the bay, attract salmon in considerable numbers.

Harmony Islands, on the eastern side of Tonowek Bay, are a group of wooded islands, the largest having an elevation of 430 feet. There are channels between the islands of this group, but they are made difficult by numerous dangers. Rocks which cover are off the southern and western points of the group.

The channel eastward of the Harmony Islands and eastward of the islands southward off the entrance to Salt Lake Bay is used extensively by small craft plying between San Christoval Channel and Tonowek Narrows. The mid-channel is safe and partially protected. It is a continuation of the small-craft channel eastward of Blanquizal, St. Philip, and Culebra Islands, directions for which are given under the Gulf of Esquibel.

Nossuk Bay, in the southeastern part of Tonowek Bay, 1 mile southward of Tonowek Narrows, is 2 miles in length and largely filled with islands and shoals. **Nossuk Anchorage,** in the northern part of the bay, 0.5 mile southward of Tonowek Narrows, affords excellent anchorage in 10 fathoms, soft bottom. The entrance, although narrow, has been examined with a wire drag, and the least depths are shown on the chart.

Tonowek Narrows, locally known as **Little Skookum Chuck,** connects Tonowek Bay and Karheen Passage. It has a least width between the 3-fathom curves of 230 yards, and the mid-channel has been examined to a depth of 27 feet with a wire drag and found clear.

Currents set through Tonowek Narrows, about 030° with an average velocity at strength of about 3 knots, and about 230° with an average velocity at strength of 3 knots. They are accompanied by tide rips and swirls, but they are seldom dangerous even to a small boat. Slack water occurs about 1 hour after the time of slack water at Sergius Narrows. The current runs strongest off the south point of the island, locally known as the **Doctor's Grave,** which lies midway of the narrows on the west side.

Directions for Tonowek Narrows are given in Chapter 3.

Karheen Passage extends from Tonowek Narrows to Sea Otter Sound. The southeastern part of the passage is characterized by islets, ledges, and generally broken ground surrounded by comparatively deep water. Much of the area is filled with kelp. The route described in the directions has been verified by means of a wire drag to a depth of 27 feet in a width of 250 yards or more from Tonowek Bay to Karheen Cove, and it is used by vessels of about 17-foot draft. The channel is marked by buoys as far as Karheen Cove. Directions for Karheen Passage are given in Chapter 3.

Point Swift is on the east side at the north end of Tonowek Narrows. **Point Swift Rock,** bare at half tide, is 0.3 mile northeastward from Point Swift. A buoy is about 600 yards north-northeastward from the rock and marks the north end of the shoal area extending from the rock.

Karheen Passage Daybeacon is on a small islet 16 feet high, on the western side of the channel, 0.6 mile northward from Point Swift.

A buoy lies about 1.1 miles northeastward of Point Swift. It marks the sunken rock which lies about 0.3 mile southward of the eastern island of the group which extends in a southeasterly direction from the islands off the northeast end of Heceta Island.

A buoy lies about 1 mile westward of the southern end of Tuxekan Island. It lies westward of a sunken rock marked by kelp.

Ham Islands are a group of several wooded islets lying 1.5 miles northeastward of Tonowek Narrows. A buoy marks the end of the reef making off to eastward of the islands.

Trim Islet lies about 0.5 mile northeastward of Ham Islands, close to the Tuxekan Island shore.

Cob Islet lies about 0.3 mile northwestward of Trim Islet and 1 mile southward of Karheen Cove. Reefs extend 150 yards southward and westward from Cob Islet. A buoy marks the edge of the reef on the western side of the islet.

Chapin Island, small and wooded, lies on the western side of Karheen Passage westward of Cob Islet. Chapin Island Range is formed by two daybeacons on the northern end of the Island, in line 308°, and marks the center of the channel lying north of Ham Islands and south of Trim and Cob Islets.

For 1.5 miles northwestward from Cob Islet, Karheen Passage has an average width of 0.5 mile. The depths are generally good except for an extensive kelp-marked ledge, with a least depth of 1½ fathoms over it, which lies in mid-channel westward of Karheen Cove.

Karheen Cove is a small indentation on the west side of Karheen Passage at its northwestern end. A bare rock lies off the southern point at the entrance. A buoy marks the outer end of the ledge which extends about 400 yards southwestward from the southern point.

Karheen is a native village on the northern side of Karheen Cove. Only a few ruins mark the site of the former cannery.

Chart 8171.—Peep Rock is a conspicuous treeless rock about 0.7 mile northwestward of Karheen Cove. Shoal areas, marked by kelp, extend for about 700 yards westward of the rock. The channel eastward and northward of the rock is clear and is generally used in preference to the channel to southward, where there are unmarked dangers. Peep Rock Light, shown from a white wooden house, is 17 feet above water and visible 6 miles. A depth of about 2 fathoms was reported in mid-channel about 0.9 mile 302° from Peep Rock Light.

Tuxekan Passage connects Karheen Passage with El Capitan Passage and lies between **Tuxekan Island** and Prince of Wales Island. From Karheen Passage to **Staney Island** the shores, islands, rocks, and kelp patches of Tuxekan Passage are correctly shown on the charts, but no sounding has been done. Northward of Staney Island the passage has not been surveyed. **Tuxekan,** on the eastern shore of the passage, is an abandoned native village. It is reported that this passage is used to considerable extent by small craft which find a mid-channel course safe. The shores are steep-to and indicate safe depths. There is a deep-water channel but local knowledge is necessary for its navigation, in the absence of surveys.

There are two privately-maintained daybeacons in the passage. The safe channel passes to the east of the northerly daybeacon. Small vessels pass either side of the southerly daybeacon.

Tuxekan Passage is straight and there are no indications of submerged dangers. It offers good shelter in bad weather. A small bay locally known as **Winter Anchorage,** on its eastern shore near the southern entrance, offers very good shelter in 2 to 8 fathoms, mud bottom.

Davidson Inlet has its entrance on the eastern side of Iphigenia Bay. From its entrance the inlet extends north-northeastward for 14 miles, with a width of 4 to 6 miles in its lower part and 0.4 mile near its head. The shores and islands in the inlet are wooded and generally high. On its east side the inlet is separated by a number of islands from Sea Otter Sound. The inlet is separated from Iphigenia Bay by a chain of islands, extending for about 3.2 miles in a southerly direction, among which are passages suitable only for small craft. **Whale Head Island,** the southernmost of the chain, is 490 feet high, and **Whale Head,** its southern end, is a prominent cliff 50 to 300 feet high, which shows up conspicuously offshore to the southwestward.

The entrance to Davidson Inlet from Iphigenia Bay is between Whale Head and Heceta Island, and is nearly 2 miles wide. **Whale Rock,** bare at half tide, is 0.5 mile south-southwestward of Whale Head; and a reef, with 2¼ fathoms over it, is 0.5 mile eastward of Whale Head; it breaks heavily in a moderate swell. By keeping in mid-channel all dangers will be avoided.

A rock with 1½ fathoms over it is about 1.5 miles westward of White Cliff Island. A kelp patch about 50 yards in diameter and breakers have been reported about 1.9 miles, 291° from the northwest extremity of White Cliff Island.

Surf Point is a low wooded point on the northwestern extremity of Heceta Island. Irregular bottom extends 0.8 mile northward from the point. During severe weather the seas are reported to pile up heavily in this section and it is advisable to give the point a berth of at least 1 mile. Surf Point Light, shown from a small white house on the point, is 29 feet above water and visible 9 miles. The light is obscured from 248½° to 058½°.

Port Alice, on the south side of the sound eastward of Surf Point, is a secure anchorage. It is 2 miles long, 1 mile wide at its entrance, and 0.2 mile wide at its head. Near the middle of the port, 0.5 mile inside the entrance, is a low, bare rock from which a ledge extends 250 yards northward and westward; a ledge, bare at low water, is 400 yards southward of this rock. A fish-buying scow anchored at the head of the port operates from May 1 to September 15. Fishermen supplies including provisions, gasoline, fuel oil, lubricating oil, and some fishing gear are available. There are 150 feet of mooring float and fresh water can be obtained at the float. A radio schedule is maintained with the Alaska Communications System.

To enter, give the points at the entrance a berth of about 0.5 mile and enter in mid-channel. Follow the western side at a distance of 250 yards, passing westward of the bare rock until about 0.5 mile from the head of the port, where good anchorage will be found in the middle in 14 to 18 fathoms, soft bottom. Fresh water can be obtained by boats from several small streams.

Fake Pass has depths of 4 to 11 fathoms, with a shallow ridge with 1¾ fathoms on it. During severe weather the seas are reported to pile up heavily in the pass. **Cosmos Pass** carries deeper water and is used by small boats bound to and from Warren Channel.

Green Island, 4 miles northeastward of Whale Head, is about 0.5 mile in diameter. A 2¾-fathom spot is 0.4 mile southward of the small island southeastward of Green Island.

Chart 8163.—Edna Bay, on the western side of Davidson Inlet, 5.5 miles northward of Whale Head, is about 0.4 mile wide at its mouth and about 1.2 miles in diameter. It has good anchorage about 0.3 mile from the southern shore in 14 to 17 fathoms, soft bottom. Islets and foul ground make out 0.5 mile from the western end of the bay; foul ground makes off in the northern part of the bay, 600 yards from the western shore and 500 yards southward from an inlet. Edna Bay Entrance Light is on the end of **Limestone Point** at the north side of the entrance. The light is shown from a small white house, is 20 feet above water and visible 9 miles.

An 8-fathom shoal extends in a northerly direction from the island forming the southwest side of the entrance to nearly halfway across the channel. At approximately mid-channel, however, depths of 10 to 20 fathoms are found. A 9-fathom shoal is just inside the entrance. Near center of the bay are two shoals with depths of 6 and 8 fathoms, respectively. A buoy, and Edna Bay Inner Light, similar in size and shape to the entrance light, and situated on the escarpment at the west side of the bay, serve as guides to the channel leading to the dock in this vicinity. The buoy marking the southern limit of an extensive shoal and foul area is in a least depth of about 9 feet. A channel extends westward from the buoy to Edna Bay Inner Light, thence northerly close to the escarpment to the vicinity of the dock. A depth of 20 feet can be carried through this channel to the vicinity of the dock, but the depths alongside the face of this dock shoal about 13 feet. A 10-foot shoal is in mid-channel near the north end of the escarpment and west-southwest of a small islet. Strangers should not attempt using this channel without obtaining local information.

The mining company has ceased operating in this area and the wharf which is supported by native piling is in much need of repair. Small boats will find excellent shelter in the extreme southwestern part of the bay from winds blowing from the southeast to west in depths of 3 to 12 fathoms with good holding ground of sticky mud. A narrow channel with a controlling depth of 4 fathoms westward of the island at the entrance is not recommended except for small boats or with local knowledge. A reef covered 4 feet, lying about 300 yards 190° from the southwest end of the entrance, is marked by kelp. No sailing directions are given as the chart is adequate for entering the bay.

Chart 8171.—Van Sant Cove, on the western side of Davidson Inlet, about 4 miles northeastward of Edna Bay, is a small open bight. A reef is off the southern point of the entrance.

Chart 8120.—Tokeen is the site of an abandoned marble quarry. Anchorage can be had westward of the ruins of the wharf in 14 to 17 fathoms. Small craft can find anchorage in 4 to 8 fathoms, soft bottom. The cove is shoal southward of the wharf site. A rock, bare 9 feet at low water, is 300 yards westward from the northeast point of the cove.

Chart 8171.—Tokeen Bay, on the eastern side of Davidson Inlet, about 11.5 miles northeastward of Whale Head, extends northeastward for about 3.5 miles, with a width of 0.5 mile at its entrance and nearly 2 miles at its eastern end. Its eastern side is connected by high-water boat passages with El Capitan Passage. A rock, bare at low water and marked by kelp, is 400 yards southeastward from the north point at the entrance, and another rock with ¾ fathom over it and marked by kelp, is near mid-channel, about

0.9 mile eastward from the north point at the entrance and 325 yards southward of an islet; the channel southward of these rocks is clear. A shoal with 2¾ fathoms over it is in the middle of the bay about 2.4 miles eastward from the north point at the entrance. Elsewhere in the bay a mid-channel course is clear, but there are rocks in places near the shores and care is required in its navigation.

Anchorage can be found in the middle of Tokeen Bay, about 0.5 mile eastward from the north point at the entrance in 14 to 16 fathoms; also at the northern end, northeast side, and southeast end of the bay. There are several sheltered anchorages for small craft, one of which is at the head of the bay behind the small islet in 4 fathoms, mud bottom. The area east of the small wooded islands in the southeastern part of the bay also offers good anchorage in 4 to 10 fathoms, mud bottom.

Marble Passage extends northward from the northeast part of Davidson Inlet between **Marble** and **Orr Islands.** The approaches to the channel at each end are obstructed by rocks and ledges and about midway between the ends the channel shoals to depths of about 2 feet.

Brockman Pass and Tenass Pass are described later in this chapter.

Sea Otter Sound extends westward from Karheen Passage and Tuxekan Island along the north side of Heceta Island to Davidson Inlet. Its west shore is formed by numerous islands, large and small. The sound is about 6 miles in extent, with depths of 17 to 75 fathoms, irregular bottom. There are few desirable anchorages in the sound. With the assistance of the chart depths suitable for anchorage can be found on its eastern side, but care is required on account of sunken rocks, which are, however, generally marked by kelp during the summer.

Turn Point, low and wooded, is on the eastern shore of the sound, and forms the northern point at the western entrance to Karheen Passage.

The cove in the eastern part of the sound to the northward of Turn Point has not been thoroughly surveyed. A depth of 9 fathoms was found in the middle of the cove, with the possibility of lesser depths in the vicinity. There is considerable foul ground in the southern part of the cove.

About 1.5 miles southward of Turn Point are a group of wooded islands which form the southern shore of the western entrance to Karheen Passage. Shoals, marked by kelp, extend for about 0.5 mile northward of the western islands of this group. The cove southward of these islands has not been completely surveyed.

The cove on the northern end of Heceta Island, about 5 miles southwestward of Turn Point, is shoal in its eastern part. Protected anchorage for small craft can be found in the westernmost of two bights at the head of the cove, with restricted swinging room.

Gas Rock, wooded, is about 0.6 mile from Heceta Island and 4 miles eastward of Whale Head. **Clump Island,** 3 miles east-northeastward of Gas Rock, is the outer one of a group 1.2 miles southward of Eagle Island, with foul ground between.

White Cliff Island is about 0.9 mile northward of Eagle Island. It is wooded, rises to an elevation of about 300 feet, and has a prominent white cliff on the southwest side. **Fox Rock** is about 0.4 mile westward of the Eagle Island group. **Dove Island, Owl Island, Hoot Island,** and **Cap Island** are some of the small wooded islands in the northern part of Sea Otter Sound. **Cyrus Cove** is a small unsurveyed bight in the northern part of the sound. The channel northward of Hoot, Owl, and White Cliff Islands is marked by two lights. Hoot Island Rock Light, on a small islet between Hoot Island and Orr Island

and shown from a small white house, is 14 feet above water and visible 9 miles. White Cliff Passage Light, shown from a small white house on the southwestern end of a small islet east of White Cliff Island, is 35 feet above the water and visible 9 miles. It is obscured from 135° to 290°.

Chart 8152.—El Capitan Passage has its entrance on the northeastern side of Sea Otter Sound. It extends about 18 miles in a northerly direction from Sea Otter Sound to Aneskett Point, then trends westward for about 6.5 miles to Shakan Strait. The southern part of the passage varies from 2 to 4 miles in width, forming a bay 6 miles long in which are numerous rocks and islets. To the northward of this section the passage varies from 0.5 to 1 mile in width and is comparatively clear to Aneskett Point. The shoreline should not be approached too closely, as numerous rocks, awash at various stages of the tide, lie close-to. Four miles westward of Aneskett Point is a small section of the pass known as Dry Pass, which bares near the channel line 4 feet at lower low water. Westward of Dry Pass the channel is foul. At high water the entire channel from Sea Otter Sound to Ahakan is navigable for small craft of about 4-foot draft.

Numerous bights and inlets indent the shores of the passage, and small boats can usually find anchorage. The entire passage is protected, and larger craft can anchor wherever the depths are suitable; for this information the chart is the best guide. The islands in the passage are heavily wooded without any marked characteristics of interest to the navigator.

Currents.—The general direction of the flood in the southern part of the channel is north; that is, from Sea Otter Sound. The flood runs easterly around the north end of Cap Island and joins with the flood from the eastward of Cap Island, giving a current which at times reaches 3 knots in the channel between El Capitan Island and Tuxekan Island. In the channel northward of Tenass Island the current is reported negligible.

In Dry Pass the current is about 2¾ hours later than in Wrangell Narrows. The flood sets eastward and the ebb westward. In the area west of Dry Pass the current turns westward about the time of strength of eastward current in Dry Pass, and turns eastward about 1 hour before the time of strength of westward current in Dry Pass. For predicted times of slacks and times and velocities of strengths see the *Current Tables, Pacific Coast.*

High and low water in this vicinity occur at practically the same time as at Sitka.

Directions.—Local knowledge is desirable for safe navigation through El Capitan Passage. This applies in particular to the section between Aneskett Point and Shakan Strait. The channels have not been wire dragged. Courses through various channels are given, as the use of any particular one has not been established. In places the courses pass close to dangers and caution is required. To the northward of Tenass Island mid-channel courses hold good, but from Sea Otter Sound to Tenass Island various courses among the islands may be followed. The following channels are used, being described in their order of preference.

Sea Otter Sound to Tenass Island by the eastern channel.—Pass westward of Cap Island and round its northern end at a distance of about 250 yards on **088°** course.

When abeam the northeast end of Cap Island, distant 0.1 mile, change course to **055°**, hold for about 0.7 mile until abeam the sound end of small islet off the southeast end of El Capitan Island. Then change course to **018°**, hold for 0.5 mile until abeam the northwest point of Tuxekan Island, distant 130 yards; then change course to **034°**.

When abeam the northwest end of the islet off the west entrance point to Tuxekan Passage, distant about 0.1 mile, change course to **022°**. Pass 0.1 mile eastward of El Capitan Passage Buoy.

When abeam Hub Rock, distant 0.25 mile on port beam, change course to **001°**, heading for the west tangent of a 165-foot island. Hold this course for about 1 mile until Sarkar Point is abeam, distant about 0.2 mile, then follow either of the routes given in the two following paragraphs.

Direct route via Burnt Island.—From Sarkar Point abeam, distant 0.2 mile, steer **345°** for 0.4 mile until the south end of the 165-foot island is abeam, then change course to **001°**. When abeam Burnt Island, change course to **330°**, with east tangent of a wooded island ahead and south tangent of another island astern (this course holds good for 0.25 mile); change course to **349°**, with Burnt Island astern. This course holds good for about 0.3 mile until abeam the north end of wooded island, then change course to **039°**. Beyond Tenass Island mid-channel courses hold good.

East of Graveyard and other islands.—From a position 0.2 mile westward of Sarkar Point abeam, steer **054°**. When abeam Graveyard Island, steer **038°**, heading for west tangent of island off the south entrance point to Tunga Inlet.

When abeam the north shore of Sarkar Cove, change course to **356°**, continue for 1.1 miles until north end of large island westward of the south point of Rocky Cove is abeam; then change course to **347°**. The western tangent of the island at the entrance to the Tunga Inlet is astern on this course. This course passes about 0.1 mile to the westward of a rock marked by kelp and awash at ¼ tide off the entrance to Rocky Cove.

Sea Otter Sound to Tenass Island by the central channel.—Leave the northwestern point of Cap Island about 0.2 mile on the starboard hand on course **021°**. When the south tangents of Teal and Flat Islands are in range, change course to **044°** with Twin Islands astern, passing midway between Keski and El Capitan Islands. When the point on the eastern side of Keski Island is abeam, change course to **341°**. When the northern end of Keski Island is abeam, change course to **335°**; this should leave White Point about 0.1 mile off the starboard beam.

From White Point steer **000°**, heading for the west end of Scow Island. When the 280-foot island north of Singa Island is abeam, change course to **034°**. When abeam the north end of Scow Island, change course to **010°**. Hold this course for about 0.5 mile and then steer **046°** with the northwest end of a 175-foot island ahead.

Hold course **046°** until Burnt Island is obscured by the 190-foot island, then steer **026°**, with the northwest point of El Capitan Island astern. When the south tangents of the two islets westward are in range, change course to **054°**. From Tenass Island, mid-channel courses hold good.

Sea Otter Sound to Tenass Island by the western channel.—Enter in mid-channel between Cap and Hoot Islands and steer **358°**, heading for the west side of the small island west of San Island; this course passes about 180 yards westward of Fir Rock.

When abeam the south end of San Island, change course to **337°**, with the southwest end of Teal Island astern; this course holds good for 0.2 mile; then change course to **357°**, with the east tangent of an island ahead and the east tangent of another island astern; this course holds good for about 0.5 mile until south tangent of Singa Island is abeam; then change course to **033°**, with the eastern tangent of a small group of islets ahead; this course holds good for about 0.8 mile until the south point of the island north of Singa

Island is abeam; then change course to **055°**, with the southeast tangent of a 160-foot island astern.

When abeam the northeast tangent of the 280-foot island north of Singa Island, change course to **046°**, and continue on courses as given in the preceding paragraph.

From Tenass Island through Dry Pass.—From Tenass Island to Aneskett Point, mid-channel courses carry over deep water. There are several rocks along the shores which are shown on the charts. Northward of Aneskett Point is a wooded island which can be passed on either side. Favor the south shore for 1.8 miles westward of Aneskett Point to where the channel turns southward. A wooded islet is in mid-channel here which should be left to westward. Follow mid-channel courses from this islet to Dry Pass. Depths of 1 to 3 feet are found in the narrow stretch 0.8 mile eastward of Dry Pass. Vessels should proceed here with great care using the lead.

Dry Pass and the section 0.8 mile eastward should be navigated only at high tide. A crooked course will have to be steered through Dry Pass to avoid boulders. Local knowledge and the lead are the two best safeguards for passage through.

Dry Pass to Shakan Strait, Chart 8172.—Dry Pass opens into a large bight with two islands at the western end. The channel is northward of the islands. From the pass a **290°** course heads northward of the eastern island; then follow the trend of the northern shore. A shoal makes off the northwestern end of the western island, and the channel here is about 20 yards wide close to the northern shore and has depths of 1 to 2½ fathoms. From this place two routes are available, the following (northern) route being the most direct.

Steer **233°** for 0.3 mile, leaving on the starboard hand a long reef which, except for several bare knobs, is usually covered at high tide. **Alligator Rock,** awash at high tide and marked by a daybeacon, and a wooded islet 108 feet high, are left on the port hand in passing through the improved channel.

When abeam the western knob on the reef, change course to **266°**, heading just to southward of the north end of a wooded island. When abeam the point on the south shore, change course to **240°**, passing southward of the reef, bare at low water, which lies slightly westward of midway between the point and the large wooded islet. When the east tangents of the two large wooded islets northward are in range, change course to **243°**. This course holds good for 0.25 mile.

Then change course to **227°**; this brings the south end of a wooded islet astern and the channel between the two islets ahead. This course holds good for 0.2 mile.

Change course to southward and pass southward of the islet with the Indian graves on it; favoring the island; then change to **227°**, with the channel between the graves island and the island to the westward astern, leaving on the starboard hand rocks at the entrance which bare at half tide.

Shakan Strait is described in Chapter 7.

Chart 8171.—Cap Island is at the southern entrance to the passage.

Knob Island, about 0.5 mile northward of Cap Island, is a small wooded island with two knobs about 240 feet and 260 feet high to the tree tops. The channel between it and El Capitan Island is about 100 yards wide, and has depths of 2 to 3 fathoms. Rocks awash lie off the shore on either side of this channel. Rocks extend off the shore of the island for about 100 yards.

Dot Island is the larger of two small islands about 0.5 mile northward of the north point of Cap Island.

El Capitan Island, about 2.8 miles long in a northerly direction and 0.8 mile wide, is near the southern end of the passage. A narrow inlet is in the southern side of the island in which are rocks and depths less than 1 fathom. Off the southeast end of the island, separated from it by a narrow, high-water channel, is a small wooded island. A group of rocks off the eastern side of the island is marked by a buoy.

On the west side of El Capitan Island is a deep bight with an off-lying wooded island at its entrance. **New Tokeen** is a settlement in this bight at its head. The bight is entered from the south through a clear channel. There is an ice and cold storate plant with a wharf having an 100-foot face and controlling depth of 4 fathoms. A mooring float 180 feet in length is available for small craft. All supplies for fishermen, including provisions, are obtainable. Fresh water can be had on the wharf and float. Radio communication is maintained with the Alaska Communications System and planes will call to take on or discharge passengers.

Twin Islands are a group of small islands about 12 feet high about 0.6 mile westward of the southern end of El Capitan Island. Several rocks are on a reef 0.5 mile 043° from Twin Islands.

Fir Rock is a rock awash at higher high water 0.3 mile west-northwestward of Twin Islands. Rocks close-to are awash at low tide and high tide.

Keski Island is a wooded island about 225 feet high in the southern part of the bight on the western side of El Capitan Island. Foul ground extends 250 yards westward from the south end of the island, and irregular bottom extends 0.2 mile westward off the northwest part of the island.

Flat Island is a small island on the southern end of the large shoal area eastward of and close to Teal Island. To the northward of Flat Island is another small island. Sunken rocks extend in a northerly direction from Flat Island for 250 yards to a rock awash at high water.

White Point is the northwestern point of the bight on the western side of El Capitan Island abeam Singa Island. Foul ground extends for about 100 yards southward of White Point.

Teal Island is the southern of three islands westward of El Capitan Island; elevation about 230 feet to the tree tops. Rocks extend off the south shore for 0.2 mile.

San Island, 490 feet high, is the largest and middle of the group westward of El Capitan Island. Between San and Teal Islands are several islets and foul ground.

Singa Island is the northern of the three large islands westward of El Capitan Island; elevation about 230 feet to the tree tops. Between Singa and San Islands are several islets with channels navigable by small boats.

Scow Island is a small island northward of Singa Island and about 0.3 mile northwestward of the northern end of El Capitan Island.

Hub Rock, 8 feet high, almost in mid-channel, eastward of El Capitan Island, is a prominent landmark. Foul ground and irregular bottom extend for almost 0.2 mile from north through west to south from the rock.

Graveyard Island is a small island with a few Indian graves on it at the entrance to Sarkar Cove; ground elevation about 15 feet.

Brockman Island, about 205 feet high to the tree tops, about 0.8 mile to the northwestward of Graveyard Island, is the largest and most southerly of a group of three islands.

Burnt Island is the small island about 250 yards northward of Brockman Island. There are several large dead trees and heavy underbrush on the island but no living trees. It is a prominent landmark. Burnt Island Light, shown from a white wooden house, is 15 feet above the water and visible 6 miles. The light is obscured from 004° to 150°.

Tenass Island, about 165 feet high to the tree tops and about 0.8 mile long in a north and south direction and 0.2 mile wide, lies southeastward of the eastern entrance to Tenass Pass.

Sarkar Cove, on the east side of El Capitan Passage about 6 miles from Sea Otter Sound and about 19 miles from Shakan, affords good anchorage in 6 to 8 fathoms, mud bottom. A large lake empties into the head of the cove through a series of rapids. The lower end of the lake is brackish, the head is fresh. The lake is an important spawning ground for red salmon.

In entering Sarkar Cove favor the northern shore to avoid a rock, awash at high water, lying 0.3 mile 092° from Graveyard Island. A 3¾-fathom patch is 400 yards off Graveyard Island in the same direction.

Deweyville, on the north side of Sarkar Cove, consists of an abandoned cannery, a few houses, and the ruins of a wharf. A small float is maintained by the local residents.

Sarkar Point is about 0.4 mile 199° from Graveyard Island.

Salt Water Lagoon is about 0.5 mile northeastward of Sarkar Cove. It is connected with sea level in **Tunga Inlet** by a short rapids. Water ebbs from the lagoon for about 2½ hours after low water. At slack water, about 2½ hours after high water, a launch drawing 4 feet may pass through the entrance into the lagoon. There is a trail from Deweyville to the lagoon.

Clam Cove is a small cove about 1.1 miles northward of Sarkar Cove. **Clam Island** and rocks block the southern part of the entrance. In entering, favor the northern shore of the cove at a distance of about 120 yards. Depths of 3 to 3½ fathoms were obtained to the northward and northwestward of Clam Island. The head of the cove is shoal.

Rocky Cove is a small cove about 0.4 mile northward of Clam Cove. In mid-channel, off the entrance, is a rock awash at minus tides with deep water on all sides; it is marked by kelp. The cove is foul.

Tenass Pass, northward of **Spanberg Island,** and **Brockman Pass,** southward of the island, connect Tokeen Bay with El Capitan Passage. Both passes bare at low water. Tenass Pass carries slightly more water than Brockman Pass, but is very narrow, having a width of 25 feet at one place where the current exceeds 5 knots at times. Boats drawing 7 feet have gone through Brockman Pass on extreme high tides.

Chart 8172.—Sarheen Cove, on the eastern shore of the passage about 5 miles northward from Sarkar Cove and about 6.5 miles southward from Aneskett Point, indents the shore 0.3 mile and is about 0.2 mile wide at the entrance. A rock is reported to be about 100 yards off the southern point of the entrance. Depths of 8 to 10 fathoms were found within the cove except toward the head where it is shoal.

Devilfish Bay, on the western side of the passage 3.5 miles southward of Aneskett Point, extends in a westerly direction for about 2.8 miles. The bay consists of two parts connected by a narrows; the eastern part, about 0.8 mile long and 0.2 mile wide, has

depths of 40 to 50 fathoms at the entrance, shoaling to 13 to 14 fathoms 0.2 mile from the narrows. The bight in the northern corner of this part of the bay is shoal.

The narrows, about 170 yards wide, expands into an arm 0.2 mile wide and about 1.8 miles long in a westerly direction, with depths of 12 to 14 fathoms to within 0.5 mile of the head. The narrows is constricted by a rock in mid-channel, awash at high water. Depths of 3 fathoms westward and of 5 fathoms eastward of the rock were found, but the channel should not be attempted until seen at low water. Currents of 2 to 3 knots were observed in the vicinity of the rock.

Aneskett Point, bold and wooded, is on the western side of the passage where its trend turns from northward to westward. Northward from the point is a wooded island which may be passed on either side.

Dry Pass is about 0.3 mile long. A section about 220 yards long bares about 4 feet at low water. The bottom is gravel, shale, and loose boulders. A dredged channel with a project depth of 6 feet over a width of 60 feet provides passage through Dry Pass and a shoal area eastward. In May 1948 the project depth obtained in both channels. The eastern channel is marked by buoys. Local knowledge and the lead are the two best safeguards for passage through.

From Dry Pass to Shakan Strait, a distance of about 2 miles, the channel is narrow and crooked, and passes close to numerous shoals, reefs, and islets. This section is marked by buoys and a daybeacon. The project provides for a dredged channel 6 feet deep over a width of 60 feet through three shoals. In May 1948 project depth was available in the improved portion of the pass but one unimproved section has 6-foot depth over a width of only 25 feet. Great care must be used to keep in the channel. By proceeding with care and making judicious use of the directions contained herein in connection with Chart 8172, any vessel that can get through Dry Pass should be able to navigate this section.

A marble quarry was formerly on the north shore of the passage about 1 mile from the Shakan Strait entrance.

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CHAPTER 7

Sumner Strait
Chart 8201

SUMNER STRAIT is one of the great inlets into southeastern Alaska from the sea. The strait consists, properly, of three entrances: The main entrance from the sea, between Coronation and Warren Islands, is about 5.8 miles wide. The entrance east of Warren Island, between it and Cape Pole, is about 1.2 miles wide and is used by vessels bound to and from Davidson Inlet and Bucareli Bay. The entrance between Cape Decision and the Spanish Islands is about 1 mile wide and is used by vessels bound to and from Chatham Strait. These entrances are described under separate headings below.

The usual track of vessels bound north from Clarence Strait is by way of Snow Passage or Stikine Strait to Sumner Strait, and thence to Wrangell Narrows. Vessels too large to make the passage through Wrangell Narrows with safety continue westward through Sumner Strait, round Cape Decision, and go northward through Chatham Strait or westward to sea by way of Cape Ommaney. In fog or thick weather, vessels bound around Cape Decision, instead of using the channel northward of Spanish Islands, can continue southward and round Helm Point, entering Chatham Strait between Hazy Islands and Coronation Island, or pass to sea southward of Hazy Islands. Nearly all of Sumner Strait has been examined by means of a wire drag, and the dangers are shown on the chart.

Currents, Sumner Strait.—The currents set directly in and out of the strait during flood and ebb, except along the shores, where it is either slack or there is a small countercurrent.

The flood from its entrance sets through Sumner Strait toward Zarembo Island, and there divides, a branch passing through Snow and Kashevarof Passages, meeting the flood current from Clarence Strait in the vicinity of Key Reef. See Currents, Snow Passage, in Chapter 5. The second branch sets northward of Zarembo Island and eastward until it at last meets and is overcome by the current from the Stikine River.

The ebb makes out from the vicinity of Wrangell through Sumner Strait, also through Stikine Strait and Chichagof Pass to Clarence Strait, its velocity being augmented by the current from Stikine River. See also Currents, Eastern Passage, in Chapter 5. The edge of the current from the Stikine River is well defined by its muddy-white appearance, and near the end of the ebb is sometimes noticed westward of Vank Island and well southward in Chichagof Pass and Stikine Strait.

Directions for vessels bound to Wrangell and thence through Wrangell Narrows, as well as directions for vessels bound to Juneau by way of Snow Passage, Sumner Strait, Chatham Strait, and Frederick Sound, are given in Chapter 3.

Through the length of Sumner Strait including the passages at the entrance, ebb velocities of from 2 to 3 knots at strength appear to be the rule. Flood velocities are smaller and generally do not exceed 1 or 2 knots. Between Point Baker and Strait Island, the irregularity of the bottom produces heavy swirls and surface disturbances.

It is reported that strong currents and heavy tide rips occur off Cape Decision, Fairway Island, Point St. Albans, and the small islands to the northward.

For predicted times and velocities, the *Current Tables, Pacific Coast* should be consulted.

Chart 8152.—Iphigenia Bay extends between the Maurelle Islands on the east and Coronation Island on the west, and is the approach from the sea to Sumner Strait, Warren Channel, Davidson Inlet, Bocas de Finas, Sonora and Arriaga Passages. The bay is about 20 miles wide in an east-west direction and extends for about 10 miles in a north-south direction. The depths are generally good but the bottom is very irregular, and there are several dangers. On the eastern side of the bay, deep water prevails until within 1.5 miles of a line passing from the northwest end of St. Joseph Island to Timbered Islet to Losa Islet, where the depths become very irregular.

Chart 8173.—Off the southern end of Warren Island are three dangerous rocks. The outermost, about 2.8 miles 198° from the southern point of Warren Island, does not show but breaks occasionally on minus tides with a long heavy break. From the same point 2.8 miles 222° is a rock which bares at ¾ flood. About 0.2 mile to the northwestward of the rock is a breaker which shows at minus tides as a short high break.

From the southern point of Warren Island, 1.5 miles 209°, is a rock which has an elevation of about 15 feet at high water; this rock should be given a berth of at least 0.3 mile, as during heavy weather a breaker was observed to the westward of the rock within that distance. A 6-fathom spot lies 0.2 mile 274° from the rock. Between the rock and Warren Island, tide rips were observed when the wind was against the current. Depths of 6½ to 15 fathoms were found in that section, but its use is not recommended.

Two rocks, awash at half tide, lie about 1 mile 235° from Helm Point, the southern extremity of Coronation Island.

Vessels bound from the southward for Davidson Inlet and Warren Channel should give Timbered Islet a berth of 1 to 1.5 miles; those bound for Sumner Strait should favor the Coronation Island side of the entrance. Those bound for Cape Ommaney can pass between Hazy Islands and Coronation Island on a mid-channel course or else pass outside of the Hazy Islands, giving them a berth of at least 1 mile.

Maurelle Islands, Bocas de Finas, and Davidson Inlet are described in Chapter 6.

Warren Island is about 5.5 miles long, 3.5 miles wide, almost rectangular in shape, with numerous peaks. The highest point, **Warren Peak**, located near the northern end, has an elevation of 2,367 feet and is snow-covered from November to May. From a northerly direction, it shows prominently as a sharp, almost conical peak. The skyline appears, from a westerly direction, as a series of jagged summits; near the southern end, it appears lower and rounding. From the southward, the skyline appears ragged

and irregular. The land rises abruptly from the shore and is heavily timbered to an elevation of 1,800 feet, above which the peaks are generally bare.

With the exception of small stretches of sand beach in Warren Cove, False Cove, and in the two small coves in the northerly coast, the shoreline is a rocky shelf, with off-lying rocks which bare at different stages of the tide; they lie from 50 to 300 yards off the west coast and about 175 yards off the southern coast. To the southward of the small cove in the west coast, 0.3 mile offshore, is a rock, 15 feet high.

A rock which bares at extreme low water but which generally shows as a breaker, is 0.6 mile to the westward of **Point Borlase,** an indefinite point at the northwest end of the island. Near the north end of the island, on the eastern side, 2 miles from False Cove, is a rock 200 yards offshore, which bares at low water. A shoal with a depth of 6½ fathoms lies 380 yards, 040° from the north point of Warren Island; the bottom is rocky. A large kelp patch, with a depth of 3¾ fathoms, lies about 200 yards off the west shore of Warren Island and about 980 yards, 051° from Point Borlase.

Warren Cove on the eastern side of Warren Island, about 2 miles from the southern end, is about 1 mile long in a westerly direction and 0.5 mile wide. In entering, the southern shore is favored until inside the entrance, as a sunken rock, bare at minus tides, is 250 yards to the southward of the north point of the entrance. Between the rock and the shore is a rock which shows at high water. This area is usually kelp-marked. Two small rocks lie close to the southern point of the entrance. At low water, a sand beach extends a considerable distance from the head of the cove.

Anchorage may be had in 7 fathoms, sand bottom, in the center of Warren Cove. A heavy swell enters the cove during southeasterly weather. At night in approaching Warren Cove from the southward, the entrance is not readily picked up. The headland to the northward shows prominently but that to the southward does not, and the entrance to False Cove is easily mistaken for that to Warren Cove. There is a small gravel beach just within the entrance on the south side of Warren Cove, the light color of which may often be distinguished at night.

False Cove, the small cove about 1.5 miles to the northward of Warren Cove, affords anchorage for small craft in depths of 4 to 5 fathoms, mud bottom. Rocks lie off the north entrance point, and the north shore is foul. Anchor to the southward of the kelp patches.

Warren Channel leads between Warren Island and **Kosciusko Island.** No out-lying dangers were found in the channel proper, which has depths of 17 to more than 100 fathoms. Numerous islets and rocks above water extend about 3 miles southerly from the southwest point of Kosciusko Island; **Black Rock,** the southernmost, is 50 feet high and pointed on top. **Cape Pole** is the western point of Kosciusko Island.

The tidal currents have velocities of 2 to 3 knots at strength. The flood sets northward and the ebb southward.

Heavy tide rips form northwestward of the entrance to Pole Anchorage.

Halibut Harbor, on the south side of Kosciusko Island, eastward of its southwest point, is protected by numerous islands and affords anchorage for small vessels in about 16 fathoms. Owing to the numerous rocks and reefs outside its entrance, it is not available for strangers.

Coronation Island is about 9 miles long and 5.8 miles wide, triangular in shape, divided into three peninsulas by Windy Bay on the western side and Aats Bay on the northern side, the heads of which are separated by a range 1 mile wide in the center of the island. From offshore, the northeastern peninsula shows heavily wooded ridges of

moderate slopes reaching an elevation of 1,730 feet, but without characteristics of interest to the navigator. The western and northern sides of the island are described with Chatham Strait in Chapter 11.

Needle Peak, in the center of the island, has an elevation of 2,025 feet. Its summit is not very definite and shows flat with a series of sharp knobs of a grayish color. The south end of Coronation Island appears from offshore to the westward as timbered ridges with gentle slopes from Needle Peak to Helm Point, where they terminate in yellow and reddish cliffs 1,000 feet high and on the western side in cliffs 350 to 450 feet high.

Windy Peak, on the northwestern side of Windy Bay, 1,785 feet in elevation, is prominent. From the westward and southwestward it shows as a cone marked by a large but not conspicuous landslide. From the northwestward and southward it shows as a flat-topped mountain with a small knob on the western end.

Pin Peak, 1,400 feet high, on the northwest end of the island, is easily recognized as a long ridge covered with trees and shrubbery. Near the southern part of the ridge is a conspicuous knob or point. The ridge for several hundred feet below the summit is of loose rock, devoid of vegetation, and shows as light yellow, very noticeable from offshore westerly directions. From northerly directions this peak is not conspicuous, as it shows against higher peaks to the southward. From the summit the ridge has a rounding slope to the depression between it and Windy Peak. To the northward the slope is gradual, drops in a long hollow or concave shoulder to a height of about 900 feet, where there is an abrupt and noticeable change to a steep slope which ends at the shoreline.

Helm Point is the southern extremity of Coronation Island; differing from most capes and points in this section, which have moderate slopes, rises vertically in sheer, weather-beaten cliffs to a height of 1,000 feet, ending abruptly in what has the appearance of a flat tableland. Cut by numerous crevices and caves, one of which shows prominently from the southward, devoid of vegetation, of a light yellow to reddish color, barren and bleak, the nesting place of thousands of sea birds, it is perhaps the most conspicuous headland in southeast Alaska. Local conditions are such that it is generally visible in moderately thick weather when other sections are shut out.

From Helm Point 0.4 mile in an east-northeasterly direction is a point about 270 feet high that has the appearance of a dome-shaped grassy islet, prominent from northeasterly and southwesterly directions. Helm Point Light, 140 feet above water and visible 9 miles, is shown from a small white house on the south side of the point. The light is obscured from 067° to 205°.

From Helm Point, 1 mile 235°, are two rocks, awash at half tide. The southern rock is the higher. In approaching the cape in thick weather the lead gives very little indication of shoaling or of the existence of these rocks.

Cora Point, at the northeastern end of Coronation Island, is the extremity of a projecting ledge and has no marked characteristics.

From Helm Point to Cora Point, the coastline is marked by ledges and cliffs; rocks extend offshore for about 350 yards. Three miles northeastward from Helm Point and 0.2 mile offshore is a rock which bares 4 feet at high water. To the southward of Cora Point 0.7 mile distant, is a small wooded islet, 170 feet high, with a cluster of rocks close-to. A breaker lies 120 yards off this islet. From the direction of Helm Point a clump of trees on this islet shows prominently.

The **Spanish Islands**, a chain of wooded islands and rocks, extend northward from the northeastern extremity of Coronation Island in the direction of Cape Decision. The southern large island has an elevation at its northern end, in a wooded summit, of 665 feet, with a rather long, moderately sloping shoulder to the southward. The summit shows prominently from the westward. A group of rocks is off the southern end of the island, a small rocky islet with a scrub growth 0.3 mile off the western shore, and two rocks, awash at low tide, about 0.6 mile westerly from the southern end.

Rocks with least depths of 2 fathoms have been reported to lie about 1.5 miles west-northwestward of the northern end of the southern of the Spanish Islands, but the least depth found is 9 fathoms. During severe weather the seas pile up heavily but do not break, as they would on a 2-fathom spot; however, it is advisable to avoid this section.

A narrow 20-fathom channel separates Coronation Island and the southern Spanish Island. The chart shows the dangers and courses can be laid out as desired. Tide rips are usually very heavy in this channel.

A channel 120 yards wide with depths of 10 and 12 fathoms lies between the southern large Spanish Island and the small islet off its northern end. Between this small islet and the small islet to the northeastward of it is a narrow channel with depths of 8 and 9 fathoms. Small craft sometimes anchor in 8 to 14 fathoms in the bight formed by these islets and the middle island.

The middle island has an elevation of 370 feet near its northern end, with a moderate slope to the southward. From offshore it appears as a flat ridge.

The northern island, highest at its southern end, has an elevation of 370 feet. Spanish Islands Light, on the north end of the island, marks the southeastern side of Decision Passage. The light is shown, at an elevation of 47 feet, from a white slatted tower, and is visible 11 miles. The light is obscured from 272° to 082°.

Cape Decision, the southern extremity of Kuiu Island, is a low, bare, rocky point, from which the land rises gradually to an irregular, timbered ridge. It stands out well when approached from a direction to pass through the passage between it and the Spanish Islands. Two large kelp patches 1.5 and 2 miles northwestward from the cape and about 0.8 mile off the Kuiu Island shore should be avoided.

Cape Decision Light, 96 feet above the water and visible 16 miles, is shown from a white square concrete building with a square tower in the center, on the bare rock at the south end of the cape. The light is obscured from 134° to 245°. The fog signal is sounded on an air diaphragm horn which is synchronized with the radiobeacon for distance finding.

Decision Passage, 1 mile wide, lies between Cape Decision and the Spanish Islands. This passage is used by large vessels bound from Sumner Strait to Chatham Strait or Cape Ommaney. The passage has been examined by means of a wire drag and is clear; however, the cape and the islands should be given a berth of not less than 0.2 mile. A rock, on which is a least depth of ½ fathom, visible at low water and marked by kelp, lies off Cape Decision, 250 yards south-southwestward from the light. Vessels in rounding the cape are cautioned to give this area sufficient berth.

The large body of water to the westward of the Spanish Islands and to the northward of Coronation Island has been closely surveyed but not wire dragged. All dangers found are shown on the chart, but after prolonged severe gales very heavy breakers of infrequent occurrence have been seen on spots where the shoalest water found was from 11 to 14 fathoms.

Chatham Strait is described in Chapter 11.

Chart 8201.—Cape Decision to Keku Strait.—This portion covers the western side of Sumner Strait extending southward from Strait Island. From Iphigenia Bay to Strait Island, Sumner Strait follows a northerly direction, and at Strait Island it turns eastward to its junction with Stikine Strait near the town of Wrangell.

The western side of Sumner Strait between Cape Decision and Keku Strait is indented with many inlets and bays, and has many islets, rocks, and reefs extending from 1 to 2 miles off the main shore into the strait. The outermost dangers are marked by aids, most of which are lighted.

Fairway Island, on the west side of the south end of Sumner Strait, is small, 207 feet high, and wooded. It is surrounded by kelp and by rocks and reefs bare at various stages of tide. Two rocks, of 6 feet and 7 feet elevation, are 0.5 mile southward of the island, and nearby is another rock which bares 10 feet at low water. At a distance of 0.5 mile to the northeastward of Fairway Island is a breaker covered by 3 fathoms of water and marked by a small patch of kelp.

Chart 8120.—Port McArthur, about 4.5 miles northward of Cape Decision, is about 1.5 miles long and 0.4 mile wide. It is protected at the entrance by a group of islands and reefs, and it affords anchorage which is not secure because large swells run to the head of the bay. For small craft the most secure anchorage is in 4 fathoms, behind South Island. In bad weather the landing can be made behind the island, from where an emergency trail leads to Cape Decision Light. The entrance leads northward and westward of North Island and has a clear width of 300 yards between the kelp patches. Fresh water can be obtained from small streams at the head of the harbor.

North and South Islands, at the entrance to Port McArthur, are 300 yards in diameter, low and wooded, with surrounding ledges; they lie nearly 0.5 mile apart north and south. Between them are half a dozen rocky islets and much kelp. The passages south of South Island, and between South and North Islands, are shoal and rocky and should not be attempted without local knowledge.

Two large kelp patches lie 0.4 to 0.5 mile eastward of North Island. In the south patch, a least depth of 1½ fathoms was obtained and in the north patch, a least depth of 3 fathoms, but there is probably less water.

Kelp patches and an area of foul ground extend to the west and northward of North Island for a distance of 0.3 mile. A rock, with a least depth over it of 5 feet, is located near the northern edge of this kelp, and another rock, which bares 2 feet, is near the southern edge. Both rocks are close to the west side of the entering channel to Port McArthur.

Lemon Point, on the opposite side of the entrance channel, is low, and has several bare rocks off it. On the southeast and south sides kelp extends a short distance out, and the point should be given a berth of 300 yards in rounding into the port. **Lemon Point Rock,** covered at half tide and marked by a light, is 0.4 mile east-northeastward of the outer bare rock off Lemon Point and 600 yards northwest of the rock awash on the east side of the channel. It is surrounded by kelp and is the only serious danger on the west side of the channel. Lemon Point Rock Light, 26 feet above water and visible 9 miles, is shown from a small white house on skeleton tower on concrete pier.

To enter Port McArthur, pass northward and westward of North Island and pass 200 yards southeastward of Lemon Point Rock Light on course 232°. When the bare

rocks off Lemon Point are abeam, distant 300 yards, round the point and keep in mid-channel to the anchorage.

The shores of Port McArthur are steep-to, the 5-fathom curve being less than 100 yards off the high-water line except at the head of the bay. Anchorage depths are about 16 fathoms with the exception of southward of Lemon Point where there is a depth of 12 fathoms.

Chart 8201.—Affleck Canal, the entrance to which is westward of Point St. Albans and northwestward of Fairway Island, is 14 miles long in a northerly direction. The depths in general are great but very irregular, especially near the shores and at the head of the canal.

Marble Islet, named from its formation, marks the western point of the entrance to Affleck Canal. There are several small islets near it.

Bush Islets, on the south side of the entrance to Kell Bay, are three in number, and from 10 to 12 feet in elevation. The two northerly islets are sparsely wooded. The area to the westward is foul and covered with thick kelp during the summer months. Two rocks, which bare about 2 feet at low water, lie about 300 yards, 284° from the islets.

A dangerous rock, over which there is a depth of 1 fathom at low water, lies in Affleck Canal, 1,300 yards, 151° from the center of Bush Islets. From this rock a kelp patch extends in a northwesterly direction for about 250 yards.

Kell Bay, about 7 miles northward of Fairway Island on the western side of Affleck Canal, is about 3 miles long with two branches. One mile inside the entrance and about 500 yards off the southern shore is a wooded islet, 10 feet high; deep water exists between this islet and the southern shore of Kell Bay. An area of foul water, marked by thick kelp in the summer months, extends for a distance of about 800 yards northwestward from the northern end of the islet. Within this foul area are several rocks and islets, bare from 3 to 15 feet at high water, and, in addition, there are rocks with from 2 to 9 feet of water over them at low water. The northern shore of the bay is very broken, with numerous indentations, wooded islets, and rocks.

The northwestern arm of Kell Bay, about 1.5 miles in length, has not been completely examined as the entrance to the extreme head is blocked by obstructions which do not permit the entry, at low tides, of even small vessels. Two wooded islands and numerous rocks mark the south side of the entrance. Vessels entering this arm should proceed with caution, favor the north shore until abreast the largest wooded islet, and then favor the south shore in order to avoid the rocks, awash and bare 8 feet at low water, near the north shore.

The southwestern arm is separated from the main body of Kell Bay by three wooded islands. To enter, pass mid-channel between the island and the southwest shore, follow the southwest shore at a distance of 150 yards until the south point of the west island has passed abeam. Then stand in mid-channel, taking care to round the south side of the island at a distance of 200 yards so as to avoid the ledge extending about 150 yards offshore. Anchorage may be had in 9 to 12 fathoms, soft bottom.

The head of the southwest arm affords excellent anchorage in depths of 4 to 5 fathoms, soft bottom. The entrance is constricted, being only 30 to 35 yards in width, and vessels entering are advised to proceed with caution keeping the western shore, which is abrupt and steep-to, close on the starboard hand.

Affleck Canal is clear eastward of the small wooded islet, about 10 feet in elevation, about 1 mile northward of Kell Bay. There are several rocks in the immediate vicinity of this islet. A lagoon, connected with Affleck Canal at high water, lies on the western shore about 2 miles northward of Kell Bay.

Bear Harbor is on the west side of Affleck Canal, about 4 miles northward of Kell Bay. From the entrance to its head, it is about 2 miles long in a northwesterly direction. The harbor has three arms; the eastern is deep and open to the south; the middle and western arms are sheltered and afford suitable anchorage for small vessels. The approach to these two arms is south of the island at the entrance. The deepest part of the channel, about 4 fathoms, lies 100 yards off the shore of the island. Favor the shore of this island in entering and navigate with caution. After having passed the eastern tip of the island abeam by 100 yards, a mid-channel course will lead over a ½-fathom spot marked by kelp. This spot is the end of a reef making out from the southern shore.

After passing the entrance, mid-channel courses lead into the west arm which is deep except along the south shore near the head.

A mid-channel course is followed in the middle arm until about 1 mile from the entrance when the eastern shore is followed at a distance of about 200 yards. This arm is deep to within 0.5 mile of its head where it shoals gradually to the tide flats off the mouth of the principal stream emptying into Bear Harbor.

On the western shore of Affleck Canal, about 2 miles northward of Bear Harbor, is a grass-topped islet, about 5 feet in elevation. A depth of about 10 fathoms can be carried to about 1 mile south of the head of the canal by favoring the western shore at all times in order to avoid the extensive kelp patches and shoals in the eastern side. About 1 mile south of the head of the canal, the eastern shore is foul and studded with rocks; the foul area extends from 300 to 400 yards offshore.

The two main inlets on the eastern side of Affleck Canal are not recommended as shelter; the heavy ground-swell runs into both well toward their heads. The entrances of both are free of obstructions. The southern inlet, which is about 500 yards in length, is about 5.5 miles northward of the eastern entrance point of Affleck Canal. Within are depths of 5 to 7 fathoms, soft bottom. A group of rocks which bare from 4 to 5 feet at low water, surrounded by kelp, lie about 1,400 yards 232° from the southern entrance point of this inlet.

The northern inlet is about 1 mile farther northward, has an entrance about 350 yards in width, and extends eastward for about 0.8 mile. In its center are depths of from 9 to 12 fathoms. Vessels desiring to enter this inlet should favor the northern shore as a rock, bare 6 feet at low water, lies about 340 yards inside the entrance and about 70 yards off the southern shore. A rock, awash at mean high water, is 200 yards off the eastern shore of Affleck Canal about 0.9 mile, 332° from the northern entrance point of the north inlet.

Point St. Albans is about 7.5 miles northeastward of Cape Decision. Rocks and heavy kelp extend 1.1 miles southward and a 3-fathom spot lies 1.6 miles southward of the point; heavy tide rips and swirls may be experienced off this extensive kelp patch. Off-lying rocks and reefs extend to a distance of 0.3 mile offshore along the east shore of Affleck Canal to the point opposite Marble Islet. An extensive foul area lies about 1.6 miles northeastward of Point St. Albans. The highest part of this area is a rock awash at high water, located in the northwestern part of the kelp patch. There are numerous other rocks which bare at various stages of the tide. A lighted whistle buoy is moored on east end of reef.

From Point St. Albans to **Point Amelius,** islands and reefs extend offshore to a distance of 1.5 miles. This section of the coast is foul and marked by kelp. A rock, awash at low water, is located in a kelp patch about 2.8 miles northeastward of Point St. Albans. There are passages between and inside the group of islets located 4 miles northward of Point St. Albans; however, as there are numerous rocks and kelp patches among them and to a distance of 1.5 miles to the southeastward of the group, this area should be avoided without local knowledge. Small vessels may find shelter in the two small bays 3 miles and 4.5 miles northward of Point St. Albans. The bays are exposed to the eastward and there are shoals off the approaches. A rock with a least depth over it of 4¼ fathoms is about 1.8 miles southeastward of Amelius Island, the outermost islet off Point Amelius. A daybeacon marks the island and a lighted buoy is on the eastern side of the rock.

The bight westward of Point Amelius is exposed to southeast and is of no importance as an anchorage except for temporary purposes. **Louise Cove,** on its western side near the head, affords anchorage for small vessels in 7 fathoms.

Port Beauclerc is a large arm on the western side of Sumner Strait, the entrance to which lies about 11 miles northward of Point St. Albans and 10 miles south-southwestward of Point Baker. **Beauclerc Island,** small, wooded, with a wooded islet close north of it, is off the middle of the entrance. Beauclerc Island Light, 30 feet above water and visible 9 miles, is shown from a white wooden house on a rock on the east side of the island. The light is obscured from 048° to 182°. A reef extends 300 yards eastward from the small wooded islet.

The narrow passage south of **Edwards Island** is clear and deep in mid-channel. The eastern shore of the cove west of Edwards Island is formed by a small island with a very small islet off its northern end. A sunken rock lies close to the western shore of the northern end of the islet. The entrance to the cove lies to the northward of the islet. A sounding of 4 fathoms was obtained in the entrance to the cove. A 3-fathom spot lies about 350 yards to the northward of the point on the western side of the cove.

The bight on the eastern shore, 3 miles from the entrance to Port Beauclerc, furnishes anchorage but is exposed to the southward.

Anchorage in Port Beauclerc may be had northward of the small island which lies about 2 miles northward of Edwards Island, but the anchorage is obstructed by a large kelp patch, with a depth of 3 fathoms and possibly less, which lies 0.5 mile 006° from the small island.

Anchorage may also be obtained in the southern arm in 7 or 8 fathoms, mud bottom. Enter by the narrow passage south of Edwards Island and slightly favor the eastern shore of the arm to avoid a sunken rock, marked by kelp, lying 1 mile westward of the western end of the narrow passage south of Edwards Island. On the eastern shore of the arm 1 mile southeastward from the narrow passage is a point close to which is a 3½-fathom spot.

Caution.—The foregoing information relative to Port Beauclerc is based on an inadequate reconnaissance survey, and where local knowledge is lacking caution is advised in entering.

Boulder Point, about 4 miles northward from Beauclerc Island, is a bold rounding point with numerous rocks close-to.

Reid Bay lies on the western side of Sumner Strait, 3 miles northward of Boulder Point. It has two islets and several outlying rocks along its northwest shore and a rock

awash south of the islets and in mid-channel. Small craft may anchor in the cove on the west side of the peninsula point on the south side at the entrance to the bay in 5 to 6 fathoms, muddy bottom. There are dangers off the points at the entrance to this cove and it should be entered with caution. A kelp-marked reef lies in the approach to Reid Bay 1.2 miles west-southwestward of the south end of Sumner Island. A rock awash is about 0.6 mile 270° from this reef.

Sumner Island, about 1.5 miles in diameter, is 4 miles north-northeastward from Boulder Point. It has steep, rocky shores and is surrounded by small rocky islets which extend northwestward to Kuiu Island and southeastward from the southeast point of the island for about 0.5 mile. The island is used for a fox farm. Several reefs extend a short distance off the northeast shore of the island and should be approached with caution. A 6-fathom bank lies 0.9 mile 340° from the small rocky islet off the east end of the island.

Alvin Bay lies to the northwestward of Sumner Island. It is clear of known dangers except well into the bay where it narrows. At this point a small islet is on the south side of the bay with a rock between it and the southern shore. There are also rocks to the north of the islet. To enter, pass north of the islet, leaving the detached rocks on the starboard side. Good anchorage may be had inside in 4½ fathoms, muddy bottom. With caution, this entrance can be easily made. The bay is used extensively for anchorage during the fishing season.

Strait Island is in the middle of Sumner Strait, 3 miles northwestward of Point Baker. It is a mile in length, divided into two parts at high water, and is low and wooded. A reef partly bare at low water extends nearly 0.8 mile southward from the island, its limits being marked by a lighted buoy.

Warren Channel to Point Baker.—This portion covers the eastern shore of Sumner Strait below Strait Island. Shipley Bay, Shakan Bay and Strait, and Port Protection are the important harbors in this section. The coast is bold and rugged with many offlying rocks and islets. Calder Rocks and Helm Rock are the principal offshore dangers. A large part of the strait has been wire dragged.

Chart 8173.—Pole Anchorage is an anchorage for small vessels on the east side of the south end of Sumner Strait; it is a fair lee from northeast and southeast winds, but is exposed to westerly winds and swells. The south point, at the entrance, is a large mass of grassy-topped rocks, about 10 feet high, extending about 0.4 mile north of Cape Pole; the passage between has many bare rocks and is nearly bare at low water. There is considerable kelp for some distance northward of the grassy-topped rocks. The north point at the entrance is a wooded islet close to shore; kelp extends some distance northwest of it, also about 100 yards westward. A shoal with a least depth of 3¾ fathoms lies about 180 yards from the eastern side of the anchorage and about 375 yards 093° from the grassy-topped rocks. This shoal is marked by very little kelp. A shoal with a depth of 4¾ fathoms lies about 340 yards 045° from Cape Pole. There is no indication of kelp on this shoal.

Approaching Pole Anchorage, steer for the entrance on a **159°** course and slightly favor the wooded islet in passing between it and the grassy-topped rocks. When abreast of the grassy-topped rocks steer **180°** for about 450 yards and when the southernmost rock is abeam steer **152°** and anchor in 10 to 11 fathoms, muddy bottom, with the north end of Warren Island showing about midway between Cape Pole and the grassy-topped

rocks. Small fishing vessels may find suitable anchorage southward of Cape Pole, eastward of the large kelp patch, in any desired depth.

Fishermans Harbor (Little Pole Anchorage), a bight northeastward of Pole Anchorage, is used extensively by trollers and other small fishing craft. It has a post office and trading post. An ice and cold storage firm maintains a store on a float where gasoline, oil, and fresh water are available. The float is 150 feet long and has a depth of 16 feet alongside. Radio communication is maintained during the summer with Alaska Communications System.

Fishermans Harbor Outer Light, 21 feet above water and visible 6 miles, is shown from a white daybeacon on an I-beam. Fishermans Harbor Inner Light, 17 feet above water, is shown from a white house.

To enter Fishermans Harbor, steer **249°**, leaving the outer light from 35 to 40 yards on the port hand and heading for the inner light. Continue this course until the fish float and a group of piling near the west shore are on range and then haul gradually southward. When abreast of the float, anchor in any desired depth. The channel has a controlling depth of 2¼ fathoms about 100 yards southward of the outer light but deepens gradually when approaching the float.

Point Hardscrabble, about 2.5 miles northward of Cape Pole, is not very prominent. A small islet lies about 500 yards westward of the point. There are depths of from 5 to 11 fathoms between the extensive kelp patches which lie between the islet and the point.

Chart 8172.—Ruins Point, about 8 miles northward from Cape Pole, is a rounding rocky point without marked characteristics of interest to the navigator. Rocks extend about 0.6 mile to the westward of the point. From the vicinity of the point, rocks extend about 0.6 mile offshore in the direction of Bluff Island.

Bluff Island is a steep wooded island about 200 feet high off the middle of the entrance to Shipley Bay; a bare islet lies close to its western side and a reef extends 0.4 mile off the islet. A rock, with ½ fathom over it and marked by kelp, lies **1** mile **111°** from the south end of Bluff Island, about 0.7 mile from the south shore.

Shipley Bay, on the east side of Sumner Strait, is about 6 miles long and 1.5 miles wide, and has good anchorage at its head, but it is seldom used, as Shakan Bay is a more desirable anchorage. A reef extends about 0.7 mile from the north shore about 1.8 miles from Bluff Island; this reef partly shows at low water, has deep water close-to and is marked by kelp. Eastward of this reef, the north shore is clear to the head of the bay. A projecting point on the south side, 4 miles from Bluff Island, has a small islet and some rocks showing kelp close north of it. On a line between the south end of Bluff Island and this point, and 1 mile from the latter, there is a reported rock, marked by kelp, 0.4 mile from the south shore. Anchorage can be had about 0.3 mile from the south shore, near the head of the bay, in 14 fathoms, muddy bottom.

This bay has not been thoroughly surveyed, and in entering the use of the lead is recommended. The following directions may be of assistance: Enter northward of Bluff Island, steer **145°** until near the southern shore and past the reef which makes out from the northern shore, then steer **072°** with the Nipples ahead and then follow the north shore to anchorage.

Shakan Bay has its entrance on the east side of Sumner Strait, about 20 miles northeastward of Cape Decision. The south shore of the bay is clear, with the exception of rocks close-to, but the entire north side is foul for 1.5 miles offshore, as shown on the chart. On

the east side of the bay are three large islands and numerous small ones, between which are boat channels connecting with the northern part of Shakan Strait.

The Nipples, 1 mile southeast of Shakan Strait, and Mount Calder, north of the bay and 2 miles northeastward of Barrier Islands, are good landmarks for the bay.

Station Islet, off the south point at the entrance, is marked by Shakan Bay Light, on the north side of the islet, shown from a white wooden house with brown skeleton structure, at an elevation of 25 feet and visible 9 miles. The light is obscured from 310° to 052°.

Shakan Islet, 0.3 mile westward of Station Islet, is a rock about 18 feet high with a few bushes and grass on top. A sunken reef, marked by heavy kelp, extends about 0.5 mile northwestward of Shakan Islet.

Shakan Strait is about 8.5 miles long, in the shape of a horseshoe, lying eastward and northward of the large islands on the east side of Shakan Bay. Its entrance is narrowed to 350 yards by kelp-marked ledges on both sides, between which the depth is 8 fathoms. When inside the entrance, the strait has a general width of about 0.5 mile and mid-channel depths of 20 to 30 fathoms for 3.5 miles, where it widens to about 0.8 mile, has depths of 6 to 13 fathoms, and is a secure anchorage.

Hamilton, Middle, Divide, and **Fontaine Islands** are wooded islands in the eastern part of Shakan Bay and Shakan Strait.

Shakan, on the east side of Shakan Strait, 4 miles from the entrance, is the site of a former cannery and native village. It is now in ruins.

El Capitan Passage enters Shakan Strait about 0.9 mile northward of Shakan. For a description of El Capitan Passage see Chapter 6.

Mt. Calder, a sharp conical peak 3,360 feet high projecting above the dark timbered slopes, is an outstanding landmark. Easily identified by its light-gray color, it can be seen from the entrance to Sumner Strait in clear weather.

Calder Bay, on the northern side of Shakan Bay, is about 1.2 miles long and 0.4 mile wide. Depths of 5 to 9 fathoms may be carried for 0.4 mile within the entrance to the edge of a flat with less than 2 fathoms on it which makes out from the head of the bay.

Local magnetic attraction.—Along the shores of Shakan Strait the compass variation was observed to be as much as 6° east of normal.

Enter Shakan Bay with Beauclerc Island Light astern and Station Islet Light a little on the starboard bow.

Favor the north point slightly in entering Shakan Strait. When 1.2 miles within the entrance to the strait, favor the north shore slightly; otherwise follow a mid-channel course to the anchorage off Shakan, a distance of 4 miles. Anchor about 0.3 mile offshore in 7 to 9 fathoms, muddy bottom.

At night, deep shadows make it difficult to distinguish the entrance to the channel between Hamilton and Kosciusko Islands. The 850-foot summit on Middle Island and the 2,235-foot summit eastward of Calder Bay, on range, can frequently be seen on clear nights and used to avoid too close an approach to the southwest point of Hamilton Island. The channel between Divide Island and Middle Island is used by small craft.

Barrier Islands, on the north side at the entrance to Shakan Bay, are two good-sized islands, with numerous rocks and islets around and between them. The western island is about 200 feet high, the eastern island about 350 feet, and both are nearly level and wooded. A reef extends about 0.8 miles southward from the south point of the western

island, and a rock with 2½ fathoms over it, lies 0.7 mile 272° from that point. The rock is marked on the western side by a lighted bell buoy.

Calder Rocks are a dangerous kelp-marked reef lying well out from the eastern shore of Sumner Strait, the southernmost point of which is 2 miles northwestward of the Barrier Islands. From this southernmost point, which bares 3 feet at low water, the reef extends 1.2 miles in a northerly direction with little depths over it and with deep water close-to. A lighted whistle buoy is moored close westward of the northern end. There is a good passage on each side of Calder Rocks; the one eastward is generally used by small craft, and the one westward is used by larger vessels.

Hole in the Wall is a small cove on the east side of Sumner Strait 2.5 miles northward of Barrier Islands, the entrance of which is through a very narrow passage 0.5 mile long, between high bluffs, and opens into a basin 400 yards in diameter. There are two rocks in the entrance to the neck with 4 feet on them. The depths in the basin are 8 to 11 fathoms and it is a good anchorage for small craft.

Chart 8174—Labouchere Bay, about 4 miles southward of Point Baker, is about 0.8 mile wide at the entrance and 1.5 miles long. It is studded with islets and rocks, the entrance being nearly closed by three rocks marked by kelp. The bay is not recommended as an anchorage. Two bare rocky islets about 25 feet high, the outer one called **Labouchere Island,** lie in the entrance.

Protection Head, a bold white bluff 150 feet high 1 mile northward of Labouchere Island, from southward can be seen for miles. It is an outstanding landmark.

Port Protection has its entrance 1 mile southward of **Point Baker,** the northwestern extremity of Prince of Wales Island, and 1.1 miles northward of Protection Head. The port is about 1.2 miles wide at the entrance, 2.8 miles long, and has good anchorage near its head. At 1.5 miles within the bay, it contracts to less than 0.5 mile in width.

Port Protection, a trading post and fish-buying station, is a permanent settlement with a general store that supplies food, gasoline, oil, fresh water, and some repair parts for boat machinery. A small-boat float, 370 feet long, has depths of 5 to 8 fathoms of water alongside. Radio contact is maintained daily with Alaska Communications System. The settlement is on the northeast side of the port in the small bay behind the wooded island and inshore from Port Protection Light. There are some homes along the beach, and a shrimp cannery was being built in 1951.

A daybeacon marks a rock 0.3 mile off the north shore near the entrance. Port Protection Light, 15 feet above water and visible 9 miles, is shown from a small white house 0.7 mile inside the entrance on the northernmost island. The light is obscured from 290° to 095°.

A chain of islands divides the upper portion of the bay. There is good anchorage on each side of these islands; the best is probably in mid-channel on the south side in about 11 fathoms depth, muddy bottom, abreast the passage between the two largest islands. Small vessels may anchor a little farther in, in 6 to 8 fathoms. This is good protection in all weather.

The best channel to the anchorage north of the islands is between the two outermost ones, but there is a sunken rock exactly in mid-channel with 1¾ fathoms over it. Leave this rock preferably on the port hand in passing between the islands and anchor in mid-channel northeastward of the eastern one in about 9 fathoms, muddy bottom.

The shores of Port Protection are usually fringed with kelp, and the soundings, though deep, are irregular and the bottom more or less rocky. About 0.8 mile southward of the north point at the entrance is a reef covered at half tide and marked by kelp and a white slatted daymark. It is easily avoided by somewhat favoring the south shore until well inside, when a mid-channel course leads safely to the head.

Point Baker, a permanent settlement with post office on the inner bay east of Point Baker and south of Point Baker Anchorage Light, is a trading post. There are two fish-buying stations, and food, fresh water, gasoline, oil, and fishermen's equipment are available. The mail boat calls weekly with supplies and mail. There is a float 250 feet long having depths of 3 to 9 fathoms alongside. Daily radio schedule is maintained with Alaska Communications System. Planes call frequently during the summer with mail and passengers.

The shores of the bay are steep-to and lined with thick kelp beds. Though not yet surveyed, the bay appears to be free of dangers. A line of soundings was carried into the inner harbor, revealing that the outer harbor offers anchorage in 5 to 10 fathoms, mud bottom. There is a depth of 4 fathoms in mid-channel past the light into the inner harbor which affords good anchorage in 5 to 9 fathoms, mud bottom. This port is used extensively during the fishing season.

Point Baker Anchorage Light, shown from a small white house, marks the eastern side of the southern end of the passage into the inner anchorage. The light is obscured from 181° to 331°.

Helm Rock with 2¼ fathoms over it, marked by a lighted whistle buoy, is on a line between the south point of Strait Island and Point Baker and 0.6 mile from the latter. There are usually heavy tide rips and swirls around it. Another rock, with 3½ fathoms over it, lies 700 yards off the north side of Point Baker. The usual course is mid-channel between Point Baker and Strait Island. Small craft frequently pass between Point Baker and Helm Rock to avoid the current and swirls around the rock.

Chart 8272.—Keku Strait connects Sumner Strait with Frederick Sound and separates Kuiu Island from Kupreanof Island. The strait consists of three parts: A large bay at the southern end, a large bay at the northern end, and a narrow, intricate passage, about 18 miles long, known as Rocky Pass, which connects the two bays. The following description covers the southern bay and Rocky Pass. The northern part is described with Frederick Sound in Chapter 8.

Passage through Keku Strait is limited to small craft at high water. The shoalest water is found at The Summit in the vicinity of Daybeacon 17. The least depth here is 1 foot at mean lower low water, boulder bottom. Due to the strong currents, narrow channel and sharp turns, it is advisable to pass through the Devils Elbow and The Summit, at or near, high-water slack. The draft which can be carried through is dependent upon the tide. There is deep water at either end of Rocky Pass and in the approaches.

The depths through Rocky Pass are generally shallow and small craft can anchor practically anywhere with the aid of the chart. Larger craft can enter the southern end of Rocky Pass for a distance of 2 miles until opposite **Tunehean Creek** and select anchorage according to draft, either to northward or southward of Daybeacon 2A. At the north end, larger craft can anchor in Big John Bay, Stedman Cove, or in the channel as far south as 1 mile below High Island.

In the southern bay, anchorage can be had about 300 yards off the eastern shore, eastward of Meadow Island. Anchorage can also be had in Threemile Arm, or in the northeastern part of the bay, eastward of the entrance to Rocky Pass.

The bay forming the southern entrance to the strait is very foul, particularly the east and northeast shore. Navigation through any portion of the bay should be with caution. The entrance to the bay lies between Sumner Island and Point Barrie.

Sumner Island and Strait Island have been described in this chapter.

Chart 8201.—Point Barrie forms the eastern point at the southern entrance to Keku Strait. Reefs and shoals extend from 0.5 to 1 mile off the point. **Barrie Islet,** 0.9 mile southeastward of the point, is a wooded islet making a good mark for entering Keku Strait from the eastward. Foul ground extends from the islet to the shore.

Westward and northwestward of Point Barrie are numerous off-lying rocks, reefs and islets. **Trouble Island,** 2 miles north-northwestward of Point Barrie, is a prominent, wooded islet lying at the outside edge of the foul area. Small craft with local knowledge can follow an irregular passage through this area, but this should not be attempted when the extensive kelp beds are not showing.

Conclusion Island is the large island about 3 miles northward of Sumner Island. It is densely wooded and has several peaks ranging up to 1,000 feet in height; it is generally steep-to. A rock awash lies 1.3 miles 263° from the southern point of Conclusion Island.

Westward of Conclusion Island is an unnamed bay about 1.2 miles wide at the entrance but narrow and foul at its head.

Seclusion Harbor is a small inlet about 3.5 miles north-northwestward of the western end of Conclusion Island. A chain of islands lies eastward of its entrance, and a rock, awash at low water, lies nearly in mid-channel southward of them and 1.6 miles from the northwest end of Conclusion Island. The southernmost, and largest of these islands, is used for a fox farm.

Threemile Arm makes off to westward at the northwestern end of the bay. Its entrance is much obstructed by rocks. By proceeding with care, vessels can enter passing northeastward of the islet in the middle of the entrance, and find good protected anchorage in the middle of the arm in 5 to 8 fathoms, soft bottom. A rock awash is reported to lie in mid-channel near the head of Threemile Arm, directly north of the sharp point and just west of the 3¼-fathom charted depth.

Meadow Island is a low, wooded island in the eastern part of the bay, 4 miles northward of Point Barrie. The island is used as a fox farm. Foul ground extends 300 yards to southward and 0.6 mile northward of the island. A 1-fathom shoal, usually marked by kelp, lies 0.5 mile eastward of the island.

For anchorage eastward of Meadow Island, from a position 1 mile **090°** from the east point of Conclusion Island, steer **040°**, heading about 0.3 mile to the right of Skiff Island. Toward the far end of the course, avoid reefs on either hand usually marked by kelp. When the north end of Conclusion Island can be seen beyond the north end of Meadow Island change course sharply to **095°** for 0.7 mile and anchor in 14 fathoms, soft bottom, about 300 yards offshore with the west tangent of Strait Island still showing clear of Trouble Island. This anchorage is well protected and is by far the best in the bay for larger vessels.

Skiff Island is low and wooded and is surrounded by rocks and reefs. The island is used for a fox farm. A small-boat passage lies to eastward of the island.

About 1.2 miles westward of Skiff Island is a small, wooded island, divided at high tide. The cut is quite prominent from eastward and westward. The south point of the island is a bold, light-colored cliff, easily identified. A dangerous rock, awash at low water, lies 675 yards westward of the island.

Monte Carlo Island is a relatively large, low, wooded islet lying about 2.5 miles south-southwestward of the entrance to Rocky Pass. It is surrounded by foul ground, particularly to the south, east, and north. Clear of the foul ground to the northward, there is a passage leading to the westward which affords indifferent anchorage in 6 to 7 fathoms, sticky bottom. The small cove on the north side of the island affords good anchorage for small craft, but the entrance is difficult on account of the numerous rocks and reefs.

Chart 8272.—Rocky Pass is the narrow intricate passage connecting the southern and northern bays of Keku Strait. The pass is about 18 miles long and has a least depth, at The Summit, of 1 foot at low water. The passage is restricted to small craft at or near high water. The pass is well marked by daybeacons and buoys, and can be navigated by small craft with the aid of the chart.

Keku Strait Light marks the western entrance to Rocky Pass. The light, shown from a small white house, is 12 feet above the water.

Devils Elbow, about 7.5 miles north of Monte Carlo Island, is the most dangerous portion of the pass. The channel here makes a full right-angle turn in a shallow, constricted width of 75 to 100 yards.

Caution.—Passage should be made within 1 hour of high or low water slack; at low water when urgent only, and the draft should then be restricted to 3 or 4 feet. Because of the constricted channel through the Elbow, it is not advisable to attempt passage unless there is at least 2 feet more tide than the draft of the boat. See *Currents* following.

Beck Island is a small island in the center of the pass about 0.8 miles southward of Summit Island. South of Beck Island is a smaller island with off-lying rocks, awash at low water, to the southward.

Summit Island, a relatively large island about halfway through the pass, lies at the southern end of the most constricted portion of the pass, known as The Summit. The island is low and wooded to the high-water mark, with large tide flats about the northern and eastern sides. Daybeacon 4 is on the northwest corner of the island.

The Summit is the very narrow passage lying northwestward of Summit Island between Daybeacons 15 and 6. The narrowest portion of the passage is just southward of Daybeacon 17, the low-water width at this point being but 30 to 40 yards. Passage through The Summit should not be attempted without local knowledge.

Contrary to frequent report, the passage does not run dry. At low water, a tortuous passage with a depth of several feet can be followed between the boulders in the channel bed. A small boat can be poled through this passage but only with difficulty, for the tidal currents are strong, except for a very brief slack water, in addition to the restricted and twisted nature of the passage.

Through the narrow portion of The Summit, the clear depth over the boulders, rather than the soundings, determines the controlling depth. There are several such boulders for 250 yards north and south of Daybeacon 17, this being the worst section of the passage. The boulder with the least depth is 117 yards 135° from Daybeacon 17; it is covered with 1 foot at low water, which depth should be considered the controlling depth.

Passage through The Summit should be made at, or near, high-water slack, preferably within 1 hour of that time. Some boats do make the passage up to 2 hours from high-water slack, but this should only be with local knowledge. The draft which can be taken through depends upon the stage of tide. The range of tide is approximately the same as at Ketchikan. See *Currents* following.

High Island is the largest island in Keku Strait. The western arm of the island has a conspicuous conical peak, 560 feet high. Boats awaiting the tide often lie off the northwest point of this portion of the island. There are several clusters of mooring piles close-in along the shore just south of the point and anchorage in 12 to 18 feet can be secured just northeastward of the point.

Beacon Island marks the turn in the general direction of the pass from northerly to westerly. Daybeacon 16 is near the west point of the island. A low-water rocky ledge extends all around the island.

Passage eastward of Beacon Island leads into **Big John Bay,** a large bay extending north and east of Horseshoe Island. Fishing vessels often anchor in the southeast arm of Big John Bay in 18 to 24 feet, soft bottom. This anchorage is protected from all directions except the northwest. The northern part of Big John Bay is considered a good game country. Entering from westward, pass north of the island just north of Daybeacon 20 and close to the northeast point of the same island on which the daybeacon stands.

Berry Island is small but quite prominent in the vicinity, the vegetation having a rather distinct shade. The island is on a reef, Daybeacon 21 marking the eastern end of the reef. At high tide, care should be taken to avoid trying to pass between the island and the daybeacon.

The deep bight in the southwest shore of **Horseshoe Island** is called **Stedman Cove.** It is by far the best anchorage in the vicinity for small craft, being well protected from almost every direction, particularly from southeast and from north to northwest. It is a very convenient place to await favorable tidal conditions for proceeding southward through the pass. When entering the cove, be careful to avoid the long sand spit extending about two-thirds the distance across the entrance from the east shore. The point of this spit is usually marked with a pole. Continue beyond the second point along the eastern shore and anchor in 12 to 18 feet in the inner cove. A fox rancher has a permanent residence on the southern shore of the inner cove.

Entrance Island a long narrow island marking the northern entrance to Rocky Pass, is low and wooded to the high-water line. Daybeacon 22 is on the southwest point of the island. A low-water ledge extends 225 yards off the southern shore of the island. Strong tidal currents run around the north end of Entrance Island, and this area is not very favorable for use as an anchorage. Even the head of the bight northeastward of Entrance Island is a poor anchorage area on account of being too exposed.

Magnetic variation.—Observations in the vicinity of Keku Strait indicate that in some places the magnetic variation may differ by as much as 3° from the value shown on the compass roses on Chart No. 8272.

Tides.—The range of tide at The Summit is approximately the same as at Ketchikan, but the time of tide occurs about ½ hour later than at Ketchikan. In the southern and northern bays of Keku Strait, the range of tide is about 0.8 of that at Ketchikan, and the time of tide is about the same as at Ketchikan.

Currents.—The flood current enters Keku Strait at both ends and meets in varying places between High Island and The Summit. At the entrances to Rocky Pass the tidal

current has a velocity at strength of from 1 to 1½ knots. Slack water before the flood occurs about ½ hour later, and slack before ebb about ½ hour earlier, than at Wrangell Narrows.

At Devils Elbow the velocity of current at strength is from 5 to 7 knots, this being the strongest current encountered in the pass. Slack water occurs at practically high and low water. The period of slack at low water lasts only 5 or 10 minutes and the current attains considerable velocity within a half hour of this time. The high-water slack lasts considerably longer, and passage through the Elbow can easily be made within an hour before and after the high-water slack.

At The Summit strong currents set in within 1 hour of high-water slack attaining at strength a velocity of 3 to 5 knots. Through The Summit and the passages north of The Summit, the currents are quite variable due to the frequent shallow depths and the intricate topography. High-water slack occurs near high water, but the ebb current runs for a considerable time after low water.

Directions.—Proceeding in either direction, it is best to enter Rocky Pass about 1½ to 2 hours before high water. The tidal currents meet at varying places between High Island and The Summit. At Devils Elbow and The Summit, the period of slack water is very short. There are many places at each end of Rocky Pass where vessels waiting for the tide can anchor.

Sumner Strait to Rocky Pass.—*Entering from eastward.*—From a poisition 1 mile south of Barrie Islet steer **315°** for 3 miles, heading for the northeastern tangent of Conclusion Island. This course leads to southward of kelp-marked rocks, and to northward of a ¼-fathom shoal.

When abeam of Trouble Island, change course to **349°** with the northernmost islet, of those making off from Monte Carlo Island, ahead. This course passes about 0.5 mile westward of Meadow Island. Hold this course for about 4.8 miles until the split island, 1.2 miles westward of Skiff Island, bears 090°, then steer **010°**, heading for Keku Strait Light which is on the western point of the entrance to Rocky Pass. This course leads to the entrance of the pass.

Entering from southward.—From a position 1 mile westward of Strait Island, steer **000°**, passing about 1 mile eastward of Conclusion Island and about 1 mile westward of Meadow Island. Hold this course for about 7.5 miles until the split island is abeam to starboard, then steer **010°**, heading for Keku Strait Light which is on the western point of the entrance to Rocky Pass. This course leads to the entrance of the pass.

Through Rocky Pass.—Pass 150 to 200 yards off Keku Strait Light, avoiding the kelp-marked rock 375 yards eastward of the light, and steer **020°**. Hold this course for 1 mile and then head for Daybeacon 2A on course **058°**, passing about 100 yards northwest of Daybeacon 2.

When midway between Daybeacons 2 and 2A, change course to pass about 100 yards eastward of buoy 1. Round the buoy at this distance and head to pass 50 yards eastward of buoy 3 and 100 yards westward of Daybeacon 2B. A rock is about 50 yards westward of this daybeacon.

From a position 100 yards west of Daybeacon 2B, steer **010°**, heading for Daybeacon 5, and passing to eastward of a kelp-marked rock 260 yards north-northwestward of Daybeacon 2B.

When halfway to Daybeacon 5, haul slightly to eastward and pass 50 yards eastward of the daybeacon, and then head for Daybeacon 7. Hold this course for a little more than

0.5 mile, and bring the eastern tangents of Eagle and Kuiu Islands astern on course **006°**, which leads to the Devils Elbow.

Devils Elbow is the most dangerous portion of the pass because of the narrow channel, sharp turns, and strong currents. When on the courses, pick a range ahead and make the courses good. Hold the course **006°** until 50 yards past Daybeacon 7, at which point Daybeacon 2C will appear between the islets to westward. Then turn sharply to the left and head for the south tangent of the small island immediately across the channel from Daybeacon 9, course **328°**, keeping this tangent in range with a point on the tree-line ahead. This course passes close to southward of a rocky reef and 100 yards to northeastward of Daybeacon 9. When midway between Daybeacon 9 and the small island to northward, swing left and head to pass 50 yards southward of Daybeacon 2C.

Round Daybeacon 2C at a distance of 50 yards and head to pass 100 yards eastward of Daybeacon 11. When abeam of Daybeacon 11, turn northward and head for the first point on the eastern shore, passing eastward of two rocks with 1 foot over them. Pass northward of these rocks and head for Daybeacon 13 with Daybeacon 2C astern.

When the east tangent of Beck Island is on range with the west tangent of the small island to southward of it, change course to pass 50 yards to westward of Beck Island. Bring the south tangent of Beck Island astern with Daybeacon 15 ahead, course **323°**. This course passes close to northward of several rocks and shoals, and leads to the southern end of The Summit.

The Summit is the shoalest area in the pass and must be navigated with extreme caution. The last course above leads close to northward of a rock which is 350 yards southeastward of Daybeacon 15. At this point Daybeacon 17 will be on range with the eastern tangent of the large island west of Summit Island. Steer the above range, course **002°**, passing between two sunken rocks with 1 foot over them.

Round the northwest end of the small island, close to westward of Summit Island, at a distance of 50 yards and then follow the west shore of Summit Island at a distance of 50 to 60 yards, being careful to avoid a rock about 35 yards off this shore.

When Daybeacon 4 is abeam, steer **000°** until 100 yards past the small island northwestward of the daybeacon, then head for Daybeacon 17. When 100 yards from the daybeacon, change course to **012°**, passing between the rocks and boulders on either side. This course passes over the shoalest area in the pass.

When about 75 yards past Daybeacon 17, head for the 110-foot island on course **337°**, passing to eastward of a line of rocks and to westward of a rock which bares 1 foot at low water. When abeam this rock, bring Daybeacon 17 astern on course **348°**, passing 75 yards west of Daybeacon 6 and 75 yards west of Daybeacon 6A.

From a position 75 yards west of Daybeacon 6A, steer **022°**, heading for the 115-foot island and passing 100 yards west of Daybeacon 8.

When the north tangent of the small 60-foot island is abeam, change course to **333°**, heading for the northern tangent of a 120-foot island and passing 100 yards west of Daybeacon 10. When this daybeacon is abeam, change course to pass 50 yards esatward of Daybeacon 19.

Pass 50 yards west of Daybeacon 12 and steer mid-channel courses west of High Island, east of Daybeacon 19A, and west of Daybeacons 14 and 16.

From a position 250 yards west of Daybeacon 16, steer **307°** to a position 100 yards north of Daybeacon 21.

Then steer to pass 200 yards north of **Cucumber Reef** and Daybeacon 23, and 125 yards south of Daybeacon 18A.

From Daybeacon 18A, steer **320°**, passing 200 yards west of Daybeacon 20 and 150 yards west of Daybeacon 22. From Daybeacon 22, a **308°** course leads into the northern bay of Keku Strait.

The northern part of Keku Strait is described with Frederick Sound in Chapter 8.

Chart 8201.—Point Baker to Duncan Canal.—Point Baker and Helm Rock have been described in this chapter.

The cove 1 mile eastward of Point Baker is good anchorage for small vessels in 8 to 10 fathoms, muddy bottom, but is open to northward. It is about 0.2 mile long and 300 yards wide at the entrance. On the western side at the entrance are several bare rocks, and a little west of the entrance and 300 yards offshore is a large rock, awash at highest tides, known as **Twin Island.**

In the open bight, 6.5 miles eastward of Point Baker, vessels may find anchorage with shelter from southerly winds in 10 fathoms, sandy bottom, about 0.7 mile from shore.

Chart 8168.—Red Bay indents the south shore of Sumner Strait, 11 miles eastward of Point Baker and 3 miles westward of Point Colpoys. It is well charted, all known dangers being shown, and is used extensively for anchorage during the fishing season.

The entrance is through a narrow and rocky channel about 0.5 mile long, with depths of 2¼ to 4 fathoms. The narrowest part of this channel is at its southern end, and is about 50 yards wide between Bell Island and a rock, bare at low water, just west of mid-channel. At about 0.8 mile southward of this point, the channel leads between two grassy rocks about 2 feet high, and then westward of **Range Islet,** which is wooded. A rock, with ¾ fathom over it, is reported to lie about 100 yards 000° from the north end of Range Islet. South of Range Islet the bay is about 2 miles long and 0.4 mile wide, with depths of 5 to 15 fathoms and no dangers.

Dead Islet, small and wooded, is close to Bell Island and forms the eastern point at the entrance; a reef with bare heads extends 350 yards northward of the islet. **Pine Point** forms the northeastern entrance of the outer bay. **Bell** and **Danger Islands,** low and wooded, form the east and west sides of the narrow entrance and are separated from the main shore by shallow passes useless for navigation.

Vessels not wishing to enter or waiting for the proper stage of tide may anchor at the entrance to Red Bay in the bight west of Dead Islet. The anchorage is in the middle, westward of Dead Islet, in 7 to 10 fathoms, muddy bottom. Larger vessels should anchor with more swinging room in 18 to 20 fathoms. Inside the entrance the anchorage most used is the small bay east of **Flat Island** in 4 to 10 fathoms, muddy bottom. This is good shelter in all weather. Vessels wishing to go farther into the bay may find anchorage in 5 to 9 fathoms, muddy bottom.

Tidal currents in the narrow entrance to the bay have velocities of 3 to 5 knots, with very short intervals of slack at times of high and low water.

About 12 feet is the greatest draft that can be safely carried in at low water. The safest time to enter is at, or shortly before, high-water slack. All dangers are marked by kelp, but it is run under during the strength of the current.

Enter between the bare rock at the north end of Danger Island and the south end of Dead Islet, favoring the latter, and then favor the western or Danger Island shore, until halfway through the passage, when the eastern or Bell Island shore should be favored to avoid the rock lying close to the southeast point of Danger Island. Bring the eastern grassy rock in line with the west side of Range Islet and steer that range until near the rock, and then pass midway between the two grassy rocks and westward of Range Islet. Then follow a mid-channel course up the bay and select anchorage as required.

Chart 8201.—Two miles eastward of Red Bay is an open bight, sheltered from southerly winds, which affords anchorage for vessels of any size in 10 to 15 fathoms, muddy bottom, about 0.5 mile offshore. The shore from Pine Point to Point Colpoys is rocky and should not be approached closely.

Point Colpoys, about 2.2 miles eastward of Pine Point, is low and wooded. Point Colpoys Light, shown from a white wooden house, is 15 feet above water and visible 9 miles. The light is obscured from 302° to 114°. Irregular bottom extends about 0.3 mile to the northward of the point. Shoals extend in the general direction of Rookery Islands from a position about 1.2 miles eastward of the light.

Clarence Strait has been described in Chapter 5.

Totem Bay is a large indentation on the northern shore of Sumner Strait midway between Point Barrie and Mitchell Point. A detached submerged rock is 1.4 miles northeast of Shingle Island and about in the center of what would be the approach to the bay. A reef extends 1.2 miles eastward from the west point at the entrance. A detached submerged rock is 0.6 mile north-northwest of the end of the reef and 0.7 mile offshore from the west point. A shoal extends 0.2 mile off the eastern point at the entrance. To enter the bay, approach from eastward, keeping about 0.5 mile off **Moss Island** and about 0.5 mile off the eastern point at the entrance. The bay has depths of 7 to 8 fathoms, mud bottom, and is good protection except in southerly weather. Shoals extend over 0.2 mile from the shores of the bay. **Shingle Island,** low and wooded, is about 1.5 miles southward of the entrance; a reef, much of which shows at low water, extends nearly 1 mile southward from the island, and a rock, with 1½ fathoms over it, unmarked by kelp, lies 1.8 miles southeastward from the island. A series of shoals, with 5 to 6 fathoms over them, extends 0.8 mile eastward from the 1½-fathom rock.

The Eye Opener is a ledge near the middle of Sumner Strait, about 11.7 miles eastward of Point Baker. A rock with 1¼ fathoms over it, not marked by kelp, is 0.4 mile southwestward of The Eye Opener.

The Eye Opener Light, 28 feet above water and visible 9 miles, is shown from a white house on brown cylindrical base.

Douglas Bay is a bight, open southward, lying 4 miles northward of The Eye Opener and eastward of Moss Island. It has depths of 5 to 6 fathoms, but is not important as an anchorage.

Chart 8160.—McArthur Reef lies about 3.2 miles eastward of The Eye Opener and 3.5 miles northwestward of Point Colpoys. This reef has 2½ fathoms over it, and is marked off its eastern end by a lighted bell buoy.

Mitchell Point is low, level, and rocky. A broad tapering reef, showing considerable kelp, extends about 2.2 miles southeastward from the point. The extreme outer end of the

reef is bare at low water; at high water it is usually marked by tide rips. A buoy marks the southern entrance of the narrow channel leading to the westward of Level Islands.

Level Islands, heavily wooded, lie about 2.5 miles eastward of Mitchell Point. South of the western island is a small islet surrounded by rocks, and the entire group is surrounded by a shelving ledge and by kelp extending out nearly 0.5 mile. A pinnacle rock, with 3¼ fathoms over it, marked by a lighted buoy, lies 0.6 mile southeastward of Level Islands in the direction of Vichnefski Rock. The passage southwestward and westward of Level Islands is foul.

White Rock, 1 mile northeastward of the east end of Level Islands, is 32 feet high, and will be readily recognized by its white appearance and detached position. A rock, bare at half tide and surrounded by kelp, lies about 0.2 mile southward of White Rock.

Kah Sheets Bay, northward of Level Islands, is shoal and has many dangers. Three wooded islands lie south of the northern entrance point. Small fishing craft frequently anchor west of the southern island in 1½ fathoms, mud bottom.

Vichnefski Rock lies on the southeast side of Sumner Strait, about 0.8 mile northward of Point St. John, Zarembo Island. It is a long bare rock, awash at extreme high water. Southeastward of Vichnefski Rock are several ledges, partly bare at low water, and the passage between the rock and **Point St. John** should not be attempted except by small craft with local knowledge.

Vichnefski Rock Light, 38 feet above water and visible 8 miles, is shown from a white wooden house on unpainted skeleton tower.

St. John Harbor, on the northwest side of Zarembo Island eastward of Vichnefski Rock Light, is sheltered except from northward. **Low Point** and Point St. John lie, respectively, to the northward and southward of the entrance. **Northerly** and **Southerly Islands,** in the outer part of the harbor, are about 150 feet high to the tops of the trees. Two large rocks are close to the north side of Northerly Island, and rocks bare at low water and marked by kelp are just outside of them. Vessels should enter midway between Northerly Island and Low Point.

Anchorage in about 14 fathoms, muddy bottom, can be had just before the north ends of Northerly and Southerly Islands come in range; this will be midway between the middle of Southerly Island and the first bight in the opposite shore of Zarembo Island. Anchorage in 7 fathoms can be had farther in, but the currents are strong.

Small craft can enter St. John Harbor southward of Northerly and Southerly Islands, taking care to avoid a rock, awash at half tide, 200 yards southwestward of the south point of Northerly Island, and a similar rock which lies 80 yards southward of Southerly Island.

Chart 8201.—Duncan Canal has its entrance 3 miles west of the entrance to Wrangell Narrows. It is about 20 miles long and 0.8 to 1.5 miles wide. From its head a low marshy valley, sometimes used as a portage, extends to Portage Bay. The soundings in the canal generally are less than 20 fathoms and somewhat irregular.

Chart 8160.—A rock that bares 12 feet is off the entrance, nearly on a line joining White Rock and the west point at the entrance to Wrangell Narrows and nearly 1 mile from the point. It is marked by **Foremost Rock Daybeacon,** a white square daymark on pipe spindle, 22 feet above high water. A rock bare about 6 feet at low water is close to the westward. To the westward of these, about 0.3 mile, is a large bare flat rock about 4

feet high. A rock covered by 6 feet at low water is about 0.5 mile northward of that rock, and not marked by kelp.

Lung Island, 54 feet high and wooded, lies on the western side of the entrance to Duncan Canal. A sunken rock with ¾ fathom over it lies 300 yards northward from the north point of the island. A small islet, 25 feet high and wooded, lies in mid-channel westward of Lung Island, and there is a narrow passage on each side of this islet, the western passage being foul.

Butterworth Island, 135 feet high and wooded, is close off the western shore of Woewodski Island and on the eastern side of Duncan Canal about 2 miles from the entrance. The narrow passage between Butterworth and Woewodski Islands is navigable for small craft at high water, but is not recommended for strangers.

Chart 8201.—Woewodski Island separates the lower part of Duncan Canal from the lower part of Wrangell Narrows, and is separated from Lindenburg Peninsula by Beecher Pass. The island is wooded and mountainous, the greatest elevation being 1,130 feet. The northwestern point of the island is marked by Beecher Pass Light, 12 feet above water and shown from a white-slatted tripod. The light is obscured from 252° to 022°. In the first bight to southward of the light are the buildings of the abandoned **Olympic Mine.** A trail leads inland to **Harvey Lake.**

Beecher Pass, 4 miles within the entrance to Duncan Canal, connects the canal with Wrangell Narrows; it is filled with islets and reefs showing much kelp. **Fair Island** lies at the west end of the pass. A reef extends about 700 yards in a northerly direction from the northwest end of Woewodski Island, and rocks lie off the eastern end of Fair Island in the middle of the channel to the southward. Reefs extend about 250 yards off the northern shore of Fair Island, and a rock lies about 250 yards eastward of its eastern point. The pass is surveyed, and all known dangers are charted. The pass is used by tugs with tows and extensively by fishermen, hunters, and trappers, and is easily navigated with proper caution. Boats may pass either north or south of Fair Island with safety. A depth of 10 feet can be carried through to Wrangell Narrows.

To go through Beecher Pass, steer mid-channel courses from westward until beyond the east end of **Big Saltery Island,** and then favor the southern shore until almost abeam of No Thorofare Point.

The bay between Keene and Big Saltery Islands is good shelter and used extensively. Anchor in 8 to 13 fathoms, muddy bottom. Small craft also anchor near the western end of the pass in the small cove on the north side north of Fair Island in 2 to 3 fathoms.

Little Duncan Bay, entering the western shore of Duncan Canal opposite Beecher Pass, about 4 miles from the entrance, is shallow but affords protected anchorage for small craft. **Emily Island** is a small, wooded islet on the southern side of the bay. Foul ground extends in a southeasterly direction from the northern point at the entrance.

Grief Islet, on the east side of Duncan Canal northwestward of Beecher Pass, must not be approached closely, as foul ground is found close inshore and southward of it. A rock, bare at low water, lies 1 mile 340° from the island.

A rock with a depth of ½ fathom over it lies 1.6 miles 320° from the northwest point of Grief Islet. It is marked by a buoy placed close-to, westward of the rock.

Castle Islands are a group of small islands, most of them wooded, lying on the southwestern side of Duncan Canal, about 10 miles from the entrance. **Castle River** empties

in the bight to westward of the islands. The head of the bight is filled with a mud flat, and the entire area westward of Castle Islands is shoal.

Currents.—The flood enters Duncan Canal with a velocity of 1 to 2 knots and runs in the direction of its axis, except at the west entrance of Beecher Pass, through which it passes into Wrangell Narrows, causing a cross-current in this immediate vicinity. The ebb flows in an opposite direction, and the same cross current, with a westerly set, is found at Beecher Pass. The flood current has a westerly set in the vicinity of the rocks lying off the south end of Woewodski Island. Strong tide rips are found at the entrance to the canal.

Directions.—Enter Duncan Canal eastward of Lung Island, proceed in mid-channel westward of Butterworth Island, and follow mid-channel courses. The known dangers are shown on the chart. The canal above Grief Islet has not been thoroughly surveyed, and caution is needed in navigating it.

Mitkof Island, triangular in shape, about 20 miles long in a northerly direction and about 14 miles wide at the southern end, is mountainous and wooded at the northern and southern ends, with a low divide in an easterly and westerly direction through the central portion. Wrangell Narrows lies to the westward and Frederick Sound and Dry Strait to the northward and eastward, respectively.

Chart 8160.—Wrangell Narrows to Wrangell.—Port Alexander, the eastern point of the southern entrance to Wrangell Narrows, is marked by Point Alexander Light, 23 feet above the water and visible 9 miles, and shown from a white wooden house on a brown skeleton structure on a reef off the point. The light is obscured from 162° to 293°. **Point Howe,** 4.5 miles to the eastward of Point Alexander, presents no special features.

Woodpecker Cove is a small indentation on the northern side of Sumner Strait, close westward of Point Howe. It affords anchorage for small craft with protection from Stikine winds.

Station Island, about 1.7 miles eastward from Point Howe, is small, timbered, and rises to an elevation of about 250 feet. The shoreline is rocky with cliffs 15 to 30 feet high.

Blind Slough enters the southern end of Mitkof Island. It is about 3 miles long and 0.8 mile wide, has a wooded island 200 feet high at the entrance and another island 2.5 miles inside. The head of the slough divides into several arms. A large stream empties into the eastern arm. From the head of the slough low ground extends to Wrangell Narrows. The slough is too shallow to be of use as an anchorage except for small craft and then local knowledge is desirable.

Baht Harbor, on the north shore of Zarembo Island, about 3.5 miles eastward of Low Point, is a broad, open bight, affording anchorage in southeast winds. A 2¾-fathom spot is off the eastern point of the bight about 0.3 miles offhore. The anchorage is in the middle of the bight, in 12 to 15 fathoms, about 0.2 mile offshore. At high water, the navigator should not seek less than 15 fathoms.

Little Baht Harbor, 1 mile westward of Craig Point, affords anchorage for small craft in 7 fathoms, soft bottom, behind a wooded islet and off the mouth of a small creek. There is considerable current at the anchorage, and its use is recommended only in case of emergency.

Craig Point, marked by a daybeacon, is on the northern shore of Zarembo Island, about 2.5 miles eastward of Baht Harbor.

Vank Island, about 3 miles long and 1.5 miles wide, is timbered and has two prominent hills 780 and 908 feet high. The southern shore is marked by cliffs 40 feet high in places; the northern shore is low and strewn with rock. Vank Island Light, 24 feet above the water and visible 9 miles, is shown from a white wooden house on a square wooden tower on a pier on **Neal Point** at the southern end of the island. The light is obscured from 110° to 264°. **Mud Bay** lies to the northwestward of Neal Point. It is deep at the entrance, shoals rapidly, and is not regarded as a favorable anchorage. The bight in the northern end of Vank Island at times is used as a small-craft anchorage.

Two Tree Islet is a small rocky islet off the north end of Vank Island. Two Tree Light, 18 feet above water, is shown from a small white house. A 2-fathom spot lies about 1 mile north-northwestward from Two Tree Islet. Passage may be made on either side of Vank Island, but the southern is preferred.

Sokolof Island is about 1.5 miles in diameter, timbered, and reaches an elevation of 830 feet at the northwest end. The center is low and is drained by a stream running westward, which empties into a bay about 0.5 mile long and 225 yards wide, used as an anchorage by small boats except during westerly winds.

Wilson Islands, two small low rocky islands thickly wooded with spruce, lie at the southern end of Dry Strait near Mitkof Island.

Chart 8201.—Dry Strait, mostly bare at low water, affords passage for small craft at high water between the head of Sumner Strait and the head of Frederick Sound. It is extensively used by fishing boats and boats operating between the towns of Wrangell and Petersburg. It is the route of the Alaska Cable. The channel requires local knowledge for safe navigation. Boats should attempt the passage only on the upper half of a rising tide. There are no abrupt changes in depth. The water is muddy at all times, and strong currents are experienced in places, 5 knots having been observed at times at Blaquiere Point.

The channel passes close eastward of **Blaquiere Point,** marked by a daybeacon, and to the westward of the small islet 0.9 mile northward of Blaquiere Point. A daybeacon on the west shore, about 3.5 miles northwestward of the islet, marks the north end of the shoal water area through the strait.

Boats should not attempt to pass between **Dry** and **Farm Islands.** A poor channel can be followed at high tide between **Sergief** and **Farm Islands.**

Kadin Island is 1,810 feet high, and wooded. From the southward it appears sharp, but from the east and west directions wedge-shaped. **Rynda, Greys, Hidden,** and **Pocket Islands** lie within Dry Strait. Fivemile Island, about 0.2 mile in diameter, is about 1.8 miles northward from the north end of Woronkofski Island.

A rock with ¾ fathom over it is 0.5 mile to the eastward of **Liesnoi Island,** a small wooded island to the southward of Kadin Island.

The **Stikine River** has its source in a small lake in British Columbia near latitude 57° 10′ N., longitude 128° 00′ W., and is about 200 miles in length. It flows in a southwesterly direction through glaciers and gorges; one of the latter, very narrow and about 30 miles long, is known as the Grand Canon. The river freezes in the winter, and with the spring freshets the current builds up great force. The river is usually navigable from about May 1 to October 15. The highest water is generally in July. Vessels drawing 3 feet and less navigate the river to Telegraph Creek, British Columbia, about 160 miles above the mouth.

Stikine River empties by two mouths: One, the north channel, following the mainland westward, enters the head of Frederick Sound; the other follows the mainland southward and forms the only navigable entrance to the river. The north channel can be navigated only by small craft at high water. The southern entrance has a least depth of about 2 feet at mean lower low water. The mean range of tide is about 11½ feet and the diurnal range is about 14 feet. The channel is from 0.2 to 0.5 mile wide, and changes with every freshet. Tidal effects have been noted for a distance of 13 miles above **Point Rothsay.**

The Federal project provides for snagging of the Stikine River from its mouth to the Canadian border, a distance of approximately 26 miles above **Gerard Point.** In June 1951, the channel was in good condition.

No permanent directions can be given since the channel across the mud flats at the mouth of the river changes with every freshet. Strangers can obtain directions from the masters of the river boats at Wrangell. The channels of the south arm of the Stikine River are followed by experienced boatmen by the appearance of the water. There is a strong current always southbound in the channel. The water appears to boil in the deeper parts, while over the shoals it runs smoothly and evenly.

Chart 8170.—Wrangell Narrows extends in a general northerly direction for 21 miles from near the east end of Sumner Strait to the eastern part of Frederick Sound. The channel is narrow and intricate in places, between dangerous ledges and flats, and the tidal currents are strong. It is marked by an extensive system of lights, beacons, and buoys which, with the aid of the chart, renders the navigation of the narrows fairly easy for small craft, even without local knowledge. Vessels of more than about 10 feet draft, however, are advised not to attempt to go through without a pilot. A local pilot can sometimes be obtained at Ketchikan, Wrangell, or Petersburg. It is safest to enter either end with a flood tide.

The Federal project for Wrangell Narrows provides for a channel 300 feet wide and 24 feet deep at mean lower low water; an anchorage basin adjacent to the channel north of Blind Island, 500 yards long, 200 yards wide, and 26 feet deep, and a channel 27 feet deep through Petersburg Bar. Some of the cuts have shown a tendency to fill and considerable dredging has been required to maintain the project. Once or twice each year exceptionally low tides occur, at which times the water may fall as much as 4 feet below the plane of reference of Chart 8170.

Vessels too large to make the passage through Wrangell Narrows safely, continue westward through Sumner Strait, round Cape Decision, and go northward through Chatham Strait, or westward to sea by way of Cape Ommaney. Smaller vessels regularly using Wrangell Narrows sometimes use the longer passage to their advantage when not favored by suitable conditions of tide or daylight in the Narrows.

Directions, Wrangell Narrows.—The courses and distances through Wrangell Narrows are given in tabulated form in Chapter 3. The short courses will only apply to small vessels since large vessels will cover a good part of the distance in making the turns. In some cases with twin screw vessels, the engines are reversed in order to help make the sharp turns. Inquiry of local pilots showed that they did not use courses in the narrows on account of strong currents and sharp turns. In foggy weather vessels come to anchor at either end of the narrows and wait until the fog clears away. Strangers may find that the large number of aids in the narrows are confusing and such persons will find the tabu-

lated courses useful in keeping in the proper channel. Vessels of over 10 feet draft are advised to take a pilot.

On the course between **Deception Point** and Point Lockwood, there is a strong tendency to be set to the westward with a flood current. At Point Lockwood Rock Light, a sharp turn is necessary and usually the time required to get on course makes it necessary to immediately change to the next course. Commercial vessels make this turn by going hard left and hard right without steadying.

On the course between Burnt Island Reef and South Ledge, there is a tendency to be set to westward on the flood. Using the back range, Burnt Island beacon on the east tangent of Keene Island, keeps one in the channel.

On the course out of the north end of the narrows during the flood, there was found to be a strong westerly set especially in the vicinity of Prolewy Rock Light.

Low-powered vessels usually enter the narrows on the last of the flood and carry a favorable current all the way through. The currents meet about 8 miles from the northerly entrance and 12 miles from the southerly entrance.

Currents.—The tidal streams enter Wrangell Narrows from both ends and meet a little south of Green Point. At the north end of the Narrows, during the turn of the tide, on the last of the flood and the first of the ebb, there is an unexpected current of approximately 2 knots setting directly across the channel toward the northwest. Within the Narrows there are two flood currents and two ebb currents each lunar day. Off Petersburg, in midstream, the flood or southerly stream runs for approximately 6 hours and attains a velocity at time of strength of about 3½ knots; the ebb or northerly stream runs for about 6½ hours and attains a velocity at strength of 3½ knots. The strongest currents occur off Turn Point and off Spike Rock Light and South Ledge Light. The average velocity of the flood at time of strength at these points is between 4 and 5 knots under normal tidal conditions. During spring and tropic tides, velocities of 6 or 7 knots may occur.

The *Pacific Coast Current Tables* include daily predictions of the times of slack water and the times and velocities of strength of current for Wrangell Narrows (off Petersburg), together with differences for obtaining similar predictions for a number of other places in the narrows.

The **aids to navigation** are placed for vessels going north; they are generally well preserved, but occasionally some of them are displaced or carried away by rafts, or drift in the strong currents, and this should be kept in mind, especially in the narrower parts of the channel. They are inspected about every 5 days or oftener, and if found out of position are replaced as soon as practicable. In many places there is a special channel for tows which is marked by buoys. Wrangell Narrows is well lighted throughout its length. The dredged channel is marked by lights, those on the western side of the channel having green lights with black daymarks, and those on the eastern side of the channel having red lights with red daymarks.

§ 207.800 *Wrangell Narrows, Alaska, use, administration, and navigation*—(a) *Definitions.* (1) The term "Wrangell Narrows" includes the entire body of water shown on U. S. Coast and Geodetic Survey Chart No. 8170 between Wrangell Narrows Lighted Bell Buoy 46 and Midway Rock Light.

(2) The term "raft section" refers to a standard raft of logs or piling securely fastened together for long towing in Alaska inland waters in the manner customary with the local logging interests, i. e., with booms, swifters, and tail sticks. It normally contains 30,000 to 70,000 feet board measure of logs or piling and has a width of 45 to 60 feet and a length of 75 to 100 feet.

(3) The term "horsepower" refers to the manufacturer's rating of the towboat engine as shown in standard catalogs or on the name plate fixed to the engine.

(b) *Fish traps.* No fish trap shall be towed through Wrangell Narrows without specific authority, in each case, from the District Engineer, Alaska District, Corps of Engineers, Anchorage, Alaska.

(c) *Tow channel.* (1) The following route shall be taken by all tows passing through Wrangell Narrows when the towboat has a draft of nine feet or less (northbound, read down; southbound, read up):

East of Battery Islets:

East of Tow Channel Buoy 1 TC and Tow Channel Buoy 3 TC.

West of Tow Channel Buoy 2 TC.

East of Keene Island:

West of Tow Channel Buoy 4 TC.

East of Tow Channel Buoy 5 TC and Tow Channel Buoy 7 TC.

West of Tow Channel Buoy 6 TC and Tow Channel Buoy 8 TC.

West of South Ledge:

East of South Ledge West Side 9 Light.

West of South Ledge East Side 8 Light and Tow Channel Buoy 10 TC.

East of North Ledge:

East of Tow Channel Buoy 9 TC.

East of Colorado Reef:

East of Colorado Reef West 15 Light.

West of Blind Slough Lighted Buoy 17.

East of Woody Island:

West of Woody Island Shoal 21A Light.

East of Tow Channel Buoy 11 TC.

West of Vexation Rock 23 Light.

West of Green Rocks.

West of North Flat:

East of North Flat South End 26 Light, Wrangell North Flat 28 Light, North Flat 30 Light, and Upper North Flat Buoy 32, whenever the stage of tide permits.

West of Blunt Point:

West of Blunt Point Reef 34 Light.

West of Petersburg:

East of Turn Point Lighted Buoy 36, Turn Point Shoal Lighted Buoy 38, and Petersburg Bar Lighted Buoy 40.

Thence proceeding to west side of channel and leaving Wrangell Narrows to westward of Prolewy Rock Lighted Buoy 43.

(2) For towboats drawing more than nine feet, application shall be made to the District Engineer, Alaska District, Corps of Engineers, Anchorage, Alaska, for authority to use the ship channel for each trip.

(d) *Size of tows.* The maximum tows permitted shall be as follows:

(1) *Towboats of 25 horsepower or less.* Not permitted to take any tows through Wrangell Narrows other than fuel logs, not to exceed 500 feet board measure per horsepower up to a maximum of 10,000 feet board measure.

(2) *Towboats of 26 to 49 horsepower.* Fuel logs not to exceed 10,000 feet board measure, or one freighting scow not larger than 30 feet by 60 feet, or one raft section.

(3) *Towboats of 50 to 89 horsepower.* Fuel logs, not to exceed 10,000 feet board measure if in "tandem" (not bound together) or 15,000 feet board measure if chained or cabled, or one anchor lifter, or one pile driver, or two units of other towable equipment, or two raft sections.

(4) *Towboats of 90 horsepower or over.* Fuel logs not to exceed 10,000 feet board measure if in "tandem" (not bound together) or 15,000 feet board measure if chained or cabled, or one anchor lifter, or one pile driver, or three units of other towable equipment, or seven raft sections.

(e) *Arrangement of tows.* (1) No towline or aggregate of towlines between towboat and separated pieces shall exceed 150 feet in length.

(2) Tows shall not exceed 65 feet in width overall.

(3) Tows other than rafts shall be taken alongside the towboat whenever possible.

(f) *Anchorage.* No craft or tow shall be anchored in Wrangell Narrows in either the main ship channel or the towing channel, nor shall any craft or tow be anchored so that it can swing into either of these channels.

Woewodski Island, Point Alexander, and Point Alexander Light have been described previously in this chapter. Deep water approaches close to Point Alexander.

Midway Rock is about 1.2 miles from the southern entrance to the narrows and 400 yards from the eastern shore. It is low and marked by a light.

Anchorage with protection from northerly and northeasterly winds can be had near the western shore of the southern end of the Narrows westward of Midway Rock, in 6 to 12 fathoms, sticky bottom.

Point Lockwood, 1.6 miles northward of Midway Rock, is marked by a light. Point Lockwood Daybeacon is on a ledge close to the western shore nearly 0.5 mile above the point.

A dangerous flat, bare at low water, extends 300 yards off the mouth of a stream on the eastern shore opposite Point Lockwood Daybeacon.

Point Lockwood Rock, with ¾ fathom over it, is 300 yards northward of the daybeacon and 200 yards from shore. It is marked on its northeasterly side by Wrangell Narrows Channel Light 1, on the highest point of rock. A rock with 2¾ fathoms over it, but no kelp, is nearly midway between the rock and Battery Islets. A buoy marks the edge of the shoal water on the west side of the western channel.

The channel westward of **Battery Islets** has a clear width of 200 yards, with rocks on both sides. Wrangell Narrows Channel Light 2 is on the west side of the southerly islets. Wrangell Narrows Channel Light 4 marks the edge of the reef off the northwest side of the northerly islet. The channel eastward of the islets is used by small craft and towboats. It is marked by buoys. Wrangell Narrows Channel Light 5, on **Boulder Point,** marks the west side of the Narrows about 800 yards northwestward of Battery Islets Light.

No Thorofare Point, 5 miles above Point Alexander, is marked by a daybeacon.

Spike Rock is being removed by progressive dredging operations.

Beecher Pass has been described with Duncan Canal previously in this chapter.

Burnt Island, small and wooded, is on the west side of the channel about 6 miles above Point Alexander. A light marks the end of the rock ledge extending southward from Burnt Island. The edge of the reef on the north side of the island is marked by a daybeacon. A buoy with reflector marks the eastern side of the channel off Burnt Island. **Burnt Island Reef** lies on the east side of the channel, northeastward from Burnt Island.

South Ledge, a reef marked by kelp, lies on the eastern side of the channel 7 miles above Point Alexander. The edge of the channel on the north side of the ledge is marked by Wrangell Narrows Channel Light 16. The edge of the channel on the south side is marked by Wrangell Narrows Channel Light 15.

North Ledge, on the eastern side of the channel 0.5 mile north of South Ledge, is a bare reef. The tow channel passes to eastward of the ledge and is marked by a buoy on the western side of the channel. **North Point** is on the western side of the narrows opposite North Ledge.

Bush Top Island is small and surrounded by a reef that bares; the island is westerly of the dredged channel. A daybeacon and a light mark the southeastern edge of the reef.

Spruce Point, low and wooded, is on the eastern side of the channel opposite Bush Top Island.

Colorado Reef is on the western side of the narrows opposite Anchor Point, about 8.5 miles above Point Alexander; the reef bares. A mud flat fills the large bight between Anchor Point and **Blind Point.** A narrow channel, called **Blind Slough,** is navigable for small craft at high tide and leads across this mud flat to the mouth of **Blind River.**

The channel between Anchor Point and **Rock Point** is well marked by lights and buoys.

Vexation Point is the eastern point of **Woody Island**, about 9.5 miles north of Point Alexander. The edge of the reef making off to northeastward of the point is marked by a daybeacon.

Danger Point Ledge is a reef that bares, lying off **Danger Point** on the eastern side of the channel opposite Vexation Point.

Green Rocks is a bare ledge about 400 yards long in a northwesterly direction. The north and south ends of the ledge are marked by daybeacons. The main ship channel passes to eastward of Green Rocks and the tow channel to westward.

North Flat, a wide flat lying on the eastern side of the channel, southeastward of Green Point, bares at low water. **South Flat** is a smaller flat, bare at low water, on the opposite side of the channel. The main ship channel between the flats is marked by lights. The tow channel passes close to eastward of the aids along North Flat. **Green Point** is marked by a daybeacon.

From the light off Green Point the channel widens to nearly the whole width of the narrows, and the water deepens to 15 to 20 fathoms.

Mountain Point is marked by a light on a white echo-board. There is a small wharf on the eastern side of the narrows opposite Mountain Point. A road extends northward along the eastern shore of the narrows from this wharf to Petersburg.

Scow Bay, about 2 miles below Petersburg, is the site of a cannery and two sawmills. The cannery wharf, in good condition, has a least depth alongside its outer face of 35 feet at low water. There is a float for small craft about 200 yards to northward of the cannery. A road connects Scow Bay with Petersburg.

At **Blunt Point** the channel narrows and boulder patches, marked by kelp, are on either side. Wrangell Narrows Channel Light 52 marks the edge of the reef on the east side of the channel off Blunt Point. The light is most brilliant on the bearing 340°, diminishing around the remainder of the horizon.

At **Turn Point** a shoal extends to northwestward halfway across the narrows. Frequent dredging is necessary to keep the channel open at this point. The dredged channel is marked by two lighted ranges and three lighted buoys.

Petersburg Creek, which empties into the narrows from the western side opposite Turn Point, is navigable for small craft at high tide.

Bayou Point is the north point at the entrance to Petersburg Creek. There is a sawmill here. A road extends along the shore behind the point.

Prolewy Rocks, off the western point just inside the northern entrance to Wrangell Narrows, are marked by a daybeacon. The tow channel passes to eastward of the rocks. A lighted bell buoy marks the northern entrance to Wrangell Narrows.

Petersburg, on Mitkof Island on the east side of Wrangell Narrows one mile inside the north entrance, is a fishing center in the Southeast Alaska fishing banks. The town has two cold-storage plants and five canneries processing salmon, halibut, herring, shrimp, crab and clams; one sawmill; a deputy collector of customs; a U. S. Public Health Service station, and a sales agency for nautical charts and related publications of the Coast and Geodetic Survey. Some 200 fishing boats have Petersburg as home port.

The entirely landlocked harbor affords excellent protection for small craft, but anchorage space is limited for large vessels. The Federal project provides for dredging suit-

able approaches with a depth of 24 feet to the existing wharves; a small-boat basin 11 feet deep between the Trading Union wharf and the Citizens wharf; and a short channel 40 feet wide and 8 feet deep to the south side of the Forestry Service float. In 1951, the Federal improvement of the harbor had been partly completed. The outer harbor, to the faces of the Pacific American Fisheries wharf, the Public Dock now of a cold-storage firm, and the wharf of the Kayler Dahl Fish Company, had a controlling depth of 24 feet. The small-craft basin between the latter two wharves has depths of 10 to 15 feet. The area to the south of the main Pacific American Fisheries wharf, between it and the Public Dock, has depths ranging from 18 feet along a line between the outer faces of the wharves to 6 feet along the inner wharf face which is 195 feet long.

Caution.—Complaint has been made that vessels, both large and small, have been proceeding past Petersburg Harbor at speeds which endanger life and damage property. It should be remembered that, in connection with the safe operation of vessels in general, due consideration should be given to the character of shore installations and the distance to shore and to other vessels in determining the upper limit of speed which may be safely employed.

Tides.—The mean range of the tide is about 14 feet and the diurnal range, i. e., the range from mean lower low water to mean higher high water, is about 16½ feet.

Wharves.—The Pacific American Fisheries wharf has an outer face 131 feet long. The Public Dock, at the Petersburg Cold Storage plant, is 173 feet long on the face. The Kayler Dahl Fish Company wharf is 210 feet long. These three wharves have least depths of 24 feet alongside.

Floats for Government launches are on each side of the approach to the Kayler Dahl wharf. Small-craft floats are maintained between the Public Dock and Kayler Dahl wharf, in which area there also are a float and hangar for seaplanes. The City wharf and plane float, southeast of Kayler Dahl wharf, has 60 feet along its face; it and the float at its northern end have controlling depths of 8 feet alongside.

The Union Oil Company wharf face is 70 feet long with a least depth of 14 feet alongside. The Standard Oil Company wharf, 160 feet long, has a least depth alongside of 20 feet. South of the latter wharf is the Sheldon wharf, 60 feet long with 14 feet depth along the face. There are two shoals, each marked by heavy kelp beds, 100 and 240 feet north of the north end of the Sheldon wharf.

The Scow Bay Canning Company, 3 miles south of Petersburg on the east side of the Narrows, has a wharf 160 feet long with a controlling depth of 35 feet alongside. A good highway leads from Petersburg past the cannery.

Supplies.—Several stores have provisions, fishing supplies, and some ship chandlery. Fresh water is available during the summer at all the wharves. Diesel oil, gasoline, and lubricating oils are obtainable at the oil company wharves.

Repairs.—There are two marine ways, the larger of which can haul out vessels up to 90 feet in length. The smaller one handles craft up to 50 feet in length. There are several machine shops where repairs to machinery of vessels can be made.

Communications.—Regular steamship lines operate between Seattle and all the major ports in Southeast and Southwest Alaska, carrying passengers and freight. The Alaska Steamship Company has two northbound, and two southbound ships calling each month, and ships of the Canadian Pacific Line from Canadian ports make regular calls with passengers and freight. There is weekly communication by mail boat with

isolated areas as far west as the west coast of Prince of Wales Island. Air service twice daily, north and south, operates the year-around between Ketchikan, Wrangell, and Juneau. Arrangements for flight to many other areas can be made at Petersburg.

The U. S. Army Signal Corps maintains radio and radiophone contact with many other Alaska towns, and to the States.

CHAPTER 8

Frederick Sound

Chart 8002

FREDERICK SOUND has its entrance from Chatham Strait between Kingsmill Point and Point Gardner and extends northeastward to The Brothers and Cape Fanshaw, at the entrance to Stephens Passage, and eastward to Dry Strait, a high-water boat passage connecting it with the eastern end of Sumner Strait. The sound is open and clear of obstructions, and there are few dangers to navigation away from the shores. The shores and islands of the sound are all high.

Ice.—Glacial ice in small quantities is generally present in the eastern arm of Frederick Sound, coming from Le Conte Bay, where at times there are enormous quantities. It generally follows the north shore as far as the entrance to Thomas Bay. With some conditions of wind and weather, ice may be expected as far as Sukoi Islands. It is sometimes seen at Cape Strait, and a piece has been seen at Turnabout Island. Occasionally a few stray pieces work into Wrangell Narrows as far as Green Point. The size of the pieces is sufficient to make them dangerous.

Currents.—The tidal current on the flood enters Frederick Sound from Chatham Strait; it sets northward into Stephens Passage and through the eastern arm. The ebb sets in the reverse direction.

Current observations made between Cape Fanshaw and Cape Strait indicate that the ebb or westerly current is considerably stronger than the flood. In the vicinity of Cape Strait the ebb velocity is about 1½ to 2 knots and it is probable that the current floods only with the largest tides of the month.

Directions for vessels passing through Frederick Sound are given in Chapter 3.

Chart 8201.—Dry Strait is described in Chapter 7.

Camp Island, Pocket Island, and Hidden Island are wooded islands on the flats northward of Dry Strait.

Ideal Cove has its entrance on the south side of Frederick Sound, 14 miles eastward of Wrangell Narrows and 1.2 miles southward of Coney Island. It furnishes good anchorage for small vessels in 7 fathoms. Two well-defined rocks awash, lie close to the east point of the entrance, while a large rock, bare except at the highest tides, lies on the west side at the entrance. **Cosmos Point,** the east point of the entrance, is wooded and reaches an elevation of about 295 feet.

Coney Island is steep-to; the edge of Stikine River flat lies about 0.5 mile eastward of it, and reefs extend 600 yards northward from the point 0.8 mile southward of the island.

Le Conte Bay, on the north side of the head of Frederick Sound, at times is inaccessible because of floating ice. Anchorage for small craft is obtainable in **Thunder Cove** in 7 fathoms and out of the path of the ice flow from the head of the bay. The great depths in the bay prevent anchoring. The entrance is narrow between the north end of Stikine River flats and the shore has a bar about 1 mile long with 2½ fathoms.

Large icebergs from **Le Conte Glacier** are a menace to navigation from Camp Island to **Frederick Point.**

Dry Strait, Le Conte Bay, and the Stikine River are excellent salmon fishing grounds, while some halibut are caught around Coney Island. Game is plentiful on Mitkof Island, and wild fowl frequent the flats.

Wrangell Narrows is described in Chapter 7.

From Wrangell Narrows to Cape Strait the southwesterly shore of Frederick Sound is bold and can be safely approached as close as 0.5 mile. A ledge, which bares about 8 feet, lies about 0.3 mile from the head of the bight, about 3 miles northward of Prolewy Point, the western point of the entrance to Wrangell Narrows.

The **McDonald Islands** are two small wooded islands about 3.8 miles eastward of the entrance to Wrangell Narrows. The eastern island, 228 feet high, is the larger.

Brown Cove, on the northeast side of the strait, to the northeastward of the entrance to Wrangell Narrows, furnishes indifferent anchorage in 11 to 12 fathoms at the entrance. The head of the cove bares at low water.

Point Agassiz is low and wooded. An extensive marsh flat extends about 2 miles to the northward.

Sukoi Islets are two wooded islands, with a smaller one between, lying about 3.8 miles northward from the entrance to Wrangell Narrows and about 1 mile off the westerly shore of Frederick Sound. The westernmost and largest island is about 330 feet high. The easternmost island is about 120 feet in elevation, and the middle island is low. Sukoi Islets Light, on the west side of the westernmost islet, shown from a white wooden house on wooden tower on concrete pier, is 24 feet above water and visible 9 miles. The light is obscured from 177° to 329°. The usual channel is westward of the islets.

Beacon Point, 3 miles northward of Sukoi Islets, is marked by a daybeacon.

Cape Strait is marked by Cape Strait Light. It is shown from a white house on a brown skeleton structure; the light is 45 feet above water and visible 11 miles. It is obscured from 311° to 116°.

About 2 miles southeastward of Cape Strait is a small valley and bight off which a reef and wooded islet extend 0.2 mile.

Chart 8210.—Thomas Bay is the large estuary on the north side of Frederick Sound between Wood Point and Cape Vandeput, about 10 miles northward of Wrangell Narrows and 22 miles east of Cape Fanshaw. The entrance is adequately marked and the bay well charted. Anchorage can be had off the southern shore inside Wood Point. Very good small-craft anchorages can be had in either of two small coves on the eastern shore of Ruth Island in depths of 3 to 10 fathoms, soft bottom.

Thomas Bay, from the bar to **Baird Glacier,** at its head, is about 10 miles long. The moraine of Baird Glacier now extends to about abreast **Elephants Head.** On the southeastern side is an arm extending about 3 miles eastward to the moraine of the **Patterson Glacier.** These glaciers do not discharge ice into the bay. A large reef, parts of which nearly always show, lies from 0.4 to 1 mile eastward of Cape Vandeput.

Wood Point, on the east side at the entrance to Thomas Bay, is low and wooded. A reef, largely bare at low water and marked by kelp, extends nearly 0.6 mile westward and southwestward from the point.

Cape Vandeput, on the west side at the entrance, is low and wooded; at the end of the wooded portion of the point is a detached clump of trees.

A reef, bare in places at low water, extends about 1.1 miles in a southerly direction from Cape Vandeput. A very narrow channel, with depths of 3½ fathoms, separates this reef from a bar which extends in a southeasterly direction from the end of the reef. Depths of 1¼ fathoms were found on this bar and there may be lesser depths. It is marked by kelp at low water.

The entrance channel lies eastward of the bar; its western side is marked by a buoy, and two buoys mark its eastern limits and the edge of the reef off Wood Point. The outermost of the two buoys on the east side of the channel is a lighted bell. Depths of 5 to 7 fathoms were found in the channel.

The **tidal currents** have a maximum velocity of about 3 knots over the bar at the entrance to Thomas Bay, and swirls occur at times from the shoal spot in the middle of the channel to Cape Vandeput. In the channel eastward of the shoal spot, the swirls are little felt.

Spurt Point, in Thomas Bay, about 3.8 miles eastward of Cape Vandeput, is steep and wooded. A large ledge, portions of which show at all stages of the tide, lies 0.6 mile westward of Spurt Point.

Bock Bight, lying about 1.8 miles eastward of Wood Point, is a narrow, deep bight, the entrance to which is bare nearly 2 hours before low water, forming a dam with deep water inside; except at slack water, the water rushes over this dam with great force.

Ruth Island is the large island on the west side to the southeast arm of the bay; close to its north end are a small islet and some low-water rocks. The northwest entrance to the passage westward of Ruth Island is shoal but may be used by small vessels. A rock, bare at mean lower low water, lies about 0.2 mile to the westward of the point on Ruth Island, which forms the eastern point of the northwest entrance. A rock, bare at mean lower low water, lies 200 yards to the southwestward of the same point.

Spray Island lies on the eastern side of the southeast arm eastward of the center of Ruth Island. A rock, with 3½ fathoms of water on it, lies 500 yards 199° from the south end of Spray Island.

Anchorage for small boats may be had in 5 fathoms off the northwestern entrance of the passage between Ruth Island and the mainland. Anchorage for small vessels may be had in the bight eastward of Spray Island in 18 fathoms, with the western side of the small islet which lies close to the south point of the bight in range with the first point southward of the islet. The anchorage is close to the beach which is steep-to. Anchorage for larger vessels may be had in 11 fathoms, mud bottom, off the bight at the southeast end of Ruth Island.

Scenery Cove, in the northern part of Thomas Bay, does not afford anchorage except for small craft. Large vessels can anchor at the entrance to the cove in 7 to 15 fathoms.

Farragut Bay is the large indentation on the north side of Frederick Sound between Grand Point and Bay Point, about 20 miles northwestward of the north entrance to Wrangell Narrows and 12 miles eastward of Cape Fanshaw. The bay is well charted and may be entered safely. It is about 3 miles wide at its entrance and 2.5 miles long. Farragut

Bay has two arms. The western arm is smaller and its entrance is obstructed near mid-channel by a rock which uncovers only at low tide and by a shoal which extends from the western shore. Vessels may enter by favoring the eastern shore. The eastern arm expands into a large bay known as **Francis Anchorage.** Small vessels may find anchorage in the northwestern arm of this bay in 8 to 15 fathoms, soft bottom, and also on the eastern side of the bay just north of the projecting point. Larger vessels may anchor off this point in 15 to 30 fathoms. There are extensive tidal flats at the head of Farragut Bay. Tidal currents have little velocity in the bay.

Grand Point, the eastern point at the entrance to Farragut Bay, is low and marshy at its end. The point is marked by Grand Point Light, 12 feet above the water and shown from a white wooden house. The light is obscured from 193° to 305°. **Bay Point,** the western point at the entrance, is bold and wooded.

Read Island, about 1.8 miles long and 0.5 mile wide, lies on the eastern side of Farragut Bay, with a very narrow passage, with a depth of 4½ fathoms between it and Grand Point.

A reef extends 350 yards off the southern end of Read Island, terminating in a bare rock. A rock, awash at low water, lies about 400 yards southwestward from the bare rock. Ledges marked by kelp extend 0.2 mile from the western side of the northern part of Read Island.

A large rock, bare several feet, lies about 0.2 mile southeastward from the eastern point of the entrance to the western arm. A rock, awash at half-tide, lies about 100 yards to the southward of the bare rock, and a shoal, with 2¼ to 2¾ fathoms of water on it, extends 0.5 mile southward from the bare rock.

Flock Rock is a small rocky islet in the middle of the passage northward of Read Island. Sunken rocks are reported to lie between Flock Rock and the shore of the mainland.

A ledge, awash at low water, lies 300 yards westward of Flock Rock.

A temporary fair-weather anchorage can be made west of the south end of Read Island in about 16 fathoms, muddy bottom, with Grand Point in line with the bare rock lying 350 yards southward of Read Island, and about 0.8 mile from the rock.

A small vessel can make a temporary fair-weather anchorage between Grand Point and the south end of Read Island in 5 to 6 fathoms, hard bottom.

The narrow passage with a depth of 4½ fathoms between Read Island and Grand Point may be used by small craft. To enter, keep Grand Point aboard at a distance of about 0.2 mile, steer for the southeastern end of Read Island on a **036°** course, and keep in mid-channel in the narrow part of the passage. The best passage to Francis Anchorage is westward of Read Island. In entering, give the western shore of Read Island a berth of about 0.5 mile, then pass between Flock Rock and Read Island, about 0.2 mile off the latter. Beyond Flock Rock, deep soundings were obtained to the anchorage. The chart is a sufficient guide.

Portage Bay, on the south side of Frederick Sound 7 miles westward of Cape Strait, is a secure anchorage but its entrance is narrow. The tidal currents in the entrance have considerable velocity at spring tides. Ice forms in the bay with extreme cold weather. **Portage Islets,** two in number, lie in Frederick Sound about 0.8 mile westward of the entrance and 0.4 mile from shore.

The entrance is 0.2 mile wide between **East** and **West Points,** and just northward of the points the channel is constricted by shoals to 150 yards width, with depths of 3 to 4 fathoms. Shoals make out from the shores of the bay and also from the head to 0.8

mile northward of **Stop Island. Harrington Rock,** bare 3 feet, lies about 0.2 mile northwestward of Stop Island.

Portage Bay Light, on the east end of East Point, is shown from a small white wooden house. The light is obscured from 201° to 329°. West Point is marked by a daybeacon.

The best time to enter Portage Bay is at high-water slack. To enter, steer **191°** for the middle of the entrance, and when inside East Point, steer **158°** in mid-channel heading for Stop Island. Anchor in 4 to 6 fathoms from 1 to 1.5 miles north-northwestward of Stop Island. The water shoals gradually toward the shore and there are no dangers outside the 3-fathom curve.

As a range for entering, small boats have used the grass line of East Point, **Hook Point,** and a small hill in the background. Round East Point at a distance of about 200 yards and follow mid-channel courses.

Chart 8201.—From Farragut Bay to Cape Fanshaw, the shore should not be approached closer than 0.5 mile. The coast is bold and heavily wooded. **Point Highland,** 4.2 miles eastward of Cape Fanshaw, is steep-to and wooded but is not prominent.

Cape Fanshaw, at the junction of Stephens Passage and Frederick Sound, is a long, low, wooded point terminating in a moderately long sand spit, with a large boulder at the extreme end, and deep water within 0.2 mile of the point. Cape Fanshaw Light, 41 feet above water and visible 9 miles, is shown from a white wooden house on a skeleton structure. The light is obscured from 210° to 229°.

Turnabout Island, about 13.5 miles westward of Cape Fanshaw, is 471 feet high and wooded. The shores are fairly bold except at the south end. A temporary anchorage for small craft is afforded in the cove on the northwest side of the island. A reef lies 0.5 mile southwestward of Turnabout Island; at high water it shows as two rocks about 10 feet high, but at half-tide the reef shows for 300 yards southward and on the line of the bare rocks. A clear channel 1.5 miles wide, between these rocks and Pinta Rocks, may be safely used in the daytime and with clear weather. Turnabout Island Light, 23 feet above water and visible 9 miles, is shown from a white wooden house. The light is obscured from 270° to 048°.

Pinta Rocks are two patches lying about 2.2 miles southward from Turnabout Island and about 1 mile off the main shore. The eastern patch covers at about half tide, and the western one is bare about 8 feet at high water; at low water, other rocks show close around them, and both patches are surrounded by extensive beds of kelp. **West Pinta Rocks Light,** 30 feet above water and visible 9 miles, is shown from a white house on a tower on the westerly rock, 3 miles 198½° from Turnabout Island Light. A buoy, moored about 1.3 miles 070° from the light, marks rocks awash at low water.

The passage south of Pinta Rocks is extensively used by small craft, and is especially valuable when going against the current since the currents here are much weaker than those north of the rocks. In rounding Cape Bendel, keep well offshore to avoid the rock described below.

Cape Bendel, a rounding wooded point, lies about 4 miles to the southward of Turnabout Island. A rock, bare at half tide and marked by kelp, is reported to lie about 0.5 mile off the cape in the direction of the westernmost Pinta Rock.

Keku Strait, northern part.—Keku Strait is divided into three parts: a southern bay, a northern bay, and a narrow intricate passage about 18 miles long known as Rocky

Pass, which connects the two bays. The southern bay and Rocky Pass are described in Chapter 7. Rocky Pass is shown in detail on Chart 8272. The following description covers the northern bay.

The northern bay of Keku Strait is about 13 miles long from the entrance to Point Camden where the bay branches, the western branch forming Port Camden and the eastern branch forming Rocky Pass. The northeastern shore of the bay is formed by **Kupreanof Island** and the southwestern shore by **Kuiu Island.** The entrance from Frederick Sound lies between Point Macartney and Cornwallis Point.

Point Macartney, the northeast point at the entrance from Frederick Sound, 2.5 miles south of Cape Bendel, is a long, low, wooded point, terminating in an abrupt wooded islet with two bare masses of rock between, all connected by a rocky platform at low water. Point Macartney Light, 25 feet above the water, is shown from a small white house on a small islet off Point Macartney. The light is obscured from 200° to 329°.

Beginning 2 miles southward of Point Macartney and extending 4.5 miles in a southeasterly direction is a chain of reefs and wooded islets lying 1 mile from the northeast shore and parallel to it; the northwesternmost reef is marked by a lighted bell buoy. On the northeastern side of this chain of reefs and wooded islets, between them and the main shore, is a narrow channel leading eastward to the village of Kake.

Kake is a native village with a post office and store on the northeast side of Keku Strait, about 4.5 miles southeastward of Point Macartney. An extensive flat makes off from the village and is marked at its outer edge by two buoys. Air transportation to Petersburg is scheduled 3 days per week. Radio communication is maintained with Alaska Communication System.

There is a salmon, crab, and shrimp cannery, cold storage plant, and wharf about 0.8 miles southeastward of the village. The wharf has a face of 103 feet with a least depth alongside of 27 feet. The oil wharf, close to southeastward of the cannery wharf, has a least depth of 24 feet alongside. Fresh water can be obtained at the wharf during canning seasons.

In approaching the cannery wharf, pass to southward of the buoys lying off the village of Kake, and pass to southward and eastward of a row of piles which extend offshore to westward of the wharf. Make either a port or starboard landing at the wharf.

Grave Island is a small scrubby island southwestward of the village of Kake.

Kake Harbor Light, 16 feet above water and visible 6 miles, is shown from a white wooden house, on the northeast side of Grave Island. The light is obscured from 300° to 097°.

Keku Islets, on the southwest side of Keku Strait, comprise a group of wooded islands, with outlying reefs, between which there are no practicable channels. A rock, bare at low water and not marked by kelp, lies 0.9 mile northeastward of the westernmost Keku Islet. There are other reefs on the southwest side, but they have portions showing above water and are easily avoided in daytime.

Between Keku Islets and the reefs on the northeast side is a channel, 2 miles wide and 8 miles long, to Point Hamilton, with depths varying from 7½ to 50 fathoms. Southward of Eva Island the channel is about 1 mile wide, between Point Hamilton and Hound Island, and leads between kelp-marked rocks and shoals on both sides.

Eva Island lies 8 miles from Point Macartney and at a distance has the appearance of being in mid-channel. It is wooded and marks the turn of the channel when bound for Hamilton Bay or Port Camden. Off its western end is a bare rock.

Point Hamilton is about 0.8 mile southeastward of Eva Island. At its extremity is a mound-shaped point connected at low water with the point proper. This point marks the entrance to Hamilton Bay.

Hamilton Bay, on the northeast side of Point Hamilton, is a secure anchorage for vessels of any size. Its entrance is about 0.8 mile wide and clear, except for a kelp patch, in which there is a depth of 3½ fathoms, 0.2 mile from the northerly shore eastward of Eva Island. Hamilton Bay is 4 miles long in a general southeasterly direction; at its head are extensive flats, bare at low water. Two large streams enter near its head.

Salt Point Light, 13 feet above the water and visible 8 miles, is shown from a small white house on the southwesterly end of **Salt Point.** The light is obscured on its northerly side between the bearings 168° to 259°.

The islands on the southwest side of the channel, from abreast Eva Island to the middle of Hound Island, are fringed with kelp to a distance of about 0.4 mile.

Hound Island lies about 2 miles southward of Eva Island. It is 1.5 miles long, low, and wooded, with outlying rocks at either end; on its northern side are extensive kelp patches.

A kelp patch, in which is a depth of ¾ fathom, lies about 0.8 mile northwestward of Salt Point Light.

A rock, with 1¾ fathoms over it and no kelp, lies about 0.4 mile southeastward of an unnamed islet and 1.8 miles south-southwestward of the south end of Hound Island. A rock, with 2¾ fathoms over it and marked by kelp, lies nearly 0.6 mile from this islet in the direction of the southeast end of Hound Island.

A rock which bares 2 feet at low water lies 1.2 miles southeastward from the southeastern point of Hound Island.

Pup Island lies about 2.8 miles south-southeastward of Hound Island. It is small, steep, and wooded, and marks **Point Camden,** the eastern point at the entrance to Port Camden.

Port Camden, the entrance to which is on the west side of Pup Island and 15 miles from Point Macartney, is an inlet 13 miles long and 1.5 miles wide for a distance of 5 miles from its entrance. At this point are several islands, the most prominent of which, and lying in mid-channel, is **Cam Island.** From these islands the inlet contracts gradually to its head, from which is a portage to Bay of Pillars. From the entrance to Cam Island there is 26 to 35 fathoms; above Cam Island there is 8 to 27 fathoms, decreasing to 4 to 8 fathoms at 2 miles from its head.

Rocky Pass, extending eastward from Point Camden and connecting with the southern bay of Keku Strait, is a high-water passage for small craft. See description in Chapter 7.

Tidal currents enter the northwestern part of Keku Strait and Port Camden from Frederick Sound. The maximum velocity in the open strait is reported to be 1¼ knots.

Directions, Keku Strait to Kake.—Head for the buildings at Kake on a **118°** course, or head for Kake Harbor Light on Grave Island on a **130°** course, until up to the lighted buoy 1 mile southwestward of **Point White.** Pass eastward of the lighted buoy and steer **121°**, with the cannery, southeast of the village, a little on the port bow.

Small craft coming from westward usually pass 100 yards off the northwesternmost Keku Islet and head for the light on Grave Island, course **088°** until within about 0.5 mile of it, and then pass northward of the island.

Chart 8214.—Saginaw Bay indents the northern shore of Kuiu Island for about 7 miles in a southeasterly direction. **Cornwallis Point,** the northern point at the entrance, is low and wooded. Cornwallis Point Light, 34 feet above the water, is shown from a white wooden house on the southwestern part of the point. The light is obscured from 144° to 316°.

Caution.—No recent surveys have been made of Saginaw Bay and vessels should proceed with caution. It has not been wire dragged and the bottom is very irregular.

Sachem Island, small and wooded, lies in mid-channel, 3 miles from Cornwallis Point. A rock, covering at three-quarters flood, lies about 0.6 mile northwestward of Sachem Island. Otherwise the bay is clear until approaching the head, where there are numerous islands with surrounding ledges.

Halleck Harbor, on the northeastern side of Saginaw Bay about 1.5 miles southeastward of Cornwallis Point, is the best anchorage in Saginaw Bay, but is open westward, and the bottom is generally hard and in places uneven. It is readily distinguished by high white bluffs on its northern side. At the foot of these bluffs are some Indian houses and graves. A rock with 3 fathoms over it and marked by kelp lies 700 yards northwestward of the east point at the entrance. The best channel entering is 0.5 mile wide between the rock and the northwest point. The bight at the northwest end of the harbor dries at low water, and a ledge, partly showing at high water, extends from the foot of the bluffs about 400 yards, its outer end bearing northeast from the east point at the entrance. Anchorage can be made in the middle of the harbor in 8 to 12 fathoms.

A small salmon cannery and wharf are in the cove on the eastern side of Saginaw Bay, about 3 miles southeastward of Halleck Harbor and northward of a high island which lies close to the northern shore. A small landing float is maintained here by the local residents. A mail boat stops on regular schedule.

Security Bay, having its entrance about 3.5 miles southwestward of Cornwallis Point, is a secure anchorage, but the entrance and bay are obstructed by numerous islands and ledges, and it should be entered with caution. **Roadstead Island** lies in the middle at the entrance, from which a chain of three small islands, **Flat, Cedar,** and **Harbor Islands,** extends about 0.7 mile in a southeasterly direction. The entrance to the bay is southwestward of these islands. From the west end of Roadstead Island a ledge, mostly showing at high water, extends 200 yards southwestward. Security Bay Light, on a small house on a skeleton tower, marks the southwestern end of this ledge. The light is 32 feet above water and is visible 9 miles. There is also a kelp-marked rock, with 1¾ fathoms over it, 0.2 mile northward from the north end of Roadstead Island.

Bibb Shoal, usually showing kelp, lies on the south side of the entrance to Security Bay. Its north end is a 2¼-fathom spot and lies 0.4 mile southwestward of the west end of Roadstead Island. A rock, awash at lowest tide, lies 150 yards farther southward.

Band Cove, just east of **Hourigan Point** and south of Bibb Shoal, at the entrance to Security Bay, is about 0.5 mile long. A small vessel can anchor in the entrance in about 6 fathoms, but the cove is not clear and is open from northwest to southwest; with Security and Saginaw Bays available, its use is not recommended as an anchorage.

Christmas Island, bluff and 200 yards in diameter, is the largest of several small islands on the south side of Security Bay at its entrance. A ledge and several bare heads extend 400 yards northwestward from Christmas Island, parallel with the channel. Between Christmas Island and Cedar Island, the channel is 0.2 mile wide.

Cleft Island, in the middle of Security Bay, about 1 mile southeastward of Christmas Island, is about 0.6 mile long and has a deep notch in its western end. At its southeastern end are some bare rocks. A narrow islet, about 0.3 mile long, lies close to the northeastern side of Cleft Island.

A ledge, marked by kelp, and with a rock, bare except at high water, near its outer end, extends 0.2 mile northwestward from the northwest end of Cleft Island.

Cedar Bight, east of Cleft Island, is obstructed at its entrance by a ledge, bare at lowest tides and surrounded by kelp, lying between Cleft Island and Retaliation Point. The southeastern part of the bight is shoal and rocky; otherwise, the depths are 4 to 6 fathoms, rocky bottom.

Retaliation Point, about 0.4 mile northward of Cleft Island, is bluff, steep-to, and wooded.

Indian Rock is a few feet above high water. A 1-fathom patch is 300 yards northward of Indian Rock.

Stewart Rock lies 0.2 mile eastward of Indian Rock, in line between it and a shallow bight in Cleft Island. The rock has ½ fathom over it and usually shows kelp at slack water. The usual channel lies between Indian Rock and Stewart Rock. The area between Stewart Rock and Cleft Island is foul.

The best anchorage in Security Bay is about 0.5 mile southward of Cleft Island in 9 to 11 fathoms, midway between the large island on the north side and a wooded islet and some bare rocks near the south side. The head of the bay is shoal and has several reefs, some of which cover at high water.

Anchorage can also be made between the west end of Cleft Island and Harbor Island, in 11 to 16 fathoms.

Directions, Security Bay.—Keep about 1 mile offshore until off the entrance. Bring the west end of Cleft Island midway between Christmas and Cedar Islands, and stand in on the range, course **141°**. This course leads 250 yards southwestward of Security Bay Light at the west end of Roadstead Island and in mid-channel.

When between Christmas and Cedar Islands, steer **149°** for a wooded islet near the southern shore and pass 300 yards southwestward of Cleft Island and 250 yards northeastward of Indian Rock, taking care to avoid Stewart Rock.

When Indian Rock is abeam, steer **129°** and anchor in mid-channel about 0.5 mile from the southeast end of Cleft Island, in 9 to 11 fathoms.

Chart 8201.—This section covers the northwest shore of Frederick Sound from Pybus Bay to Chatham Strait. Anchorage can be had in Surprise Harbor, Herring Bay, or Chapin Bay. Small vessels can find secure anchorage in Murder Cove. The post office and cannery at Tyee comprise the only settlement of importance in this area.

The Brothers, lying at the junction of Frederick Sound and Stephens Passage and about 2.5 miles off the western shore, are 2 large islands and 12 smaller ones, all high and wooded. The largest, **West Brother,** is 2 miles long, 1 mile wide, and 650 feet high.

Secure anchorage for small craft can be found in the narrow passage lying close to westward of the West Brother and between it and the small islet surrounded by reefs lying close to westward. The entrance is from southward, passing close along the west shore of the West Brother. The northern approach is foul.

Chart 8218.—Round Rock, 40 feet high and bare, is about 2.6 miles southwestward from West Brother Island. Round Rock Light, 49 feet above water and visible 9 miles, is shown from a white wooden house. There is a clear channel about 2 miles wide between Round Rock and the northern shore, but the bottom is somewhat irregular, the soundings ranging from 11 to 36 fathoms. The water is much deeper eastward of Round Rock and between it and The Brothers. The waters have been wire-dragged to within 600 yards of the rock.

Pybus Bay is located on the northwest side of Frederick Sound, westward of its junction with Stephens Passage and 5.5 miles westward of The Brothers. It is about 9.5 miles long in a north-northwesterly direction, about 6 miles wide at the entrance, and is divided into two arms by a long point from which three groups of islands, rocks, and reefs extend in a southerly direction. The bay has been thoroughly surveyed and the main channels have been wire dragged. The best anchorage in the bay is in Cannery Cove.

Point Pybus, the north point at the entrance to Pybus Bay, is low and wooded. A group of rocks extends 0.6 mile southward from the point.

San Juan Islands, low, wooded, and surrounded by foul ground, lie about 0.8 mile southwestward of Point Pybus. A rock baring at low water is 0.4 mile southward of the southernmost and largest island, and dangerous rocks lie 0.2 mile westward of the western point of this island.

Southwest Islands are a narrow chain of four wooded islands, the largest of which is named **Elliott Island,** lying parallel with the western shore of the bay about 1.5 miles southwestward of San Juan Islands. Foul ground extends about 0.5 mile southward of Elliott Island, and two dangerous rocks are 0.3 mile north-northwestward of the northernmost island of the group. Two dangerous rocks, bare at ½ tide, lie about 0.2 and 0.4 mile westward of **Long Island,** the middle Island of the group.

Grave Island, 150 feet high, steep, and wooded, is on the western side of West Channel, about 0.7 mile westward of the northern extremity of Elliott Island, and is a prominent landmark for this channel. A group of bare rocks, 12 feet high, lie 0.2 mile northward of the island, and a group of bare rocks, 6 feet high, is about 0.8 mile southward of the island.

Grave Island Light, 16 feet above water and visible 9 miles, is shown from a white wooden house on the southeast side of Grave Island. The obscured section is westward of the light between the bearings 031° to 167°.

Midway Islands are the triangular group of wooded islands lying northward of Southeast Islands and eastward of the entrance to Cannery Cove. Each island of the group has foul ground surrounding it, and there is a rock with 1½ fathoms over it lying midway between the two islands westward of the northern island. A dangerous rock which bares 2 feet is 0.8 mile southeastward of the northern island. A 2-fathom rock lies about halfway between this dangerous rock and the northern island.

Cannery Cove indents the western shore of Pybus Bay about 3.5 miles northwestward of Elliott Island. The cove is nearly landlocked and affords secure anchorage in 6 to 15 fathoms, sticky bottom. A large island with an islet close to the southward forms the north point at the entrance. A rock marked by a buoy on its northeastern side is in the middle of the entrance. A daybeacon on the southern entrance point marks the turn into the bay.

The cannery which formerly stood on the southern shore of Cannery Cove has been entirely dismantled; the buildings are in ruins and only a few broken piles mark the site of

the wharves. A shoal-water flat with outcropping rock is just westward of the site of the main wharf.

Donkey Bay, on the west side of Pybus Bay about 1.8 miles northward of Cannery Cove, is an open bight which bares in its western part and is of no importance.

The channel between Point Pybus and the San Juan Islands is not recommended except for small craft with local knowledge.

The channel between the San Juan and the Southwest Islands has been examined with the wire drag, and the dangers are as shown on the chart.

The channel between the Southwest and Midway Islands can be used but is not recommended for large vessels on account of the sharp turns.

Probably, the best passage between the eastern and western parts of the bay is between the northwestern Midway Island and the mainland. A rock in this channel has a depth of 2½ fathoms and lies 270° 1,000 yards from the northern point of the northern Midway Island. As this rock is unmarked, however, the use of West Channel, described below, is recommended for use by vessels bound for Cannery Cove.

West Channel extends between Grave Island and Southwest Islands and then between the Midway Islands and the western shore of the bay. Several dangers are passed when using this channel, but they are charted, and the channel has been wire-dragged along the sailing lines given below. The obstructions charted about 0.6 mile southward from Grave Island are rocky islets about 6 feet high. They are not easily picked up at night. Between Spruce Island and the entrance to West Channel, strong cross currents may be encountered.

Directions *to Cannery Cove, via West Channel.*—From a position 0.4 mile eastward of Spruce Island, steer **356°** until 0.4 mile past Grave Island passing 325 yards eastward of Grave Island Light. Then steer **331°** until the south tangent of the southernmost Midway Island and the south tangent of the northernmost Southwest Island are in range. Then steer **302°** with this range astern until off the entrance to the cove. Pass between the sunken rock at the entrance, marked by a buoy, and the south entrance point, marked by a daybeacon, to an anchorage in 13 to 14 fathoms.

Spruce Island, 84 feet high, small and wooded, is 2 miles from the Admiralty Island shore and 6 miles northwestward from Turnabout Island; other and larger islands are well northwestward of it in the entrance to Pybus Bay.

Chart 8216.—Woewodski and **Eliza Harbors** have a common entrance between **Point Napean** and **Deepwater Point** 9 miles westward of Turnabout Island. The entrances are much obstructed by dangerous ledges, and with the close proximity of better anchorages the use of these harbors is seldom necessary. **Liesnoi Island**, about 1.2 miles long and of irregular shape, lies in the entrance.

Woewodski Harbor is the open bight between Liesnoi Island and Deepwater Point. Ledges and rocks, covered or awash at various stages of the tide and generally marked by kelp, extend northeastward from Liesnoi Island halfway across Woewodski Harbor. **Polivnoi Rocks**, three bare rocks surrounded by ledges, lie at the northern edge of this foul ground. The only anchorage for large vessels in Woewodski Harbor is northeastward of this foul ground in 20 to 26 fathoms, hard bottom, and exposed to southeast winds. Small vessels find temporary shelter off **Bluff Point** in 6 fathoms, and south of Polivnoi Rocks in 3 to 6 fathoms, soft bottom.

Eliza Harbor is a deep inlet, with generally bold shores, extending about 5.5 miles in a northerly direction and about 0.5 mile wide. The only available anchorage is at the south end of the harbor, off the western side of Liesnoi Island in desired depths from 2 to 20 fathoms. On each side of Liesnoi Island are narrow passages called, respectively, North and South Passage, leading to Eliza Harbor.

The **North Passage** to Eliza Harbor enters from the northwestern part of Woewodski Harbor. This passage is straight, but narrow; its northern shore is bold-to, its southern shore is foul, and sunken rocks and kelp patches extend to mid-channel, leaving a navigable passage 75 to 100 yards wide. The rocks on the south side of North Passage cause tide swirls; the ebb has a velocity of 4 knots, and the flood about 3 knots. This passage should be attempted only at slack water.

South Passage, south of Liesnoi Island, is reduced by sunken rocks at its narrowest part to a width of 70 yards, has a sharp turn and strong tidal currents, and should not be attempted except at slack water and with local knowledge. The rocks are marked by kelp, which, however, does not show when the current is running. In northerly winds, an indifferent anchorage may be had in the entrance to South Passage in 7 fathoms, with the southeast side of Liesnoi Island bearing 082°, and Point Napean and **Sharp Point** in line, bearing 189°.

Enter Eliza Harbor through North Passage and at slack water. Keep 0.5 mile or more offshore until Woewodski Harbor is well open. Stand in between Liesnoi Island and Deepwater Point, keeping the eastern shore aboard at a distance of about 400 yards on a **003°** course, with Bluff Point ahead, until North Passage is opened north of Polivnoi Rocks. Then haul gradually westward, pass midway between the rocks and the north shore and keep the north shore of North Passage close aboard. There is not less than 6 fathoms in the passage, which was carefully examined. When through the passage, haul southward and anchor in mid-channel in 18 to 20 fathoms, bottom soft in places, at two-thirds the distance toward **Thumb Point,** the southwestern extremity of Liesnoi Island.

Chart 8242.—Chapin Bay is a small inlet on the north side of Frederick Sound, on the southwest side of Point Napean. Its total length is 2.5 miles, width at entrance 1 mile, contracting to 250 yards halfway to its head, and above this expanding into a basin 1.2 miles by 0.5 mile, affording secure anchorage in 9 to 11 fathoms, sandy bottom. From the south point at the entrance a reef extends 0.6 mile northeastward, terminating in a ledge, reported bare at low water, lying in the middle of the entrance, the whole well marked by kelp. A ledge, bare at half tide, is 330 yards from the north point at the entrance, and kelp shows about 400 yards southward of the ledge. There is also kelp in the middle of the channel, about 0.8 mile inside the entrance, and a shoal extends 150 yards eastward from the point on the southern side to the entrance to the narrows.

It is safest to enter Chapin Bay at low water. Enter about 400 yards southwestward of the half-tide ledge off the north point at the entrance on a **324°** course and keep the north shore aboard at a distance of 200 yards until in the narrows, when a mid-channel course leads safely to the anchorage.

Herring Bay, 6 miles northeastward of Carroll Island, is about 2 miles long and about 2 miles in width between **Point Brightman** and the point to the northward which separates the bay from Chapin Bay. A tongue of land, prolonged by rocks, reefs, and

kelp patches, extends in a southeasterly direction from the western shore of the bay, dividing it centrally into two parts.

A rock, awash at a minus 1-foot tide, has been reported near the middle of the entrance to Herring Bay about 1,700 yards 054° from Point Brightman.

There is a fair anchorage in the southwest corner of the bay, about 0.8 mile from the head, but it is open southeast. To make the anchorage, follow the south shore at a distance of about 0.4 mile, course 293°, and anchor 0.5 to 0.8 mile from the head in 5 to 10 fathoms.

Chart 8252.—Carroll Island, a small island about 5.5 miles westward of Point Brightman, is conspicuous, but it appears as a point of the main shore.

Walker Point, 2.3 miles westward of Carroll Island, is the end of a low wooded peninsula separating Murder Cove from a foul bight eastward of it. Ledges and kelp surround the point to a distance of 0.2 mile.

Bartlett Point is the end of a long, low wooded strip separating Murder Cove from Surprise Harbor; the end of the point is two wooded islands, joined by dry ledges. A bare ledge extends 300 yards southward, and foul ground marked by kelp extends 0.5 mile southeast and southwestward of the point, also over half-way across Surprise Harbor.

Chart 8242.—Murder Cove.—This body of water has its entrance between Bartlett Point and Walker Point, 2 miles eastward of Point Gardner. The cove is about 0.8 mile wide between Walker and Bartlett Points. At 0.4 mile inside the entrance, the channel contracts to 300 yards between a bare ledge on the east and two rocks, each with a clump of scrub, on the west. Above this the channel has a width of about 200 yards between kelp-marked ledges, and it is best to enter at low water when the dangers show. A daybeacon marks the east side of the channel about 0.6 mile above the light. The tide rips are sometimes heavy across the entrance when the wind is strong against the current.

Murder Cove Light, 25 feet above water and visible 9 miles, is shown from a white wooden house on the bare ledge on the eastern side of the cove.

Tyee is a post office, cannery, and fishing station on the east side of Murder Cove about 1.2 miles northward of Walker Point. The cannery wharf has a face 150 feet long with depths alongside ranging from 25 at the south end to 22 feet at the north end. Vessels usually make a port landing. An electric-driven crane of 1-ton capacity is on the wharf. Fresh water can be obtained through a pipeline. It is reported that severe southwesterly weather causes a light swell at the wharf. The oil wharf, about 100 yards south of the cannery wharf, has a depth of 20 feet alongside. The cannery maintains a general store and radio station during the season. There is a small machine shop. Diesel oil, fuel oil, and gasoline are stored for cannery use. Mail and passenger planes and boats call on regular schedule.

The head of the cove is filled by a flat which comes down nearly to the wharf. Good anchorage for a small vessel is in mid-channel 150 to 200 yards westward of the wharf, in 8 to 11 fathoms.

Enter about midway between Bartlett Point and Walker Point on a 358° course, heading to pass midway between Murder Cove Light, on the east and a rock with a clump of scrub on the west. About 225 yards northward of the light is a dangerous ledge which must be avoided. Pass the light on the above course at a distance of 200 yards

and when the light is on the starboard quarter, steer **018°**, keeping in mid-channel as defined by the ledges and kelp. Pass about 100 yards westward of the beacon.

Point Gardner, the south extremity of Admiralty Island, is long, low and wooded, and has two rocks 20 to 30 feet high 600 yards southward of the point. Point Gardner Light, 65 feet above water and visible 9 miles, is shown from a white wooden house on a steel tower; it marks the westerly of these two rocks. A prominent mound 400 feet high is 0.2 mile back from the point and 1.3 miles from the point is a conspicuous round hill 800 feet high. The elevation reaches 1,000 feet about 2.5 miles back from the point. The water is clear 0.2 mile from the rocks off the point, but the rocks should be given a berth of 0.5 mile to avoid tide rips frequently encountered there.

Surprise Harbor, on the east side of Point Gardner, is about 1.2 miles wide and 2 miles long, open southward, has much kelp and is not a good anchorage. It is, however, a good lee when the wind is blowing strong down Chatham Strait. A kelp patch extends over half way across the entrance from Bartlett Point.

To enter, stand in on about a **020°** course, keeping from 0.2 to 0.5 mile from the west shore, using caution and avoiding kelp. Anchor about mid-harbor in 7 fathoms, rocky bottom.

Chart 8252.—Yasha Island, lying about 3.5 miles southeastward of Point Gardner, is small, low, wooded, and surrounded by kelp to a distance of 200 yards. There is a sunken rock with a depth of 2½ fathoms over it, lying 0.5 mile, 289° from the north point of this island. Another rock with a depth of 1¾ fathoms over it lies about 1 mile, 318° from the same point. A buoy marks the northwest side of the second rock.

Heavy tide rips will be found between Yasha Island and the buoy. These tide rips sometimes extend clear across to Point Gardner and along that shore eastward as far as Carroll Island, in a manner dangerous to small boats.

Chatham Strait is described in Chapter 11.

CHAPTER 9

Stephens Passage

Chart 8002

STEPHENS PASSAGE extends from its junction with Frederick Sound at Cape Fanshaw in a general north-northwesterly direction for 88 miles to Shelter Island which divides it into two channels, Saginaw Channel and Favorite Channel, which connect it with Lynn Canal. Numerous islands lie in both entrances to the passage, but otherwise it is open, deep, and generally free from dangers. The entire passage as well as Gambier Bay, Gastineau Channel, and part of Port Snettisham have been examined by means of a wire drag and all dangers in these areas are shown on the charts.

Anchorages.—The waters of Stephens Passage and its branches are generally deep and there are few good anchorages. Anchorage can be had in Cleveland Passage, Gambier Bay, Seymour Canal, Taku Harbor, Gastineau Channel, Young Bay, Fritz Cove, Barlow Cove, Tee Harbor, and Eagle Harbor. Temporary anchorage can also be found in Port Houghton, Hobart Bay, Sanford Cove (Endicott Arm), Limestone Inlet, Taku Inlet, and Adams Anchorage.

Settlements.—There are few settlements in this section except for the towns of Juneau and Douglas and the post office of Thane on Gastineau Channel. There are a post office and cannery at Taku Harbor, a post office at Speel River, Port Snettisham, a post office and small mining camp in Windham Bay, and post offices but no settlements at Sumdum and Cape Fanshaw. The only canneries in operation are at Taku Harbor and Douglas.

Weather.—The prevailing winds are southeasterly throughout the year. During the winter months the winds are more variable and winds from the northeast quarter may prevail, particularly in January. Southeast gales may occur at any season but they are more frequent and more severe in winter than summer. **Fog** may occur at any time but is more frequent during the winter months, reaching its maximum in January. The least fog occurs during April to July, inclusive, the minimum being in May.

Ice is discharged from glaciers in Tracy and Endicott Arms and is always found in Holkham Bay, and is prevalent in Stephens Passage off the entrance to that bay. Taku Glacier discharges an enormous quantity of ice into Taku Inlet, and this ice finds its way into Stephens Passage off the entrance to the inlet. Occasional pieces of ice may be expected in all parts of the passage. In daytime with clear weather it is not a serious menace to navigation, but is dangerous at night or in thick weather.

Currents.—The flood current enters Stephens Passage from both ends and meets in varying places westward of Point Arden; the ebb current flows in the opposite direction. The average velocity of the current at strength is 1 to 2 knots. In Saginaw Channel,

the current frequently ebbs throughout the day when the moon is in quadrature. The ebb current in this channel is considerably stronger than the flood. The currents have considerable velocity in the entrances to all the larger bays and inlets which make off from Stephens Passage, causing tide rips and swirls. The *Pacific Coast Current Tables* should be consulted for the predicted times of slack water and the velocities of the current at strength for a number of places in Stephens Passage.

Directions through Stephens Passage are given in Chapter 3.

Chart 8216.—Cape Fanshaw, on the easterly side at the junction of Stephens Passage and Frederick Sound, is a long, low wooded point terminating in a sand spit, with a large boulder at the extreme end and deep water within 0.2 mile.

Cape Fanshaw Light, 41 feet above water and visible 9 miles, is shown from a white wooden house on a skeleton structure. The light is obscured from 210° to 229°.

Fanshaw Bay, on the northwest side of Cape Fanshaw, is over 1 mile wide at its entrance between the cape and Storm Islands, and 2.2 miles long to Whitney Island. The bay is connected with Cleveland Passage by South Passage. Anchorage can be made in the southeast side at the head of the bay, about 600 yards offshore and 0.5 mile southwestward of Whitney Island in 12 to 15 fathoms, bottom sand and shells, sheltered from northeasterly and southeasterly winds.

Storm Islands, about 1.5 miles northward of Cape Fanshaw, consist of a wooded island and several rocks, the southernmost of which, **Bird Rock,** is 22 feet high and grass-covered. Bird Island Daybeacon is on the southwest side of the rock. A shelving ledge extends 0.1 mile westward of Bird Rock. A grass-covered rock, 30 feet high, is between the larger Storm Island and Bird Rock. There is no safe passage through the Storm Islands and adjoining rocks, and the passage between Storm Islands and Whitney Island is narrowed to 0.5 mile by a ledge bare at low water 0.2 mile northeastward of the north end of the larger island.

Whitney Island, 405 feet high and wooded, forms the northeastern shore of Fanshaw Bay and the western shore of Cleveland Passage. The buildings of a fox farm are in the bight in the eastern shore westward of West Spit. **Duck Point**, the southern point of the island, and **Bill Point**, the northern point, are marked by lights. Bill Point Light, 12 feet above water and visible 8 miles, is shown from a white wooden house; it is obscured from 264° to 338°. Duck Point Light, 17 feet above water and visible 6 miles, is shown from a white wooden house; it is obscured from 140° to 257°.

Cleveland Passage, separating Whitney Island from the mainland, is 0.5 mile wide and affords good anchorage near its southeast end. The depths vary from 8 fathoms at its southeast end to over 70 fathoms at the northwest end. The anchorage is about 0.8 mile northward of the narrowest part of South Passage, favoring the eastern shore, in 12 to 20 fathoms, soft bottom, care being taken to keep clear of East Spit. Small craft find anchorage in 4 to 8 fathoms east and north of East Spit. Winds from west to north bring in a slight swell but do not seem to blow home with any force. Winds from southeast, however, blow down from the mountains with great force during the southeast blows in Frederick Sound.

A rock with a least depth of 1¼ fathoms at low water has been reported as lying 1,880 yards 007° from Duck Point Light; it is about 225 yards off the eastern shore of Whitney Island.

The entrance from northwest is much the safer, as from it a mid-channel course leads safely to the anchorage. **South Passage** is 400 yards wide but is narrowed to 200 yards by sand spits, with a mid-channel depth of 11 fathoms. At the north end of South Passage are **East** and **West Spits,** projecting northward, the former 0.2 mile, into the southeast end of Cleveland Passage. A buoy marks West Spit.

Small boats find anchorage between Duck Point and the mainland in 12 fathoms, and in the bight eastward of East Spit in 8 fathoms.

The **tidal currents** have a velocity of 1 to 2 knots in South Passage.

Fanshaw is a fishing village and post office on the east side of the South Passage.

Steamboat Bay is 1 mile northward of Whitney Island and has Foot Island on its northern side. **McNairy Point** is the south point and **Fort Point** the north point at the entrance. This bay has 22 fathoms of water, and with the near proximity of Cleveland Passage has no advantage as an anchorage. **Foot Island** is connected by a sand spit with the small islet at the head of the bay. The narrow passage on the north side of Foot Island might afford shelter to small craft in 7 to 10 fathoms abreast the middle of the island.

Chart 8201.—The Five Fingers, about 6 miles north-northwestward of Cape Fanshaw, are a group of islets, the larger ones wooded, and ledges extending 3 miles in a northwesterly direction and 1.5 miles wide. The southeasterly Five Finger is marked by a light, fog signal, and radiobeacon. A reef, covered at high water, extends 300 yards southwestward from it.

Five Fingers Light, 81 feet above water and visible 15 miles, is shown from a white concrete tower rising from the center of a building. The fog signal is an air diaphone. The radiobeacon is synchronized for distance finding.

Akusha Island, the northerly island of the group, and the largest, is about 245 feet high; rocks lie about 1 mile to the westward. Deep-water channels are on all sides of the group. These areas have been wire dragged and all dangers are charted.

Sail Island, about 5 miles northwestward of Five Finger Islands Light, is about 0.5 mile long, 100 yards wide, 308 feet high, wooded, and has two hummocks with low land between. It is conspicuous when approaching from the northward. At the southern end are two small islets and a rock awash.

The Brothers, marked on the eastern side by a light, and Round Rock, marked by a light, are described in Chapter 8.

False Point Pybus is about 5 miles northeastward of Point Pybus. A daybeacon marks the point 1 mile to the southward of False Point Pybus. The center of a rock pile, baring 10 feet at low water, is 810 yards 350° from the point 1 mile northward of False Point Pybus.

Point Walpole is the western extremity of the western wooded islet, 213 feet high, on the south side of the entrance to Port Houghton. The shores of the bight to the southeastward are foul.

Port Houghton, about 9 miles above Cape Fanshaw, is an extensive bay, 4 miles wide at its entrance and 12 miles long in an easterly direction. **Roberts Islands** are a group of islands forming the south points at the entrance; the largest island is 322 feet high. The waters of Port Houghton are very deep, and it affords no shelter for large craft. A good small-craft anchorage may be found in the long narrow arm southeast of **Walter Island** in 8 fathoms, soft bottom. This is a good winter anchorage if ice does not bother.

A mid-channel course into it is clear. The proximity of Cleveland Passage makes it unnecessary to use Port Houghton for anchorage except in winter.

McDonald Rock lies in the broad part of Stephens Passage, about 8.8 miles northward of Five Finger Light; it is small, has 3½ fathoms over it with deep water close-to, and is marked by a buoy on its northern side. The range of the southeast tangent of The Brothers over the middle of Sail Island crosses this dangerous rock, which is almost directly in the track of vessels from Cape Fanshaw through Stephens Passage.

Chart 8218.—The Twins are two wooded islets, 226 and 239 feet high, about 9.8 miles north-northwestward of Five Finger Light and off the entrance to Hobart Bay.

Hobart Bay, on the north side of **Point Hobart,** has its entrance about 14 miles northward of Cape Fanshaw and 3 miles eastward of The Twins. It is about 1.8 miles wide at its entrance and extends about 6 miles in a general easterly and northeasterly direction. Off the south point at its entrance a ledge, bare at low water and marked by kelp, extends 0.5 mile offshore from an islet. The waters of Hobart Bay are deep.

Entrance Islet, 458 feet high, lies in the entrance to Hobart Bay. In the small cove on the southern shore of the islet is anchored a float maintained by the Territory. There is good shelter for small craft at the float. The mail boat from Juneau calls here regularly.

A rock with about 1 fathom over it at mean lower low water has been reported in the basin 2,150 yards, 222° from the northwest point of Entrance Islet.

About 0.5 mile northeastward of Entrance Islet, projecting points narrow the bay to about 0.2 mile; between the points is a bar with a depth of 5½ fathoms on which are several rocks which bare at lowest tide. On the northwest side, just within the inner points, a narrow arm leads northwestward to an inner basin about 0.3 mile in diameter, where a contracted anchorage in 10 fathoms may be found. To enter this basin, pass northward of Entrance Islet and close northward of the rocky islets inside the entrance to the basin.

The channel leading to the basin at the head of the bay is very narrow, and heavy overfalls, dangerous for small craft, are experienced at the ends of the narrow passage except during a short period at slack water. At present no information is available relative to the time of slack water.

Temporary anchorage has been found in 27 fathoms, soft bottom, eastward of Entrance Island, with the north point of the entrance to Hobart Bay in range with the south shore of the small island northward of Entrance Island.

Temporary anchorage has been found in the bight to the southeastward of Entrance Island in 17 fathoms, soft bottom, about 0.2 mile from a fine sand beach. The north tangent of the eastern of The Twins just shuts in the south tangent of the western of The Twins.

The foregoing information relative to anchorages has been obtained from a source considered reliable. The following was also submitted: "In entering the southern anchorage favor the shore of Entrance Island, keeping northward of the range mentioned. The shoreline of the south shore is considerably in error. A ledge makes out about 160 yards from the point on the south shore."

Caution.—The chart of Hobart Bay is based on a reconnaissance survey. Other dangers in addition to those charted probably exist.

Sunset Island, a large rounded islet 400 feet high, lies about 4 miles to the northward of The Twins and to the southward of the entrance to Windham Bay. A reef, awash,

is about 50 yards from the south shore, and a rock, awash at low water, is about 225 yards off the eastern point of the island.

Windham Bay, on the southwest side of **Point Windham,** has its entrance about 17 miles northward of Five Finger Light. In the middle of the entrance is a small group of wooded islets, with a deep passage on either side; the largest islet has trees about 100 feet high. Reefs extend about 400 yards eastward of the islands. Close to the northwest point at the entrance is another small group of islets. The northernmost islet has trees about 60 feet high, and the islet southward of it has shrubs about 10 feet high. Windham Bay Entrance Light, shown from a white wooden house, about 0.6 mile eastward of Point Windham, is 35 feet above water.

Point Windham bearing N by W, distant 5 miles

(Original Sketch made before 1883)

From its 1.5-miles-wide entrance, Windham Bay narrows rapidly to 200 yards in width, and connects with a deep inner basin nearly 4 miles long and 0.5 mile wide. This narrow channel is further constricted to 100 yards by a ledge on its north side, bare at low water. From the point on the south shore southeastward of the ledge, a spur bare at low water extends about 20 yards.

The southern point is marked by Windham Bay Narrows Light, 12 feet above water and shown from a white wooden house. The depth in the channel is 7 fathoms. A small islet, with trees about 25 feet high, is close to the southern shore about 1.2 miles southwest from the light. Another small islet, with trees about 30 feet high, is close to the north shore about 0.6 mile westward from the light.

An extensive flat extends from the southeast side at the head, leaving a passage about 0.2 mile wide close to the north shore up to **Windham,** where there is a post office, but no store. Supplies are obtained from Juneau, from which place there is a weekly mail service by launch. There is no wharf, but a float about 30 feet square is anchored just north of the sand spit in deep water.

There are several gold prospects in the vicinity, and a log road extends about 2 miles from the town site to one of the prospects. **Chuck River,** entering the head of the bay, is said to be navigable in a pulling boat for about 8 miles. During the winter the head of the bay to the narrows may be frozen over. A trail maintained by the Forest Service extends from the **Narrows** along the south shore and up the river to a crossing and thence to Windham. Mail is carried from the Narrows over this trail during the winter freeze-up.

Indifferent anchorage, in about 20 fathoms, may be had at Windham northwestward of the flat. There is contracted anchorage in the cove just eastward of the south point of the entrance to the bay in 25 fathoms. Small craft anchor closer in.

A fog bank of varying density frequently hangs over Windham Bay from the narrows well up toward the head, especially at night.

Windham Bay and its approaches are clear. In passing through the narrow neck, great care should be exercised and the south shore kept aboard at a distance of about 50 yards.

Chart 8201.—Point League, about 5 miles northwestward from Point Windham, is a gently rounding precipitous point. The cliff, about 30 feet high, is whitish. The point rises rapidly to a lofty mountain with partially bare slopes. **Point Lookout** is about 2 miles northward of Point League and is hummocky and timbered.

Anchorage has been obtained in the cove between Point League and Point Lookout by a vessel 150 feet in length in 15 fathoms close to the entrance near the north shore, but is not recommended. It is exposed to southwesterly winds and is restricted by a shoal making out from the south shore and shoal water inside the cove.

Thistle Ledge, covered at high water and marked by kelp, lies about 0.6 mile from the eastern shore of Stephens Passage about 1 mile northward from Point Lookout and 3 miles to the southward of Point Astley. Between Thistle Ledge and Point Astley, the shore is more or less foul; nearly 0.2 mile westward of Point Astley is a bare reef, and 0.9 mile southward of the point is a small islet.

Chart 8224.—Gambier Bay has its entrance on the western side of Stephens Passage, about 8 miles northward of The Brothers Light. There are numerous islands and ledges in the entrance, but with the aid of the chart and the directions it can be readily entered in the daytime.

Point Gambier, the northern point at the entrance to Gambier Bay, is the southeastern end of **Gambier Island.** A rock, awash at low water and marked by kelp, lies nearly 0.4 mile southward from the point. A large shoal with three rocks which bare on its western end lies 1.8 miles northward of Point Gambier.

Point Gambier Light, shown from a white wooden house, is 38 feet above water and visible 9 miles. The light is obscured from 083° to 217°.

The bay is irregular in shape and is divided into two parts by a chain of narrow islands and reefs. The outer bay, extending from Point Gambier about 7 miles in a north-northwesterly direction, is about 2 miles wide at the entrance; its northern end is an inlet about 3 miles long and 300 to 700 yards wide, with 15 to 20 fathoms, soft bottom, affording anchorage. Anchorage in 6 to 16 fathoms, mud bottom, can be had northward of **Good Island.** It can be approached without difficulty, but care should be taken to avoid the foul ground extending off the northwest point of the island.

Romp Island is about 0.4 mile northwestward of Gambier Island, with ledges between.

The chain of islands and reefs, including Chapel and Price Islands, paralleling Gain Island and the mainland at Church Point, divides the outer part of the bay into two passages. The fairly straight narrow channel to the westward of this chain has been examined with the wire drag and is considered the better approach to the inner parts of the bay. In navigating this passage care should be taken to avoid the rocks, baring 13 feet at low water, which extend 165 yards out from the point 0.6 mile southward of **Church Point.**

Price Island is 600 yards from the west shore of the outer bay. Ledges with two bare heads extend 0.6 mile southeast of the island. A 5-fathom spot lies 1 mile, 133° from the south end of Price Island, with deep water between it and the ledge. A large, conspicuous, gray boulder on the southern ledge is a good landmark.

About 0.8 mile northward of Price Island is **Chapel Island**, of small extent. Ledges with bare heads lie between these islands. A rock, bare at low water and marked by a buoy, lies 0.4 mile eastward of Chapel Island. Ledges extend about 0.9 mile northwestward from the northwest point of Chapel Island to a channel about 450 yards wide. A buoy moored in 9 fathoms marks the southeast side of the channel, and the reef on the northwestern side of the channel is marked by Gambier Bay Entrance Light, 22 feet above water and visible 6 miles, shown from a white slatted tower with a concrete base.

Tree Island appears as a clump of trees just northward of **Gain Island.** At low water Tree Island appears at the end of a spit off Gain Island—in reality a part of Gain Island.

The inner bay is clear except for two pinnacle rocks, with 2½ and 2 fathoms over them, which lie 710 yards and 1,120 yards respectively northwestward of Tree Island. The northern rock is marked by a buoy.

Ruins mark the site of the cannery formerly located in the bight 2 miles northwestward of Gain Island.

Snug Cove, on the south side of the inner bay, has anchorage in 15 to 20 fathoms, soft bottom. Small craft find good protection here in 4 to 7 fathoms. Large vessels reach the cove by following the channel east of but close to Church Point and Gain Island, rounding the buoy on the 2-fathom shoal and passing between **Muse** and Gain **Islands.** Small craft can use the channel between Gain Island and Church Point, but rocks (found with the wire drag) close this passage to large vessels.

Tidal currents have a maximum velocity of about 3 knots in the passage between Church Point and Gain Island, and some swirls occur around the ledges eastward and northward of Gain Island.

Directions.—To enter between Point Gambier and Price Island and avoid the rock off Chapel Island, round Point Gambier at a distance of about 1.5 miles until mid-channel is well opened up and then steer **334°**, heading for a prominent rounded hill which appears as an island but which is the long, bold point at the long inlet viewed endwise. On this course a similar appearing hill, but flat-topped and somewhat higher, appears to the right. Continue on this course until abeam the southeast tangent of Romp Island.

Then steer **302°**, heading for the light, until abeam of buoy marking the south side of the channel. Pass between the light and the buoy, heading for Tree Island, and then stand up along the shore of the unnamed island to the northwestward of Gain Island at a distance of 200 to 250 yards.

Pass 150 yards northward of the buoy marking the 2-fathom pinnacle rock.

If using the western channel and coming from the southward, pass to westward of the 5-fathom spot which lies 1 mile 133° from Price Island; pass in mid-channel between the bare ledge, southward of Price Island, and the western shore and follow a mid-channel course through the narrow passage westward of Price and Chapel Islands, then follow the east shore of Gain Island and the large island northwestward of it at a distance of 200 to 250 yards. Pass 150 yards eastward of the buoy marking the 2-fathom pinnacle rock 0.6 mile northwestward of Tree Island.

Chart 8201.—**Seymour Canal** has its entrance westward of Point Hugh. It extends in a northwesterly direction into Admiralty Island for 35 miles, with an average width of about 2 miles. The upper part of the canal (Chart 8202), to a distance of 20 miles from its head, is filled with islands, ledges and rocks. **Tiedeman Island,** 15 miles above Point Hugh, divides the canal for a distance of 8 miles, and above Tiedeman Island is another large island called Swan Island. The waters of the canal are, in general, deep, and passing eastward of Tiedeman and Swan Islands, the canal may be navigated to its head, though above the former island the passage is narrow and somewhat intricate. In the upper part of the canal the depths are moderate, and anchorage can be selected in places for which the chart is the guide. The extreme head of the canal is separated by a portage of less than 0.5 mile from Oliver Inlet.

Point Hugh is the southern extremity of **Glass Peninsula,** a long, narrow, and moderately high strip of land, which separates Seymour Canal from Stephens Passage. Rocks, awash, lie about 400 yards off the point.

Chart 8228.—**Pleasant Bay** is a small cove on the western side of the Seymour Canal, 6.5 miles above Point Hugh, which affords anchorage for small craft. Two islets are in its entrance. The channel between the two islets is obstructed by a dangerous rock. It is reported that a reef extends about 200 yards northward from the northwestern islet. The best channel to enter is said to be between this reef and the very prominent point of broken rock resembling a breakwater on the northwestern side of the entrance. This breakwater reef shows prominently at all stages of the tide. The channel is about 75 to 100 feet from the point of the breakwater reef. Anchor in 6 fathoms about 300 yards southward of the northwestern islet. The bottom here is apparently a thin layer of mud on rock which makes poor holding ground in heavy southerly weather. A spit extends about 125 yards southward of the islet.

The edge of the flat which fills the head of the cove, extends within 0.2 mile of the islet. At low water, the head of the bay bares except for a pool just westward of the small point which projects from the west shore. Small craft can pass into this pool at high water and have sufficient depth and swinging room for one or two boats at low water. This is an excellent shelter in north winds. A spring is in the little bight near this pool and fresh water can be readily obtained.

Mole Harbor, on the western shore of the canal about 9 miles above Point Hugh, is about 2 miles long and nearly a mile wide with a greatest depth of 25 fathoms. A flat extends about 0.6 mile from the head of the harbor with deep water close to its edge. Near the middle of the entrance is **Beacon Rock,** small and bare, and another bare rock is about 200 yards westward of it. The ground is foul between Beacon Rock and the southern point at the entrance. A small bare rock, **Rasp Ledge,** is 0.2 mile northeastward of **Flaw Point,** the northern point at the entrance. At low water, all dangers show. Enter midway between Beacon Rock and Rasp Ledge and anchor in 13 to 17 fathoms, sticky bottom, about 1 mile within the harbor, giving the shores a berth of about 0.2 mile. Small craft find anchorage southwest of Beacon Rock in 3 to 10 fathoms, mud bottom.

Chart 8202.—A rock awash at low water and surrounded by an extensive bed of kelp is 1 mile southward of the southeast end of Tiedeman Island.

Short Finger Bay is a small bay on the eastern shore of Seymour Canal, directly east of Faust Island. Good shelter from southerly weather and anchorage in 5 to 10 fathoms, mud bottom, can be had here.

Dorn, Faust, and **Bug Islands** are small, wooded islands in the eastern part of the canal. **Winning Cove** is a shallow inlet in the eastern shore of the canal, opposite Tiedeman Island, and is of no importance.

Chart 8228.—Windfall Harbor is on the western shore of Seymour Canal abreast the northwest end of Tiedeman Island. A large and high island, **Windfall Island,** is in the middle of the entrance. The harbor is about 4 miles long and about 0.8 mile wide. A flat extends about 0.8 mile from its head, and a long bight on its western shore 1.5 to 2.8 miles southward of Windfall Island is also dry at low water. The entrance is southeast of Windfall Island, between **Late** and **Staunch Points,** the passage on the northwest side being foul. The mid-channel soundings in the harbor range from 12 to 16 fathoms.

On the western shore near the head of the harbor is a trail marker and shelter cabin. A trail, maintained by the Forest Service, starts near the cabin and extends inland 9 miles to **Lake Hassellborg.** There are two cabins on the shore of the lake.

On the shoreline west of the north end of Windfall Island is a trail marker indicating the beginning of a trail maintained by the Forest Service, running 1 mile inland to a bear-observation sheltered platform.

Windfall Harbor should be approached only by the channel westward of Tiedeman Island, which is about 0.8 mile wide. In using this passage keep in mid-channel, except at a point 2 miles above the southeast end of the island, where the western shore, which is bold, should be kept best aboard to avoid a patch of rocks about 600 yards off the eastern shore. Enter the harbor southeastward of Windfall Island, and anchor anywhere in 15 to 17 fathoms, sticky bottom, preferably near the southeastern shore.

Chart 8202.—King Salmon Bay, on the western side of the canal near its head, affords anchorage but the approach is difficult. A least found depth of 3 fathoms is in the narrow approach channel westward of King Salmon Bay. The Fish and Wildlife Service patrol vessel *Brant* reported grounding on a gravel bar extending 100 yards westward from the end of the long point forming the west side of the bay.

Point Hugh Light, 38 feet above water and visible 9 miles, is shown from a white horizontally-slatted tripod on the point 2.9 miles northward of Point Hugh. The light is obscured from 351½° to 173°. About 1.2 miles southward of the light, rocks extend offshore about 400 yards.

Midway Point, about 10 miles northward of Point Hugh, is distinguishable from seaward and made prominent by a white rocky cliff about 30 feet high, backed by a round grassy knoll.

Point Glass, about 4.5 miles northward of Midway Point, is an indefinite point. The shore is steep and rocky. Rocks covered at half tide lie about 0.2 mile offshore, 0.9 mile southward from the point. A rock, awash at half tide, lies 0.3 mile southward of the point about 100 yards offshore.

Holkham Bay is an inlet, with two extensive arms, which lies on the eastern side of Stephens Passage about 28 miles northward of the Five Fingers Light. The water in both arms is very deep, in some place more than 200 fathoms. The tidal currents have considerable velocity in the entrance to the arms and there is at times floating ice which

makes navigation somewhat hazardous. In both arms the shores are steep and high. **Point Astley** is the southern and **Point Coke** the northern point at the entrance.

A cove about 0.2 mile in extent, close under the eastern side of Point Coke, might afford a lee and anchorage for small craft with heavy northwest winds blowing down Stephens Passage.

An anchorage with shelter from southeast winds may be had in the southern bight between Point Astley and Wood Spit, in 20 to 30 fathoms, hard bottom.

Harbor Island, in the middle just within the entrance to Holkham Bay, is high and wooded. Eastward of it, within 0.5 mile, is a group of five small islets; the small southeasternmost islet is named **Round Island.** There is a safe passage through the group just south of Harbor Island. The small bight on the south side of Harbor Island, at the head of which is an abandoned fox farm, affords safe anchorage from northerly weather for small craft in 2 to 8 fathoms, hard bottom. On the north side of Harbor Island, the passage between the islets and the projecting shoals from the mainland is about 0.8 mile wide, with depths of not less than 23 fathoms in mid-channel. At low water, both shores are steep-to.

Wood Spit is a long narrow spit extending nearly 0.8 mile in a northerly direction from the southern point at the entrance to Endicott Arm. At high water it shows as an island about 20 feet high with three trees. Two rocky spits, bare at low water, lie about 0.2 mile northward of this island, and are marked by Wood Spit Light, 27 feet above water and visible 9 miles, which is shown from a white house on a skeleton tower on a concrete base.

On the east side of the long, low, wooded point of the mainland eastward of Harbor Island is an extensive flat with boulder patches, bare at low water. **Sand Spit,** a small islet, stands on the southeastern edge of the flat; from it, a flat that covers at all stages of the tide, extends nearly 1 mile southwestward, on which are two rocks bare at low water, and lying 0.4 and 0.8 mile from Sand Spit. Between the end of this flat and Wood Spit, the channel is 0.5 mile wide, with not less than 13 fathoms, leading into Endicott Arm. The edges of both shoals are steep-to.

Endicott Arm, the southern arm of Holkham Bay, is 25 miles long in a southeasterly direction, with a width of 3 miles below Sumdum Island and narrowing to less than 1 mile at its head. In mid-channel of the arm, abreast Sanford Cove, is **Sumdum Island,** about 1.2 miles long, and midway between it and the northeastern shore are two small islets named **Bushy Islands.** At the head of the arm are the **Dawes Glaciers,** extending to the water's edge.

Fords Terror is a narrow inlet having a length of 5 miles in a northerly direction; its entrance is on the northern side of Endicott Arm 10 miles southeastward of Sumdum Island. The narrowest part of this inlet is but 100 yards wide, and through it the tidal currents rush with great velocity. Fords Terror has magnificent scenery. The entrance, except at slack water, is somewhat dangerous. **Brown Glacier** is reported to have receded, and the shoreline is about 0.5 mile eastward of the former charted position of the edge of the glacier. Fragments of ice, however, float down a small stream at the head of the arm.

Sanford Cove, on the southern shore of Endicott Arm 5 miles within the entrance, is the only available anchorage; it has a depth of 35 fathoms, and is protected except from northerly winds. A flat extends out 300 yards in the southern part of the cove. An occasional piece of ice drifts into the cove, but it is not dangerous to vessels at anchor. **Sumdum** is a post office on the southeast side of the cove. Some mining has been done here.

Ice is discharged by glaciers in both Tracy and Endicott Arms, and is always present in Holkham Bay, sometimes in large quantities, and is prevalent in Stephens Passage off the entrance to the bay in greater or smaller quantities. This ice is dangerous at night or in thick weather, and in entering Tracy or Endicott Arms care should be taken when near the ice, as the swirls are often dangerous.

The **tidal currents** have an estimated maximum velocity of 4 knots at the entrances to Tracy and Endicott Arms, forming swirls in these areas. Currents of much greater velocity are found in Fords Terror.

Directions, *Holkham Bay* and *Endicott Arm.*—In approaching from southward give the eastern shore of Stephens Passage a berth of 1 mile or more. From a position 0.8 to 1 mile northwestward of Point Astley steer for **Sumdum Glacier,** course **065°** and pass in mid-channel between Wood Spit Light and the Round Islet group.

When the southwest point of Harbor Island shows midway between Round Islet and the largest one of the group northward of it, bearing 291°, steer **111°**, keeping the range, which carries clear in mid-channel.

When the end of the long, low wooded point on the main shore eastward from Harbor Island bears 330°, steer **150°** which leads well clear of the northern end of Wood Spit, inside of which are no dangers.

In approaching from westward, pass about 0.5 mile southward of Point Coke and steer about **133°**, leaving Harbor Island 0.2 mile or more on the port hand. Follow around the south side of Harbor Island and the Round Islet group at 0.2 mile distance, pass between the latter and Wood Spit, and proceed as directed in the preceding paragraph.

Chart 8202.—Tracy Arm, the north arm of Holkham Bay, takes a general northerly direction for 9 miles and then turns eastward 13 miles to its head, where two large glaciers, North and South Sawyer, discharge into salt water. The arm is often clogged by small icebergs for several miles, and great care is needed in navigating the ice field. At times **South Sawyer Glacier** is very active, huge blocks of ice falling off its face into very deep water. These set up waves which have been observed as high as 25 feet; however, a small boat can ride the waves safely if it keeps a few miles distant from the glacier face and avoids getting packed in the ice flow. **North Sawyer Glacier** ordinarily is much less active. Tracy Arm, with its deep water and bold shores, is one of the outstanding fiords of Southeast Alaska.

The entrance to the arm is about 1 mile wide, but the navigable channel is restricted though not to the extent of making it unsafe to enter. The point of the rock shoal on the west side is marked by a buoy moored in 9 fathoms. The entrance between the buoy and the shoal water on the eastern side is 0.3 mile wide, the shoal on the eastern side being marked by heavy kelp beds in summer. Tide swirls will be met in the entrance except at slack water.

A deep-water anchorage with restricted swinging room is at the head of the large bight on the western side of the arm 6 miles from its entrance. **Directions.**—To enter Tracy Arm, pass northwestward of Harbor Island and steer **043°** with the northwest end of Harbor Island astern, passing the buoy about 0.15 mile distant on the port side.

Midway Islands lie 16 miles northward of Point Hugh and 2 miles off the eastern shore of Stephens Passage. The group consists of two small, sparsely wooded islets, about 60 feet high, with rocks awash at highest tides between them. A ledge extends about 0.2 mile southward from the southerly islet, the whole group forming an obstruction about

0.8 mile long, in a southerly direction, and 0.2 mile wide, with deep water close-to. The southeasterly islet is marked by Midway Islands Light, 73 feet above water and visible 9 miles, and shown from a white wooden tower and tank house. The light is obscured from 167° to 204°.

Midway Islands bearing SW by S, distant 1.5 miles

(Original sketch made before 1883)

Twin Point, a narrow point with steep rocky shores, the more northerly of two similar points, lies about 7 miles north-northwestward of Point Glass.

Station Point, about 6 miles to the northward of Twin Point, is wooded and rises to a knob 660 feet high, 1.5 miles from the shore. A small wooded islet 105 feet high, lies 300 yards off the point. The bight, about 0.5 mile to the southward of the islet, is used as a fair-weather anchorage by small craft.

South Island, about 2 miles southeastward from Station Point, about 0.3 mile long in an easterly direction, 175 yards wide, is 111 feet high and wooded. Reefs extend 50 to 100 yards from its shores and from the eastern end extend 0.2 mile to the eastward. Two small wooded islets lie close to the point to the southward of South Island. Anchorage in 14 fathoms, sticky bottom, has been made to the westward of South Island. In the bight to the southward of the small islets, small craft find fair-weather anchorage.

Chart 8227.—Port Snettisham has its entrance on the east side of Stephens Passage, about 7 miles northward of Midway Islands and 10 miles southeastward of Grand Island. It is 1.5 miles wide at the entrance, and has a northeasterly direction for 5 miles, narrowing somewhat, and then divides. The north arm is 7.5 miles long to the flat at the mouth of **Speel River** at its head. **Gilbert Bay,** the south arm, is 3.5 miles long to the flat which extends 1 mile from its head, above which is a low valley 3 miles long to Holkham Bay.

The port is entirely free from dangers, but there are large flats at the heads of all the arms. On account of the great depth, it is not suitable as an anchorage, though in case of necessity a vessel might anchor in about 20 fathoms at the head of either the north or south arm, close to the flats. Moderately heavy tide rips are sometimes found at the entrance.

Whiting River empties into the middle arm at the northeastern part of Gilbert Bay.

A poor but possible anchorage exists in the small cove west of **Mist Island** in 28 fathoms, sticky bottom. It is exposed to southerly winds and eddies during strong tides. Anchorage can be had directly across from Mist Island, on the southeast side in the small cove which has a cabin at its head, in 5 to 15 fathoms, hard bottom.

Local magnetic attraction.—A strong local magnetic attraction has been observed in the vicinity of **Sentinel Point,** the variation being east of normal to the westward of the point and west of normal to the eastward of the point. From the entrance to Port Snettisham to Mist Island, the variation is normal. One-half mile east of Mist Island the variation is about 5° east of normal and increases rapidly to more than 45° east of normal 0.2 mile south of Sentinel Point. About 0.5 mile eastward of the point the variation is about 5° west of normal.

Warning.—*A vessel entering Port Snettisham in mid-channel and steering a compass course selected without regard to the local disturbance would be led to ground about 0.2 mile southwestward of Sentinel Point.*

Chart 8229.—**Limestone Inlet,** 2 miles southeast of Taku Harbor, is a narrow arm 350 yards wide and 1.8 miles long in an easterly direction. The depths are 13 to 18 fathoms in the lower half of the inlet, and a small vessel may anchor anywhere in mid-channel, but the holding ground is not very good, and with the close proximity of Taku Harbor, vessels seldom find it necessary to enter. The upper half of the inlet is filled by a flat, most of which covers only at high water.

Taku Harbor, on the eastern shore of Stephens Passage 3 miles southeastward of Grand Island, is about 0.2 mile wide at the entrance between **Stockade** and **Grave Points.** In approaching from southward, its position is readily known by the projecting high land of Grave Point, and by the light on the point. The light, 45 feet above water and visible 9 miles, is shown from a red wooden house. The light is obscured from 156° to 280°. The harbor is about 0.5 mile long, a little less in width, and clear. A flat extends out 0.4 mile from the head of the harbor.

Enter Taku Harbor on a **030°** course, heading about midway between two conspicuous houses at the head of the harbor.

The anchorage is in about 13 fathoms, soft bottom, favoring the eastern shore. A slight eddy current in Taku Harbor from Stephens Passage is sometimes noticed on the flood and, with large tides, swirls are produced which cause a vessel to surge somewhat on her cables at times. The northerly winter winds from the interior draw through the valley back of the harbor with great force. In the winter these conditions, when at their severest, render the anchorage somewhat dangerous.

In Taku Harbor are abandoned cannery buildings and a large wharf which is in good condition; it has a 285-foot face with a depth of 25 feet at the southern corner shoaling to 20 feet at the center and 8 feet at the northern corner. The mail boat from Juneau calls once a week. A 1-ton crane is on the wharf. In 1951 the cannery buildings were being removed.

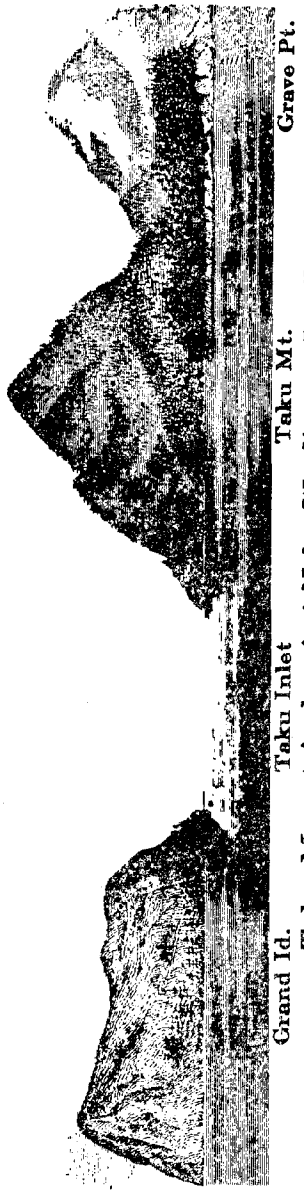
Slocum Inlet lies on the eastern shore of Stephens Passage, 2.5 miles northeastward of Grand Island. It is a little more than 1 mile long and less than 0.5 mile wide, but is nearly filled with flats. The water is deep close to the flats, and it does not afford convenient anchorage.

Circle Point, the southern point of the entrance to Slocum Inlet, rises to **Butler Peak,** a prominent conical peak 1,060 feet high. The southern slope of the hill has been burned over.

Chart 8202.—**Grand Island** is in the middle of Stephens Passage, 17 miles northwestward of Midway Islands and 4 miles southward of Point Arden. It is 2 miles long, 1 mile wide, and 1,510 feet high, with three knolls; it rises abruptly from deep water. A good channel is on each side of the island, the eastward one being favored generally.

Grand Island Light, 47 feet above the water and visible 7 miles, is shown from a small red house on the north point of the island. The light is obscured from 335° to 116°.

Cove Point, on the west side of Stephens Passage, about 1.8 miles northwestward of Grand Island, rises to a timbered knob 575 feet high, with a depression between it and a 1,500-foot ridge to the northwestward. Two rocks are close to the south shore



Taku Mountain bearing N by W, distant 5 miles

(Original sketch made before 1883)

of the point. The outer rock bares at all tides; the inner rock shows at ¾ tide. **Doty Cove,** to the southward of Cove Point, is deep. Flats at the head of the cove drop off rapidly to 20 fathoms.

Point Arden is a rocky bluff on the westerly side of Stephens Passage about 3.5 miles northward of Grand Island and 11 miles from Juneau. Point Arden Light, 50 feet above water and visible 9 miles, is shown from a white wooden house on the northeast end of the point. The light is obscured from 332° to 118°.

Chart 8235.—Taku Inlet has a length of 18 miles from **Bishop Point,** at the entrance from Stephens Passage, to Taku Glacier at its head. Extensive shoaling has been reported at the head of Taku Inlet.

Anchorages.—There is no secure anchorage in the inlet which is exposed to floating ice and strong winds. The best general anchorage, with fair protection from southerly winds, is to be had in 5 to 7 fathoms, soft bottom, 2 miles east-northeast of Jaw Point and about 0.5 mile offshore. Temporary anchorage, partially protected from northerly winds, can be made in from 3 to 7 fathoms, soft mud bottom, eastward of the Annex Creek Power Station; in mid-channel, in 3 to 8 fathoms, soft mud bottom, eastward of Flat Point (this anchorage is not sheltered from the wind and is much exposed to floating ice); and at the head of the inlet westward of **Swede Point** at the mouth of Taku River, in 12 to 15 fathoms (this temporary anchorage is exposed to heavy floating ice and is dangerous.)

For a distance of 8 miles, from Bishop Point to 2 miles above Jaw Point the water is deep and shores bold. Thence to Taku Point, a distance of 6 miles, the channel is narrowed by flats which extend about 0.8 mile from the eastern shore and 0.5 mile from the moraine of **Norris Glacier** on the western shore, with depths in the channel of 5 to 9 fathoms.

Jaw Point is the prominently projecting point on the eastern shore 6 miles within the entrance; there are high cliffs on the eastern shore southward of it. **Flat Point** is on the western shore 3 miles northward of Jaw Point. **Greely Point,** on the eastern shore, 4 miles south of Jaw Point, is distinguished by its reddish-brown color.

Sunny Cove, on the western side of the inlet 4 miles above **Cooper Point,** is a shallow bight on the north shore of which are the ruins of an abandoned wharf. In the small bight about midway between Sunny Cove and Flat Point is the **Annex Creek** Powerhouse and small wharf of the Alaska Juneau Gold Mining Co. The powerhouse constitutes a good landmark. The wharf has a depth of 3½ feet alongside.

Small craft should exercise caution when maneuvering in shoal water, especially off Sunny Cove, the Annex Creek Power Station, and off **Turner Creek** on the eastern side of Taku Inlet. There are scattered boulders in these areas which stand 2 to 5 feet above the surrounding bottom. Because of the discoloration of the water it is impossible to see them even when covered by only a foot of water.

There is a flat for 1.5 miles alongshore southward of Flat Point which extends off a greatest distance of 0.5 mile offshore. It has depths of ½ to 2 fathoms over it within these limits and deepens to 10 fathoms in about 0.2 mile. If the range Flat Point-Taku Point is kept slightly open, a least depth of 4 fathoms will be had and this flat avoided. Depths increase as the range is opened.

Beginning at a point 2 miles eastward of Jaw Point, a flat extends from the eastern shore from 0.8 to 1 mile, in places, to the 3-fathom curve and then deepens gradually to

5 and 6 fathoms in mid-channel. Deeper water is found on the western side of the channel. The shoaling is more abrupt as Taku Point is approached. The width of the clear channel at its narrowest part is over 0.3 mile between this flat and that off the moraine of Norris Glacier.

Taku Point is on the eastern shore south of the mouth of the Taku River and 4.5 miles northward of Flat Point. The ruins of an abandoned saltery are located here. These ruins and several shacks are occupied by fishermen during the summer fishing season.

The moraine of Norris Glacier is surrounded by a flat, bare at low water, to a fairly uniform distance of nearly 0.5 mile. It is mostly steep-to at its edge.

Directions.—In proceeding up Taku Inlet above Flat Point, keep Jaw Point open on Cooper Point and Flat Point open on Cooper Point, bearing 194°. This range gives a minimum depth of 5 fathoms. When abeam of Taku Point, steer 000° for 1 mile and then steer for the center of Taku Glacier, keeping at least 0.5 mile off the Norris Glacier moraine. It is not advisable to approach Taku Glacier closer than 0.5 mile.

In 1937, deep water was found 0.3 mile off the face of Taku Glacier, with mud banks between this distance and the face of the glacier, two of which were visible at high tide. The advancing glacier is pushing these mud banks ahead of it and future approaches to Taku Glacier should be made with extreme caution as there is every indication that these mud banks will extend farther out into the inlet.

Vessels should go well into the basin above Taku Point before attempting to turn lest the current from Taku River set them against the mud flats off the Norris Glacier moraine.

The Taku River mouth is filled by a flat, the western limit of which is defined by the range previously mentioned for proceeding up Taku Inlet above Flat Point. The sand bars at the mouth of the river are shifting continually, and gradually building out into the inlet.

Taku River is reported to be navigable for canoes a distance of 60 miles. The pass up the river has been used by the prospectors going to the headwaters of the Yukon, who do not report favorably upon it. The current is swift.

From late spring until early fall, depending on the river stage, river boats with barges proceed up as far as Tulsequah, B. C., about 5 miles over the boundary.

Taku Glacier discharges directly into the inlet at its head, the face of the glacier extending entirely across the inlet. Of all the glaciers in Alaska, this is one of the very few which is now advancing. In 1951 the face of the glacier had moved forward about 1 mile from its charted position. It projected ahead of it such large amounts of sediment into the previously deep basins that craft now hesitate to pass between the face of the glacier and the mouth of Taku River. Large masses of ice are always floating at the head of the inlet. The mud banks building up in front of the glacier are also added dangers to vessels approaching Taku Glacier. Considerable shoaling was reported in the navigation channel leading up the inlet and in the area west of Taku Point.

Winds.—The conformation of Taku Inlet is such that northerly winter gales sweep down the inlet and across Stephens Passage with great force, often accompanied by a blinding snowstorm. Southeast gales draw through the inlet.

Ice.—Taku Glacier discharges an enormous quantity of ice into the inlet, and this ice is always present, sometimes in large quantities, and is also present in Stephens Passage off the entrance. In daytime with clear weather it is not a serious menace to navigation.

The **currents** in Taku Inlet have greater velocity on the ebb than on the flood. At Taku Point, the ebb current has an estimated velocity of 3 or 4 knots at times. At the entrance to Taku Inlet the velocity of the ebb current does not exceed 2 knots.

Gastineau Channel, separating Douglas Island from the mainland, extends northwestward for 13 miles from Stephens Passage, and then westward for 3 miles to Fritz Cove. Juneau, 8 miles above the southeastern entrance, is practically the head of navigation, except for small craft, as above that point for 2.5 miles to **Salmon Creek,** flats make out from both sides with only a narrow channel between. From Salmon Creek to Entrance Point, at the western end of Gastineau Channel, there is a bar on which the channel depth at highest tides is only about 5 feet. This channel is marked by lights.

The Federal project provides for a channel from Juneau to Fritz Cove 75 feet wide with the bottom at the elevation of mean lower low water. In June 1951 no work had been done on this project.

Marmion Island, about 300 yards to the northeastward of Point Tantallon, the eastern point of Douglas Island and the southern point of the entrance to Gastineau, is small, flat-topped, and bare of trees. Marmion Island Light, 40 feet above water and visible 9 miles, is shown from a white wooden house. The light is obscured from 022° to 147°.

Dupont Explosives wharf on the eastern side of Gastineau Channel at the mouth of **Dupont Creek,** has a depth of 30 feet at its face.

Sheep Creek Flat, 4.5 miles above Marmion Island and close southward of Thane, on the easterly side of Gastineau Channel, extends one-third the distance across the channel from the mouth of Sheep Creek, and is bare at low water. The outer limit of the flat is marked by Sheep Creek Light, 12 feet above water and shown from a white wooden house on a square pile structure.

Thane is on the northeast side of Gastineau Channel, 5 miles from Stephens Passage. The mine buildings and wharf are in ruins, but some dwellings are occupied. A highway connects with Juneau.

Treadwell, an abandoned mining town with all mine buildings and wharves in ruins, is on the southwesterly side of Gastineau Channel about 6 miles from Stephens Passage. A watchman and a few families reside there.

Douglas, on the southwest side of Gastineau about 6.5 miles from Stephens Passage, is a residental center of some 500 population. A post office and cannery are here, but the cannery has been inoperative for several years. The wharf is no longer suitable for landing; freight and passengers are landed in Juneau and taken to Douglas by land vehicles. A highway connects with Juneau by way of the bridge.

Juneau Isle is a small rocky promontory between Treadwell and Douglas. The tan-colored building of the Bureau of Mines experimental station is prominent from southward.

The spit off the mouth of **Lawson Creek,** about 0.8 mile northwestward of Douglas, is marked by a light.

The breakwater of mine tailings, about 1 mile southward from Juneau is constantly being extended from the northeastern shore, and shoal water is found inside the buoys which mark the northeastern side of the channel. An orange and black radio tower stands near the northwestern end of the rock dump. The tower is marked by a red light.

Caution.—In navigating Gastineau Channel do not approach the shores too closely, especially the southwestern shore. Stream flats and deposits from mine tailings extend well offshore.

Anchorage can be made throughout the channel wherever the depth is suitable. The usual anchorage is off Juneau in 20 fathoms, soft bottom.

Winds.—Southeast gales may occur in the vicinity of Juneau at any season, but they are much more frequent in winter than in summer. They are usually accompanied by rain, but not always by mountain squalls. The strongest winds are in winter and are locally called **"Taku Winds."** They draw down the mountain passes from northward, in gusts, with terrific force. Their force is modified somewhat under the lee of the highland eastward of Juneau. The southeast winds in summer seldom blow home, and when they do the confined channel admits but little sea.

Tides.—Daily tide predictions for Juneau are given in the tide tables published annually by the Coast and Geodetic Survey.

Currents.—The flood current sets northwestward in Gastineau Channel past Juneau with a maximum velocity of about 2 knots. Slack water off Juneau occurs at about the time of slack water at Wrangell Narrows.

Magnetic disturbance.—A local attraction of the compass, which does not exceed about 4° in the track usually followed by vessels, has been observed in Gastineau Channel. There is a local center of attraction abreast of Sheep Creek, and in passing this point the local attraction has been observed to change from about 3° west to 3° east. Along the south shore a westerly local attraction has been observed for some distance eastward of **Bullion Creek.** These local attractions affect the general easterly variation for this locality by the amounts stated.

For directions, Gastineau Channel, see table of courses, in Chapter 3.

Juneau, a thriving modern city with a population of about 6,000, is the territorial capital of Alaska. It is on the northeasterly side of Gastineau Channel, 8 miles north of Stephens Passage. Extensive hard-rock gold mining operations formerly were carried on, but since 1943 the mines have been closed. However, the mine buildings remain and are the most prominent feature of the city, situated on the mountain slope above the southerly end of the business district. Juneau has several modern hotels and apartment houses, and numerous stores.

A fixed highway bridge over Gastineau Channel at Juneau has a horizontal clearance of 200 feet between the main piers where the vertical clearance is 45½ feet. A green light marks the center of the span, and a red light on each side indicates the limits of the maximum vertical clearance. The fender piles of the piers are lighted. The top of each of the main piers is marked by a light.

Hospitals.—The Public Health Service maintains a relief station at Juneau and has contract hospital space. There are also private hospitals. The nearest Public Health Service Hospital is at Seattle, Wash.

Customs.—Juneau is a port of entry and marine documents are issued. The customs office is in the Federal and Territorial Building.

Immigration.—The Immigration and Naturalization Service office is in the McKinley Building.

Coast Guard.—The office of the Commander of the 17th Coast Guard District is in the Community Building. A cutter is stationed at Juneau.

Other Government bureaus having offices in Juneau include the Weather Bureau, Civil Aeronautics Administration, Federal Communications Commission, Fish and Wildlife Service, Forest Service, and Geological Survey.

Wharves.—Several wharves front the business district between the mine-tailing rock dump on the south and the flats of Gold Creek on the north. The principal ones have depths of 23 to 42 feet along the face.

A small-boat basin used as an operating base for commercial fishing is just north of the Juneau-Douglas Bridge on the Juneau side of the channel. The Federal project provides for a basin 11½ acres in area with a depth of 12 feet by the construction of two rock-mound breakwaters and dredging of the protected area. In June 1951, the controlling depth was 12 feet. The entrance is marked by lights. In the basin are finger piers and floats. Gridirons are available for hull repairs at low tide.

Supplies.—Coal, ship chandlery in limited quantities, and provisions of all kinds are obtainable. Diesel oil, gasoline, and fuel oil can be obtained from the oil companies. Fresh water is available at several wharves, and lumber at a sawmill.

Repairs.—A marine railway has a capacity of 300 tons, 110 feet in length, and 28 feet in beam. A 15-ton crane is in service, and several machine shops have maximum lathe capacity of 22 feet between centers and a throw of 54 inches in diameter.

Communication.—Juneau has frequent communication by steamer with Seattle, British Columbia, and the more important Southeast Alaska ports, and by small craft with other ports in Southeast Alaska. Daily scheduled air service operates to Seattle, Anchorage, Ketchikan, and all other Southeast ports. The service to Whitehorse and Fairbanks is thrice weekly, and that to Nome is twice weekly. Airplanes are available by charter to all non-scheduled Southeast Alaskan points. Cable and radio communications may be had to Seattle and Alaskan ports, and local telephone service to all Gastineau Channel ports. The local commercial broadcasting station is KINY.

Point Arden has been described previously in this chapter. **False Arden** is a prominent point 1 mile westward of Point Arden.

Douglas Island, between Stephens Passage and Gastineau Island, is large and wooded. It has several prominent peaks ranging in height from 2,500 to 3,500 feet. The southern shore of the island is fairly bold and steep-to and can be followed at a distance of 0.3 mile.

Point Tantallon, a timbered point with a rocky beach, is at the southeastern extremity of Douglas Island. **Icy Point** is 0.6 mile westward of Point Tantallon.

Point Hilda, the western end of a large bight, is about 8 miles to the westward of Point Tantallon. Point Hilda Light, 20 feet above water and visible 9 miles, is shown from a small white house on the point. The light is obscured from 097° to 268°. There is good anchorage and shelter from northerly weather 1 mile northeast of the light, in depths of 6 to 15 fathoms.

Inner Point, marked by a beacon, lies 2.8 miles westward of Point Hilda. A lighted buoy marks the outer extremity of a shoal which extends 225 yards off **Middle Point,** 4.5 miles westward of Point Hilda.

Chart 8202.—Oliver Inlet has its entrance on the south side of Stephens Passage, about 4.5 miles westward of Point Arden, through a narrow neck 1 mile long and 200 yards wide. The inlet is accessible only at high water to boats and small craft, the narrow entrance being barred at low water by a natural dam of rocks, over which the water pours like a waterfall except at slack water. At high-water slack, small vessels drawing not over 6 feet can enter. The tidal currents in the entrance have a velocity of 6 to 8 knots,

forming heavy swirls. A portage about 0.5 mile long connects this inlet with the head of Seymour Canal.

Chart 8235.—Point Young is 12 miles westward of Point Arden. The extremity of the point is grass-covered and has a pebble beach. From the point the land rises in a timbered ridge with a long gentle slope in a southeasterly direction to an elevation of 2,113 feet. A low, rocky cliff, fringed by a kelp patch 40 yards offshore, extends about 0.2 mile westward from the point.

Admiralty Cove lies on the south side of Stephens Passage westward of Point Young. It does not afford anchorage except for small craft, on account of shallow water. A small vessel can anchor in the cove southward of the island on the southwest side of Admiralty Cove, in 8 to 9 fathoms, mud bottom. The anchorage is open to westerly winds. A conspicuous trail-marker on the southeastern shore marks the end of a good trail maintained by the Forest Service. The trail extends 4.5 miles to **Admiralty Lake,** and is much used by trout fishermen and hunters in season. A shelter cabin is on the beach near the end of the trail, and another is on the shore of the lake.

A long narrow sand beach fronting a large tidal marsh is at the head of the cove, into which empties **Admiralty Creek,** a swift shallow mountain stream.

Young Bay is the broad bight in the southern shore of Stephens Passage westward of Point Young. **Scull Island,** a grass-covered rock 53 feet high with deep water around it, lies in the middle off the entrance. A rocky shoal with a least depth of 1½ fathoms lies 300 yards, 193° from Scull Island. A good foot-trail maintained by the Forest Service extends from the northwest side of Young Bay to the shore of Hawk Inlet. The cliff on the eastern shore about midway between the head of the bay and Young Point is marked by a light-colored scar 60 feet high and 30 feet wide.

Anchorage with shelter from southeast winds can be had about 0.5 mile from the southeast side of the bay at any point between Point Young and the head in 18 to 22 fathoms, soft bottom. Small vessels may anchor closer inshore in desired depths. The favorite anchorage for small craft is south of the island in Admiralty Cove.

Horse and Colt Islands, connected at low water, are about 40 feet high and wooded with trees about 80 feet high. **Colt Island,** the northerly one, has a ledge on its northern, eastern, and northwestern sides to a distance of about 600 yards. The northern point of Colt Island appears as a separate islet about 20 feet high, but forms a part of the island at all stages of the tide.

Horse Island, the larger and southernmost of the two islands, has shoal ground extending about 0.2 mile off the south shore of the island and a practically continuous rock ledge extending from the southern tip of the island in a south-southeasterly direction across the entrance of the cove. This ledge bares at the lower tides 380 yards 160° and 587 yards 147° from the south end of Horse Island, with 1 to 2 fathoms of water between these two rocks; and a rock bares 7 feet at mean lower low water, 1,165 yards 150° from the south end of Horse Island. The best water for entering this cove lies just north and close to this last rock. A fair anchorage for small boats is had in this cove but its use is not recommended due to the obstructions across the entrance.

A fair anchorage for small boats with protection from southerly winds can be had in mid-channel west of Colt Island in 12 to 15 fathoms, mud bottom, or in the area just north of Horse Island in 3 to 7 fathoms, mud bottom. Anchorage should be approached

from the north, avoiding the ledge and rock which bares 10 feet, north-northwestward of Colt Island, and the various small ledges and rocks near the shores.

Horse Shoal, about 0.8 mile eastward of Horse Island, consists of two patches 0.5 mile apart, both of which are bare at half tide.

A small ledge, which covers at half tide, lies about 0.7 mile north-northwestward of the north end of Colt Island.

Fritz Cove, the northwestern extremity of Douglas Island, northward of **Outer Point,** affords anchorage and shelter from southerly and easterly winds.

Shaman Island, 0.2 mile to the northward of Outer Point, is 100 feet high, wooded, and connected with Douglas Island by a gravel bar. There is a rock, awash, off the north end of the island, close-to.

Dornin Rock, with 2¼ fathoms over it, lies 0.4 mile westward of Shaman Island. **George Rock,** lying nearly 1 mile north-northwestward of Outer Point, covers at highest tides. It is marked by a daybeacon.

Entrance Point, at the east end of Fritz Cove, is a wooded knoll connected with Douglas Island by a low spit. Northward and westward of Entrance Point is the **Gastineau Channel Flat.** Juneau Airport has been built on filled ground on the Gastineau Channel Flat at the mouth of **Mendenhall River.**

A rock with ¼ fathom over it is 0.7 mile 252° from **Spuhn Island,** and on the range of **Spuhn Point,** the south end of Spuhn Island, and the north end of Douglas Island. Passing on either side of George Rock, follow the shore of Douglas Island, giving it a berth of 0.2 mile. Anchor about 400 yards from shore and 0.4 mile southwestward of Entrance Point in 20 to 25 fathoms, soft bottom.

Auke Bay lies northward of Fritz Cove. Entering the bay, pass 0.2 mile southward and eastward of **Coghlan Island,** and with the summit of the island astern, steer course **048°.**

Anchorage for small craft, with protection from southeast winds, may be found in 5 to 10 fathoms, soft bottom, in the cove southwestward of **Auke Lake.** Swinging room is limited. A small landing float, marked by a light, is on the eastern side of the cove. On the western side is a Standard marine fuel station and general store. Food, gasoline, fuel and lubricating oils, and fresh water are available. Another general store is at a road intersection near the Territorial float.

Old Auke Village is on the north shore of the bay to the eastward of **Point Louisa,** near the entrance, and to the westward of **Indian Point. Auke Lake** lies about 0.3 mile back from the shore. There are several homes in this area. A church and additional houses are being built. A highway runs from Auke Bay past the Juneau airport to Juneau. **Mendenhall Glacier** is about 2 miles inland, and a road running from its face joins the Auke Bay-to-Juneau highway.

Portland Island is about 0.9 mile long, 0.1 mile wide, 160 feet high, and wooded. Its northwest end is prolonged by a reef which entirely covers at high water, except for two small patches about 0.1 and 0.2 mile from the island, which are bare rocks about 6 feet high. The northwestern end of the reef is covered about 10 feet at highest tides. The south side of Portland Island is foul for about 300 yards.

Portland Island Light, 29 feet above the water and visible 9 miles, is shown from a small white house on the middle of the reef north of Portland Island. The light is obscured from 327° to 341°.

Chart 8302.—Saginaw Channel connects Stephens Passage with Lynn Canal and separates Mansfield Peninsula, the northwest end of Admiralty Island, from Shelter Island. This channel is used by vessels going from Stephens Passage to Chatham Strait or Icy Strait.

Symonds Point, the south point at the entrance to Saginaw Channel, is low and wooded; it rises with a gradual slope to Lone Mountain. Reefs extend about 300 yards off the point to the northwestward. There is foul ground in the bight to the southward.

Lone Mountain, 1,963 feet high; **Mount Robert Barron,** 3,321 feet high, and the low divide between them, are conspicuous landmarks on **Mansfield Peninsula,** the northwestern extremity of Admiralty Island.

Shelter Island, off the northwest point of Admiralty Island, at the northwestern end of Stephens Passage, is 7.8 miles long, 1 mile wide, and timbered. A dome-shaped peak, 1,220 feet high, on the northwest part of the island forms an excellent landmark when coming down Lynn Canal. The southeastern part of the island is a long ridge 800 to 900 feet high. Reefs extend off the northwest end of the island for about 0.5 mile. A rock, bare at low water, lies about 350 yards off the southeast end of the island with a 2¾-fathom spot outside it, about 0.5 mile offshore in the direction of Portland Island. Shelter Island Light, 19 feet above water and visible 9 miles, is shown from a white wooden house on the east side of the south end of the island. The light is obscured from 338° to 159°. About 0.2 mile northwestward of the light a spur makes offshore for about 300 yards.

Strauss Rock, 0.5 mile southward of the southeast end of Shelter Island, marked by a buoy, has 2 fathoms on it. It is of small extent and dangerous.

Adams Anchorage, off the southeast end of Shelter Island and northwestward of Strauss Rock, offers good anchorage in 11 fathoms and very good anchorage for small craft in less depth, close in to the shore during northerly weather.

Favorite Reef, in the southeasterly part of Saginaw Channel, is 0.5 mile long in the direction of the channel, 250 yards wide, and bare at half tide. The reef lies about 0.2 mile from the Shelter Island shore, with a deep channel between, which, however, is seldom used, as it is partially obstructed at its southeast end by a reef which bares about 6 feet and extends out nearly 0.2 mile from Shelter Island. Favorite Reef Light, 36 feet above water and visible 9 miles, is shown from a white wooden house on a skeleton structure on a concrete pier on the southern part of the reef.

Barlow Point lies about 3 miles northwestward from Symonds Point. **Barlow Islands** extend about 1.5 miles in a north-northwesterly direction from Barlow Point.

Barlow Cove, on the eastern side of the northern end of Mansfield Peninsula, is about 5 miles long in a southerly direction and 0.8 mile wide. Point Retreat Light marks the western point of the entrance and the Barlow Islands form the eastern point of the entrance. The waters throughout the cove are deep. Anchorage may be obtained 0.2 mile from the southeast side at the head, in 22 to 23 fathoms, soft bottom.

In entering, favor the Barlow Islands to avoid the foul ground which extends about 400 yards off the shore southeastward of Point Retreat. There is a narrow passage between Barlow Point and the Barlow Islands through which 20 feet can be carried, but it is unfit for vessels and is filled with tidal eddies and swirls except at slack water.

Faust Rock lies in Saginaw Channel 1.1 miles from Barlow Islands and in continuation of them. It is of small extent, has 2¾ fathoms over it, and is marked by a lighted buoy. It can be passed on either side.

Point Retreat, Hump Island, and Lincoln Island are described with Lynn Canal in Chapter 10.

Favorite Channel connects Stephens Passage with Lynn Canal northward of Shelter Island. It is the channel used by vessels going from Stephens Passage to upper Lynn Canal points and Skagway.

Lena Cove lies on the eastern shore of Favorite Channel northward of Point Lena. It affords a southeast lee, but the bottom is rocky and it is not a good anchorage. Rocks awash lie close to the northern shore, northward of the northern point of the entrance.

Point Lena, the southern point at the entrance, is low and wooded. Rocks, awash at low water, lie about 100 yards from the north shore of the point.

Tee Harbor, on the eastern side of Favorite Channel, 1.5 miles northward from Point Lena, affords anchorage in the middle just within the points at the entrance in 12 to 14 fathoms. During southeast weather, williwaws at the entrance, at times, are severe. Small craft avoid these by anchoring in 6 to 9 fathoms at the southern end of the southern arm close to the beach. A road connects with Juneau. A sunken rock of small area, marked by a buoy, lies 300 yards 300° from **Point Stephens**, the southern point of the entrance. Tee Harbor Light, 25 feet above water and visible 6 miles, is shown from a white wooden house on the northern point of the entrance. The light is obscured from 147° to 240°.

Cohen Islet lies about 0.9 mile northwestward from Point Stephens. It is about 200 yards long, 100 yards wide, 110 feet high, timbered on the northern end, bare and rocky on the southern end, and has two rocks, awash, close to the northwestern shore.

Aaron Island, 1 mile eastward of the middle of Shelter Island and 2 miles northwestward of Tee Harbor, is about 0.3 mile long, 170 feet high, and wooded. A grass-covered rock, 35 feet high, lies 200 yards northwestward from Aaron Island with which it is connected by a reef at low water. A shelving ledge, largely covered at half tide, extends 0.2 mile southward from the southern end of Aaron Island.

Cohen Reef, covered at high tide, lies about 0.6 mile southeastward of the south end of Aaron Island.

Eagle Reef, about 1.2 miles northward of Aaron Island, is awash at highest tides.

Bird Island, 2 miles eastward of the northern extremity of Shelter Island, is 80 feet high and sparsely wooded.

Gull Island, about 0.8 mile northward of Bird Island, is about 0.3 mile long, about 100 yards wide, 90 feet high, and wooded. Reefs extend off the south point and the southwest shore for about 250 yards and for about 100 yards off the east shore. A small islet, 60 feet high, lies close to the north end of Gull Island.

Amalga is a small settlement near **Amalga Harbor**, the cove that lies about 1.8 miles eastward of Bird Island. A road connects with Juneau.

Eagle Harbor affords anchorage in moderate weather in the middle of the harbor, with the outer tangent of the island on the south side on range with the tangent of the land beyond. Vessels allowing sufficient swinging room off the piles near the shore will find good holding ground in 14 fathoms. Small craft find good anchorage in the small landlocked cove in the southeast corner of the harbor. Fresh vegetables in season may be obtained from the ranchers who live on the shores of the lagoon.

Poundstone Rock, Sentinel Island, and the features northwestward in Lynn Canal are described in Chapter 10.

For directions through Stephens Passage, see Chapter 3.

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CHAPTER 10

Lynn Canal

Chart 8202

LYNN CANAL extends from the junction of Chatham Strait and Icy Strait, at Rocky Island, in a north-northwesterly direction for about 55 miles to Seduction Point, where it divides into two arms, called Chilkat and Chilkoot Inlets. At Rocky Island, Lynn Canal is 5 miles wide; from Point Howard to Ralston Island about 3 miles wide; thence it averages 6 miles wide to Seduction Point. The canal is nearly free from dangers, and the water is generally very deep. The shores as a rule are very high and wooded, with many bare mountain peaks and small glaciers in nearly every ravine. It has been wire dragged to the north end of Taiya Inlet, including the passage inside Indian Rock and the comparatively shallow water off Katzehin River Spit.

The towns of Haines and Skagway are the only important ports in Lynn Canal. There is also a post office at Funter Bay.

Anchorage can be had in Funter Bay, William Henry Bay, west of Sullivan Island, Pyramid Harbor (Chilkat Inlet), and Portage Cove (Chilkoot Inlet). Temporary anchorage can also be had in St. James Bay, Berners Bay, and at Skagway. There are several coves where small craft can find anchorage.

Local magnetic attraction.—Local magnetic disturbances have been observed in Chilkoot Inlet from Seduction Point to Indian Rock. The variation of the compass is about 20° west of normal at Battery Point; off the point the variation is about 15° west of normal; off Katzehin River the variation is 6° to 10° west of normal. In Portage Cove the range is from 9° west to 5° east of normal. Small areas of local disturbance were found as follows: Kataguni Island, 12° west of normal; Chilkat Inlet, south of Jenkins Rock, 7° west of normal.

Currents in Lynn Canal have a velocity of 1 to 1½ knots at strength in the southern part, diminishing in velocity toward the head. From Point Whidbey to Point Sherman currents are quite regular and apparently tidal. Off Berners Bay rips and eddies are noted and sets across the channel occur. From Point Sherman to Chilkoot Inlet currents are quite regular and of moderate strength. Off the mouth of the Endicott River, at times, the river water extends a considerable distance offshore, where its limits are often well defined. In the vicinity of the Chilkat Islands the currents are moderate and no peculiarities were noted. In Chilkoot Inlet, the currents are regular and apparently tidal. South of the Katzehin River much fresh water is noticeable. In the restricted channel, between the bar and the western shore, the currents are strong, but not irregular. In the vicinity of Indian Rock, an easterly set across the channel has been noted. The current in Taiya Inlet is moderate and regular.

Pacific Coast Current Tables include data for several stations in Lynn Canal. Courses and distances to Skagway are given in Chapter 3.

Chart 8302.—Hanus Reef is a dangerous reef about 0.2 mile in extent which lies at the junction of Chatham Strait, Icy Strait, and Lynn Canal. The highest part of the reef, bare at half-tide, is marked by a light. The light, 28 feet above the water and visible 9 miles, is shown from a small white house on a skeleton tower on a concrete pier. At times the tidal current attains a velocity of 2 or 3 knots over the reef.

Rocky Island, 2.3 miles northwestward of Hanus Reef, is marked by a light, is grass-covered, and about 40 feet high. The light, 68 feet above water and visible 9 miles, is shown from a white wooden house on a skeleton structure. The water is deep to within 250 yards of the island. The channel between Rocky Island and Point Couverden, about 0.8 mile northward, has been wire-dragged to a depth of 35 feet. As the currents are erratic, the slight saving in distance this channel offers does not warrant its use; however, if used, vessels should favor Rocky Island, as shoal water extends from Point Couverden.

Swanson Harbor is formed by a group of islands and reefs off the extreme southeast point of the mainland at the junction of Icy Strait with Chatham Strait and Lynn Canal. It affords good anchorage and shelter. Its northeast side is formed by Couverden Island and a small island between its western end and the mainland, all connected at low water. The southwest side is formed by Ansley and **Entrance Islands** and their associated rocks; the passages between them and between Ansley Island and the mainland are dry at low water and filled with rocks. Swanson Harbor Entrance Light, 21 feet above the water, is shown from a small white house on the southwesterly side of Couverden Island. The light is obscured from 144° to 299°. **Ansley Island** is marked on its southwest side by an aviation light. The light is 230 feet above the water, and is obscured at various sectors by small islands from 098° to 319°.

Sharp Ledge is 200 to 400 yards eastward of the southeast end of Entrance Island, and another ledge extends nearly 0.5 mile from the southeast end of Entrance Island toward Rocky Island. These ledges are covered at half tide and marked by kelp.

No Use Ledge, bare at one-quarter ebb, lies on the north side of the anchorage about 0.4 mile northwestward of the northwest end of Couverden Island.

To enter Swanson Harbor, bring Rocky Island astern on a northwesterly course and follow the southwest shore of Couverden Island at a distance of about 250 yards until Entrance Island is passed. Then steer a mid-channel course until up with the northwestern end of Couverden Island. Then follow the shore of Ansley Island at a distance of about 250 yards to the anchorage. Anchor with the northeast side of Entrance Island just open from the east side of Ansley Island, and with the northwest end of Ansley Island bearing southwestward, distant 0.3 mile, in 14 to 16 fathoms, soft bottom. Small vessels anchor close in the head of the bay or to the east side of the head behind the reef.

Couverden Island and the islands close by appear from most points of view as a long, low, wooded point, the southeast extremity of which is **Point Couverden.** A reef extends 0.3 mile off Point Couverden in the direction of Rocky Island.

Couverden Rock, 2.4 miles northward of Rocky Island, is 12 feet high, and should not be approached closer than 200 yards. It is the outer one of a group of islands and rocks extending 4 miles southeastward from the western shore of Lynn Canal.

Funter Bay lies on the east side of Chatham Strait at its junction with Lynn Canal, about 10.5 miles southward of Point Retreat and 5.5 miles northeastward of Rocky

Island. It is the best and most convenient anchorage in the vicinity. The bay is 2 miles long in a northeasterly direction, and 0.8 mile wide at the entrance, expanding slightly inside. A cannery and wharf are on the northwest side of the bay.

The south point at the entrance has several small islands near it, with a clear channel between. **Station Island,** the largest, is 78 feet high and wooded; at low water it is joined to a small islet southward, 40 feet high. **Rat Island,** 400 yards northeastward of Station Island, is 17 feet high and bare; a ledge, bare at low water, extends 0.1 mile northwestward from it.

Clear Point, the north entrance point, is marked by a light, 26 feet above water and visible 6 miles, which is shown from a white pyramidal skeleton tower on a wooden house. The light is obscured from 115° to 238°.

The Kittens, two small islands 0.2 mile from shore, are 0.8 mile northwest of Clear Point.

Naked Island is 1.1 miles northwestward of Clear Point and 0.5 mile offshore, with deep water between. Naked Island Light, 40 feet above the water and visible 9 miles, is shown from a white wooden house on the highest part of the island.

Four islets are in Funter Bay between Clear Point and the head. **Bare Island,** the first from Clear Point, is 13 feet high. **Curlew Ledge,** bare at low water, lies 250 yards southward of Bare Island, and a shoal, with 1¾ fathoms over it, extends 100 yards southward from the ledge, and is marked at its southeast end by a buoy. **Gauge Island,** the second islet, is 72 feet high and wooded; it is surrounded by ledges, which extend mainly in a southerly direction for 150 yards. **Star Rock,** a small pinnacle, bare at lowest tides, lies 120 yards northward of Gauge Island. **Ledge Island,** the third islet, is 5 feet high; ledges bare at low water, extend 200 yards southward from it. The fourth islet is the largest and lies at the head of the cove; it is connected with the main shore at low water.

Coot Cove, at the northwest end of the bay, has extensive beaches at its head, where the cannery has gridirons and ways. **Crab Cove,** with depths of 12 to 13 fathoms, lies at the northeast end of the bay.

The cannery and post office of **Funter** are on the northern side of the bay, and there is regular communication with Juneau. The main cannery wharf has been replaced by a small wharf with a 60-foot face at which there is a least depth of 6 feet. A rock ledge with a least-found depth of 14 feet lies off the southern corner of the wharf with deeper water close-in. Fresh water can be obtained on the wharf. The cannery operates a radio station during the season.

Only a few buildings mark the sites of the stamp mill and smelter which stood on the southeastern side of the bay.

A fish-buying scow is anchored at the head of the bay from May 1 to September 15. All fishermen's supplies are available, including groceries, Diesel oil, and gasoline. There is a mooring float for small craft, where fresh water can be obtained.

Anchorage in Funter Bay can be made about 0.2 mile southwestward of the cannery, with the north end of Gauge Island bearing 122°. Small craft can find protected anchorage in Coot Cove or Crab Cove.

In entering Funter Bay, pass 250 yards or more southward of Clear Point and Curlew Ledge and keep in mid-channel between Bare and Gauge Islands. The narrow channel to the westward of Bare Island is frequently used by boats proceeding to the cannery.

Point Howard, on the west side of Lynn Canal, is about 6.8 miles northward of Rocky Island. A ledge bare at low water is about 400 yards southward of the point. **False Point Retreat,** 7 miles northward of Naked Island, is marked by a daybeacon.

Point Retreat, the northern extremity of Admiralty Island, is at the turning point from Lynn Canal to Saginaw Channel. Ledges that show well at low water extend about 300 yards northward from Point Retreat, and about the same distance off its west side for 0.5 mile southward. Point Retreat Light, 63 feet above the water and visible 13 miles, is shown from a square concrete tower on a building. A fog signal is sounded on an air diaphone. A radiobeacon is at the light.

Hump Island lies at the junction of Saginaw Channel with Lynn Canal. It is about 0.6 mile long, 0.4 mile wide, about 250 feet high and wooded. A reef extends offshore 300 to 400 yards.

Lincoln Island, 4 miles long, is separated from the northwest end of Shelter Island by a narrow navigable channel about 0.2 mile wide. The island is wooded and has three summits 500 to 600 feet high, one at each end and one in the middle separated by low divides. On the southern shore at the base of the middle knob are some prominent boulders.

Ralston Island, 110 feet high and wooded, lies close to the northwest end of Lincoln Island.

Little Island, 40 feet high, and grass-covered, lies about 0.3 mile northward of Ralston Island. A rocky ledge extends about 0.3 mile northward. A detached 2¾-fathom spot lies about 700 yards northward of the island. Little Island Light, 50 feet above the water and visible 9 miles, is shown from a white wooden house.

Lynn Sisters are two wooded islands, about 150 feet high, close to the western shore of Lynn Canal, about 3.5 miles southwestward of Little Island. They are connected with each other and with the shore at low water.

Poundstone Rock, lying about 3.8 miles east-southeastward of Little Island and 1.1 miles southward of Sentinel Island Light, has 2¾ fathoms over it and is marked by a lighted bell buoy. From the rock, a ridge 0.5 mile wide, extends 3 miles toward Vanderbilt Reef. Depths of 5¼ and 7 fathoms are found on this ridge 1.2 miles westward of Poundstone Rock.

Sentinel Island, on which a light, fog signal, and radiobeacon are maintained, lies about 3.5 miles northward from the northern extremity of Shelter Island. A shelving ledge extends about 0.2 mile in a northwesterly direction from the northern end of the island.

Sentinel Island Light, 86 feet above water and visible 15 miles, is shown from a white square tower on a fog-signal building. The fog signal is sounded on an air diaphone. The radiobeacon is synchronized for distance finding.

Benjamin Island lies about 0.8 mile northeastward of Sentinel Island. It is about 1.5 miles long in a northerly direction, 0.5 mile wide, timbered, and has two knobs about 260 feet high near the southern part of the island. Rocks, bare at low water, extend about 0.2 mile off the southeast point of the island. A small wooded islet, 160 feet high, lies close to the south point of the island. A small grassy islet, 40 feet high, with rocks bare at low water extending 0.2 mile to the northward, lies 0.2 mile to the northward of the western point of the island.

Temporary anchorage against the severe winds which occasionally blow down Lynn Canal may be obtained in the bight in the south side of Benjamin Island.

North Island, 110 feet high and wooded, is separated from the end of Benjamin Island by a narrow shallow channel with strong currents. A shoal with 1½ fathoms on it lies 0.2 mile westward of North Island.

Vanderbilt Reef, 4 miles northwestward of Sentinel Island Light, is a rock covered at three-quarters flood. It is marked by Vanderbilt Reef Light, 36 feet above water and visible 11 miles, which is shown from a white wooden house on a skeleton structure on a concrete pier.

Yankee Cove, a small bight on the east shore of Lynn Canal, is east-northeastward of North Island. **Bessie Creek** empties into the head of the cove.

Bridget Cove, about 3.4 miles to the northward of Vanderbilt Reef, lies behind **Mab Island.** It affords anchorage for small craft in 6 to 10 fathoms, with scant swinging room. Small boats may secure better protection by anchoring inside the cove opposite the north end of Mab Island; the beach makes out about 100 yards at low water. A well-defined trail crosses to the river mouth on the south side of Berners Bay.

St. James Bay lies on the western side of Lynn Canal, inside of **Point Whidbey,** about 11.5 miles north-northwestward of Point Retreat. This bay extends 5 miles in a northerly direction, is 1 mile wide at the entrance and 2 miles near its head, where a large stream enters, forming extensive mud flats. A temporary anchorage may be selected on its eastern side 2 miles northward of Point Whidbey, in 20 fathoms, soft bottom, but it is open to southeast winds.

The **Lynn Brothers** are a chain of islands parallel to the western shore of St. James Bay. Small boats may possibly enter the basin westward of the islands through the reefs at the southern end of the islands.

A reconnaissance survey only has been made of St. James Bay, and all the information available is given on the chart.

From Point Whidbey the west shore of Lynn Canal extends in a north-northwesterly direction, with some indentations and rocky shoreline, about 3.8 miles to a narrow inlet leading into **Boat Harbor,** a basin 0.5 mile in extent, with 14 fathoms greatest depth and 2¾ fathoms at the entrance. It can be entered by small craft only, because of its contracted entrance, which is about 100 feet wide in its narrowest part and apparently clear, though the turns are sharp. The currents have considerable velocity through the entrance.

William Henry Bay, on the western side of Lynn Canal, 9 miles northward of Point Whidbey, is about 0.8 mile long and 800 yards wide; it is easy of access and is the best anchorage in this vicinity from southerly weather. According to local reports, northerly winds are felt with considerable force. Enter in mid-channel, and when the second waterfall is on the starboard beam anchor in 14 fathoms, soft bottom, about 0.4 mile from the head. The shores are high and bold. **Beardslee River** enters at the head, where there is a flat 350 yards wide.

The ruins of a mine and a stamp mill are about 3 miles up the creek which empties at the head of the bay on the western side. The wharf on the eastern side of the bay is in ruins.

Endicott River, about 4 miles northward of William Henry Bay, flows from the westward through a narrow, deep gorge in the mountains. A broad shoal makes out from the mouth of the river nearly 0.3 mile. A narrow channel follows close around the cliff on the southern side. Small craft may enter the lagoon in the flats just north of the river's mouth at half tide.

Berners Bay is a large deep indentation on the east side of Lynn Canal between **Point Bridget** and **Point St. Mary.** It has a northerly direction for 6 miles from Point Bridget, with a width of 3 miles opposite Point St. Mary. Extensive flats and several large streams make in at the head. This bay is open to southerly winds, but in fine weather temporary anchorage in 16 to 25 fathoms may be selected near the head; the chart is the guide. The mines in this vicinity were not being worked in 1951.

Eastward of Point Bridget are two bights. The westernmost is filled by flats, and the water is shoal for over 0.2 mile from shore. **Echo Cove,** the east bight, has its entrance 2 miles eastward of Point Bridget. Its entrance is nearly blocked by a flat making out from the west point, leaving a very narrow channel, which follows the east shore at a distance of 150 yards and has a least depth of 2¾ fathoms. Inside, the depths are 8 to 11 fathoms, and small vessels using caution can enter and find secure anchorage in 8 to 10 fathoms. A rock awash at one-fourth tide lies 220 yards southeastward of Point St. Mary.

Point Sherman, on the eastern side of Lynn Canal about 9 miles north-northwestward of Berners Bay, is prominent and is marked by an unused lighthouse. Temporary fair-weather anchorage may be had in 16 fathoms, muddy bottom, in the bight northward of Point Sherman. In approaching from the southward give the point a wide berth.

Sherman Rock is 0.5 mile southwestward of Point Sherman and has about 1 fathom over it; it is marked by a lighted whistle buoy. A ledge, with 2 fathoms at its end, extends 0.4 mile northwestward from Point Sherman; it bares a considerable distance from the point at low water.

Chart 8303.—Comet is an abandoned settlement on the eastern side of Lynn Canal, about 0.8 mile northward of Point Sherman. The buildings are in the custody of a watchman. Roads extend to both the Comet and **Kensington** mines.

Sullivan Island, 6 miles long and about 1 mile wide, lies on the western side of Lynn Canal about 6 miles northwestward of Point Sherman. It is timbered and has several knobs on the southern end; the highest, about 500 feet in elevation, is separated by a saddle about 300 feet high from the 1,000-foot ridge at the north end.

Sullivan Rock, 129 feet high, lies off the southern end of the narrow wooded island 0.9 mile long which lies off the southern end of Sullivan Island.

Anchorage may be obtained in 18 fathoms, sticky bottom, in the bight in the west shore to the westward of the south end of Sullivan Island. Vessels entering from the southward should favor the islands. Entering from the northward the only danger to be avoided is the rock with ¾ fathom of water on it, which lies midway between the ends of Sullivan Island, 0.4 mile off the western shore of the island. A rock which bares has been reported in this vicinity.

Anchorage for small boats furnishing protection against northerly winds may be obtained in the small bight on the eastern shore of Sullivan Island near the southeast end. In entering avoid the reef which extends about 0.2 mile off the northeast entrance point.

Eldred Rock lies 7.5 miles north-northwestward from Point Sherman and 1.4 miles from the easterly shore of Lynn Canal. It is small and 50 feet high; a ledge extends about 300 yards northwestward from the rock; a rock lies 600 yards 325° from Eldred Rock Light.

Eldred Rock Light, 91 feet above water and visible 15 miles, is shown from a white octagonal tower on a building. A fog signal is sounded on a two-tone air diaphone. The radiobeacon at the light is synchronized for distance finding.

Chilkat Islands, a chain of four wooded islands, extends 5 miles in a south-southeasterly direction from Seduction Point, the southeastern end of the peninsula which separates Chilkoot and Chilkat Islets. **Kataguni (Seduction) Island,** the southern one, lies about 2.5 miles north-northwestward of Eldred Rock. **Shikosi Island,** next northward of Kataguni Island, has a bight in its northern side which affords anchorage for small craft with shelter from moderate southerly winds. A shoal with depths of as little as 1 fathom over it and terminating in a rock bare at low water, extends over 0.2 mile northward from the eastern point of the bight. Favor the westerly point of the bight in entering. A daybeacon marks the northeast point of **Talsani Island,** the northern of the Chilkat Islands.

Chilkat Inlet, the western arm at the head of Lynn Canal, is 9 miles long in a northwesterly direction, from Seduction Point to McClellan Flats at the mouth of Chilkat River. At 2.5 miles from Seduction Point, the arm is narrowed to 0.8 mile by Glacier Point, the moraine of Davidson Glacier; it then expands to 2.5 miles and maintains this width for some distance, narrowing to 2 miles at its head.

Seduction Point is the extremity of **Chilkat Peninsula** which separates Chilkoot and Chilkat Inlets. Near the end is a 450-foot knob, then a depression and a gradual rise to a knob 1,450 feet high, 2 miles from the point. **Dalasuga Island,** small and wooded, lies about 0.3 mile to the westward of the point. A rock, bare 3 feet at low water, lies 1 mile northwestward of Seduction Point.

The eastern shore of Chilkat Inlet is very irregular. The shoreline consists of gravel and boulder beaches with short, rocky sections. There are several bights which furnish fair-weather anchorage for small boats.

Glacier Point is the wooded and grassy moraine of Davidson Glacier, on the west side, at the entrance to Chilkat Inlet. A flat, bare at low water and about 0.2 mile wide, borders the western shore for 2 miles southward and the same distance westward of Glacier Point, but at the point it is only 200 yards wide. There are several small vegetable ranches in the vicinity. From the point to **McClellan Flats** the shore is partly rocky, partly a boulder beach.

Davidson Glacier lies back of the narrow wooded moraine at Glacier Point. It slopes uniformly back from the moraine.

A ledge, bare at low water, extends 0.2 mile southward from the point on the eastern shore northeastward from **Chilkat Point** and westward of **Kalhagu Cove.**

Kochu Island, located about 2.3 miles northward from Glacier Point, is low, small, and thickly wooded. A long, narrow ledge extends about 0.4 mile southward from the island. The passage between the island and the eastern shore is obstructed by a ½-fathom spot in mid-channel and by a reef which extends about 0.3 mile from the eastern shore in the direction of the ledge off the southeast end of Kochu Island. **Lehunua Island,** small and wooded, lies to the eastward of the center of Kochu Island, close to the eastern shore of the passage. A rock, awash at half tide, lies close to the northwestern end of Lehunua Island.

Letnikof Cove, on the east shore of Chilkat Inlet, about 1.6 miles northward of Kochu Island, affords anchorage for small craft, exposed to northwesterly winds near the head of the cove, in 6 to 10 fathoms. A cannery and wharf are on the south side of the cove near the head. The wharf has a face 30 feet long with a least depth alongside of about 25 feet. Fresh water is available through a pipe line. The cannery maintains a

general store and a small machine shop during the season. The company stores a limited supply of fuel oil, Diesel oil, and gasoline for its own use.

The entrance point to the cove is marked by Letnikof Light, 25 feet above water and visible 5 miles, which is shown from a white wooden house. The light is obscured from 256° to 359°. The light is maintained only when the local cannery is in operation.

Jenkins Rock, with 1¾ fathoms of water over it, lies 0.2 mile from the northeastern shore, 1 mile northwestward from the entrance to Letnikof Cove. Less water than is charted has been reported on this rock.

Magnetic disturbance.—In Chilkat Inlet south of Jenkins Rock the variation is 7° west of normal.

Pyramid Harbor is a bight in the western shore of Chilkat Inlet about 5.5 miles northwestward from Glacier Point. Anchorage can be had in the middle of the harbor in about 20 fathoms, with sufficient swinging room for a single vessel. This is the best sheltered anchorage and holding ground for vessels in Chilkat Inlet. Remains of a cannery are visible on the south side of the harbor.

Anchorage Point, the southeast point of the entrance to Pyramid Harbor, is low.

Green Point, the northwestern point of Pyramid Harbor, has a shoal on its northern side to a distance of 400 yards with depths of 1 to 2 fathoms. From this shoal a ridge extends eastward for about 0.6 mile with depths of 2 to 3¾ fathoms.

Pyramid Island, about 1.2 miles to the northward of Anchorage Point, grass-covered and 86 feet high, is surrounded by a shelving beach and connected with the northeastern shore by a spit, bare at lowest tides. There are roadstead fair-weather anchorages on both the northwest and southeast sides of the spit. The edge of McClellan Flats at the mouth of Chilkat River lies about 1 mile northwestward of Pyramid Island.

Chilkat River is a shallow stream about 50 miles long, flowing in a general southeasterly direction, and at its mouth is about 2 miles wide. This mouth is so choked with sand bars as to be practically closed for anything except canoes, and the bar at low water appears as if dry clear across. The village of **Klukwan** may be considered the head of boat navigation, though small canoes may go somewhat farther. A wagon road follows the river starting from Haines.

Chilkoot Inlet, the eastern arm at the head of Lynn Canal, extends 12 miles in a northerly direction, with an average width of 2 miles, and then divides; the eastern and principal arm, called **Taiya Inlet,** trends northward for about 13 miles, and has a width of 1 mile. Chilkoot Inlet has on its east side, and Taiya Inlet on both sides, lofty mountains with glaciers in their gorges. The mid-channel depths are great throughout. Katzehin River Flat and Indian Rock are the only dangers.

Magnetic disturbance.—Local magnetic disturbances of 3° to 5° from normal have been observed in mid-channel of Chilkoot Inlet from Kataguni Island to Low Point. Larger disturbances have been found along the west side of the inlet as follows: South of Seduction Point, 13° west of normal; just south of Battery Point, 15° west of normal, shifting to 9° west 0.8 mile southward; the variation is from 9° west to 5° east of normal in Portage Cove.

Flat Bay, on the western shore 4 miles from Seduction Point, is a shallow cove of small extent, from which low land extends across the peninsula to Letnikof Cove.

Katzehin River enters Chilkoot Inlet through a deep valley on the easterly side of Chilkoot Inlet, 14 miles above Eldred Rock Light. From the mouth of the river a flat,

bare at low water to its outer edge, extends two-thirds of the distance across the inlet, and alongshore for 1.5 miles on either side of the mouth. The west edge of the flat is marked by a lighted bell buoy moored in 13 fathoms of water.

Battery Point is on the west side of Chilkoot Inlet, 8 miles northward of Seduction Point. Battery Point Light, 50 feet above water and visible 9 miles, is shown from a white wooden house. The light is obscured from 343° to 157°. **Kelgaya Bay** is a small cove on the north side of Battery Point.

Portage Cove, on the west shore, about 2.5 miles northwestward of Battery Point, affords the best anchorage and shelter in Chilkoot Inlet. The anchorage is about 0.2 mile off the wharf in 12 to 15 fathoms, soft bottom. Northerly winds blow home and bring in some little sea. From the anchorage the water shoals gradually to a gravel and boulder beach, which is bare some distance out at low water, and the water is shoal 200 yards from shore. A buoy is moored in 38 feet of water off **Nukdik Point.**

Haines is a small town and post office on the west side of Portage Cove. It is at the southern end of the highway running along the Chilkat River northward through the Porcupine Mining District and connecting with the Alaska Highway. Though Haines is not a port of entry, representatives of the Bureau of Customs and the Immigration and Naturalization Service are stationed in the town. A U. S. Commissioner is in Haines. Supplies and provisions can be obtained in limited quantities. Alaska Communication Service maintains radiophone contact with the States, points in Alaska, and with western Canada. A small ferry hauling pedestrians, automobiles, and freight operates between Haines, Skagway, and Juneau. There is daily airplane service.

Chilkoot Barracks, 0.5 mile south of Haines, is a de-activated Army post. The only wharf at this point, in 1951, had deteriorated to such an extent as to be practically useless.

Low Point, on the eastern side of Chilkoot Inlet, 2.6 miles northeastward of Haines, is marked by Low Point Light. The light, 35 feet above water and visible 9 miles, is shown from a white wooden house, and is obscured from 175° to 332°.

Indian Rock, lying 1 mile northwestward of Low Point, is a dangerous reef, about 0.2 mile long east and west, at the eastern end of which is a pinnacle rock, awash at lowest tides. It is marked by a buoy placed close southeastward of the rock.

Lutak Inlet, the western arm of Chilkoot Inlet, is 5 miles long. At its head it receives **Chilkoot River,** a short stream which drains **Chilkoot Lake;** at the mouth of this river is a flat nearly 0.5 mile wide. Anchorage with good holding bottom for large vessels can be had in a depth of 40 fathoms about 2.5 miles from the head of the inlet to 20 fathoms about 0.8 mile from the head.

Taiyasanka Harbor, about 5.8 miles northward of Battery Point, is a small harbor at the foot of the **Ferebee River** valley. The harbor has a narrow entrance, and is about 1 mile long and 0.5 mile wide, protected from southward but exposed to winter winds drawing down the **Ferebee Glacier.** There is 12 fathoms in the narrow entrance, which is 100 yards wide and close to the west side. A spit extends over half way across the entrance from the west end of the bare part of a moraine that nearly closes the entrance. The tidal currents have an estimated maximum velocity of 3 knots in the entrance. Small craft can select anchorage near the southeast end of the basin in 8 to 15 fathoms, soft bottom.

Nahku Bay (Long Bay) is the narrow bay between Skagway and the head of **Taiya Inlet.** Good anchorage is available in mid-channel in 30 fathoms about 0.5 mile from the head. The bottom is sticky mud; it shoals gradually. During the summer with the pre-

vailing southerly winds, there is little protection from the short choppy seas coming in from Taiya Inlet.

Taiya River, at the head of Taiya Inlet, is navigable for small boats and canoes as far as high water can be carried, which is but a short distance above the mud flats. Canoes can be poled or towed by line for a greater distance.

Skagway, a city on the delta formed by the Skagway River at the northerly terminus of the Inside Passage to Alaska, is essentially a transfer point between water and rail shipping routes. It is the ocean terminus of the White Pass and Yukon Route (Pacific & Arctic Railway & Navigation Company). It is also the terminus of a branch of the Canol pipeline.

The **Skagway River** originates in White Pass at the boundary between British Columbia and Alaska, and flows southwestward for 14 miles. Because of its shallow depths and swift currents, the river is not navigable. A breakwater extends along the southeast side of the river channel and about 525 yards across the flats.

The anchorage is in 30 to 35 fathoms, soft bottom, near the eastern side about 300 yards from the wharf, with the point on the west side of Nahku Bay just shut out by **Yakutania Point.** The anchorage space is small, and the winds draw through the valley and anchorage. With northerly gales a vessel is liable to drag anchor because of the steep pitch of the bottom, and under such conditions a safer berth can be had at the wharf. The north side of the anchorage is formed by the flat of Skagway River, the edge of which extends eastward from Yakutania Point at the end of the western wharf. Protection from the north can be obtained in Nahku Bay for vessels under 200 feet in length. Large ships can anchor in Latak Inlet.

The Federal project provides for a small-boat basin with a depth of 8 feet, of about one acre in area, near the north end of the wharf. In June 1951 no work had been done on this project.

The White Pass and Yukon Route maintains a hospital where emergency space is available. A doctor is in attendance at all times.

Skagway is a port of entry and marine documents are issued. The Immigration and Naturalization Service has an office here. A United States deputy marshal and a commissioner are stationed in the city.

The outer or southern section of the railroad wharf has a face of 165 feet and a least depth alongside of 22 feet. The inner or main section has a face 970 feet long between the small-boat float and the point where it bends inshore to form the outer or southern section. The depth in 1951 ranged from 20 to 43 feet alongside. The shoal or 20-foot depth was about 100 feet east of the automobile elevator. The float for small boats has a depth varying from 7 to 20 feet.

Either port or starboard landings can be made, but larger vessels customarily favor the latter. During the falling tide the current sets toward the wharf so that a vessel departing from the northerly half of the wharf has difficulty clearing another vessel moored at the southerly end.

Warehouse and railroad freight sheds are maintained on the wharf. An elevator for unloading automobiles from sidedoor-loading ships is at the middle of the face of the wharf.

Two barge terminals are on the tide flats; the one at the foot of State Street is seldom used and has not been maintained. The other, along the approach to the railroad wharf, is in use and in good condition.

The White Pass and Yukon Route is a railroad of 3-foot gage, 111 miles long, extending from tidewater up the Skagway Valley to White Pass and across the international boundary to Whitehorse, the head of navigation on the Yukon River.

A limited supply of coal is usually kept on hand. Gasoline and oil are available. Water is piped to the wharf. Provisions of all kinds and a few articles of ship chandlery can be obtained. A berth for beaching small vessels can be selected on the flats.

Skagway has regular passenger, express, and freight services by vessels to Puget Sound, Canadian, and Alaskan seaports. It is connected by regular plane service to the other Alaskan towns and cities. A small ferry which hauls passengers, freight, and autos operates between Haines, Juneau, and Skagway. The Alaska Communication System maintains telephone, radio, and cable connections with points in Alaska, Canada, and the United States.

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CHAPTER 11

Chatham Strait

Chart 8002

CHATHAM STRAIT is the most extensive of the inland passages of southeastern Alaska. It is 18 miles wide at its entrance between Cape Ommaney and Coronation Island and 14 miles between the cape and the west shore of Kuiu Island, with a length of 138 miles from Coronation Island northward to Rocky Island. The main strait is clear, open, and deep throughout but some of the bays and bights are foul. In the winter ice forms in many of the bays and inlets, particularly those into which large fresh-water streams empty and which have narrow entrances. The west shore as far as Point Augusta is high, bluff, and rugged, and free from hidden dangers in the way of navigation from point to point, except in the vicinity of the easterly entrance to Peril Strait. The water is shoaler on the eastern side and the reefs extend out farther, but in most cases they are in the bights and bays, and in no case do they extend out beyond a line drawn 0.5 mile off from point to point, except a ledge about 1 mile offshore at Point Crowley.

Soundings are not a sufficient guide in these waters in thick weather, 20 and 30 fathoms being frequently found within a few yards of the shore, while 0.2 mile from the shore, 100 to 200 fathoms are not at all unusual. An almost universal feature is the occurrence of flats, with one or more small streams, at the head of all bights and inlets. The slope, from 8 to 10 fathoms to a few feet, is abrupt, and in approaching the head of an inlet at high water, care should be exercised in anchoring to give the flats a sufficient berth to avoid grounding at low water.

Harbors and ports.—The most important herring fisheries in southeastern Alaska center in the lower part of Chatham Strait. Salteries or reduction plants are located in Port Conclusion, Port Armstrong, Port Walter, Port Herbert, Deep Cove, Bay of Pillars, and Washington Bay. Salmon canneries are located in Bay of Pillars, Hood Bay, Tenakee Inlet, and Hawk Inlet. Not all of these plants were operating in 1951. Many of these plants operate general stores and radio stations during the season.

Port Alexander is a post office and the headquarters of a large fleet of salmon trollers. Small settlements and post offices are also located at Baranof, Angoon, and Tenakee Springs. There is a post office at Hawk Inlet.

Weather.—The wind generally draws through Chatham Strait parallel to its axis, but if from northeast, will come down Frederick Sound and be felt in heavy squalls through the divides in the mountains on the east side. It sometimes draws through Tenakee Inlet and Peril Strait if blowing strong northwest outside. Most of the west shore is so high and bluff that the strong southwest winds cannot blow down into the strait, but draw around

Cape Ommaney and northward through the strait, usually bringing fog and rain as far as Point Gardner.

Currents.—In Chatham Strait, the current has a maximum velocity of 1 to 3 knots, depending on the range of the tide. The flood sets northward in the strait, entering Frederick Sound and Peril Strait and meets the flood from Icy Strait and Cross Sound between Points Hayes and Augusta. Strong tide rips are found around the various points, sometimes extending a mile or more into the strait when the current is strong. These are dangerous for small, open boats, especially at points surrounded by broken ground. Sometimes, however, they will be encountered well offshore without apparent cause.

Along the east shore from Cape Decision to Point Crowley, a strong northwesterly set has been noted during the flood. During the ebb the current in the opposite direction is weak, and very often there is a northwest eddy. The current seems to travel along the shore in definite streams. The outer limit of the current stream is marked by drifting material, and the difference in current on either side can be noted. It appears that the flood current travels from the sea toward and up the east shore of the strait and that the ebb is strongest on the west side.

In the middle of the strait, eastward of Point Thatcher, the velocity of either flood or ebb at strength is about 1½ knots.

In the middle of the strait, between Killisnoo and Tenakee Inlet, the velocity of either flood or ebb stream is about 1½ knots. For predicted times and velocities, the *Current Tables, Pacific Coast,* should be consulted.

Directions.—Courses and distances through the lower part and through the upper part of Chatham Strait are given in Chapter 3.

Chart 8252.—In approaching Chatham Strait from seaward, Hazy Islands are distinctive from their position and form a good landmark when they can be seen. They are also sometimes useful for fixing the position when it is thick inshore. The passage between them and Coronation Island is clear. Cape Ommaney is high and an important landmark. The summit back of the cape appears as a rounded knob with gentle sloping shoulders which drop steeply to the water's edge. In approaching from the westward in thick stormy weather, there is a possibility of mistaking the high land northwestward of Larch Bay for that of the cape.

From Sumner Strait, vessels enter Chatham Strait between Cape Decision and the Spanish Islands. Very dense fog has at times been observed in the southern part of Sumner Strait which extended about 1 mile to the westward of Cape Decision beyond which it was clear. Approaching from the southward, it is suggested to make Coronation Island and pass between it and Hazy Islands. In thick weather, should Coronation Island not be sighted, a sharp lookout should be kept for Hazy Islands. Whistle echoes along the Coronation Island coast on either side of Windy Bay have usually been found sharp and distinct. The current sets northwest along the coast, with an estimated maximum velocity of 1 knot, depending on the wind, and should Coronation Island not be sighted a vessel may be set toward Cape Ommaney. There are several dangers off the northern side of Coronation Island. When once in Chatham Strait the navigation is easy, for it is wide and comparatively clear, with fair steamer anchorages at short distances.

Cape Decision radiobeacon will be of great assistance to vessels equipped with a radio direction finder in making the entrance to Chatham Strait.

Hazy Islands are about 8 miles westward of Coronation Island. They form two distinctive groups which are separated by a channel 1.2 miles in width with depths of 25 to 40 fathoms. The northwestern group consists of three prominent islets, the largest of which, **Big Hazy Islet,** is conical in shape, bare of vegetation except a spare grassy growth, and has an elevation of 258 feet. The second largest of this group, about 0.3 mile to the northwestward, has three sharp, well-defined summits, 161 feet, 113 feet, and 108 feet high, respectively. The smallest of the group consists of two jagged rocks which are connected at low water but appear as one islet with two summits 88 and 50 feet high.

The southeastern group is low. The northern islet of this group has two grassy knobs, 67 feet and 52 feet high, and a very sharp pillar-shaped knob 58 feet high. Off the southeastern side of this islet are two rocks, close-to, with an elevation of about 10 feet.

The southern islet of this group is a very low rocky reef averaging in elevation 10 feet on the north end and 25 feet on the south end. A breaker is about 300 yards off the south end of the islet.

Hazy Islands are a National Wildlife Refuge under the jurisdiction of the U. S. Fish and Wildlife Service.

In navigating in this section in thick weather, the northern group of islets can usually be seen in time to avoid trouble, but the southern group is dangerous. Although the lead gives evidence of shoaling, it is very slight until within less than 0.5 mile of the islets.

Currents are irregular. The coast currents in this section appear to set northwesterly at from ½ to 1 knot, but in the vicinity of the islets appear to be modified by the tidal currents from Chatham Straits. Currents with a northerly set, varying from ¼ to ¾ knot; were found 5 miles northward of the Hazy Islands.

Cape Ommaney, the western point at the entrance to Chatham Strait, is a remarkable promontory terminating in **Ommaney Peak,** a bluff, rugged, rocky mountain, 2,005 feet high, detached from the higher land northward by a low depression running through from Port Conclusion. **Wooden Island,** 250 feet high and sparsely wooded, is close southeastward of Cape Ommaney.

Cape Ommaney Light, on Wooden Island, is shown from a white wooden house; it is 190 feet above water and visible 11 miles. The light is obscured from 122° to 250°.

Chart 8173.—Helm Point and the dangers to southward of Coronation Island are described in Chapter 7.

From Helm Point to Windy Bay the shoreline of Coronation Island is rugged and rocky, with steep brown and yellow-covered cliffs. In the bight westward of Helm Point is a rock awash. Between Helm Point and Windy Bay are off-lying rocky islets, the outermost of which is 1.3 miles 276° from Helm Point and about 0.5 mile offshore. It is about 40 feet high, of a grayish color, without vegetation, with deep water close-to, and is generally visible in moderately thick weather.

Windy Bay, on the western side of the island, about 2 miles long, 1.8 miles wide at the entrance and 0.6 mile wide inside, is well protected from the sea by rocks and reefs which extend from the north shore of the entrance to within 0.3 mile of the south shore. The outermost rock, 78 feet high, has the appearance of a boulder; from it, 0.2 mile 172°, is a rock awash at low water. From the outer rock, 0.4 mile 081°, is a small grassy islet 25 feet high. A line of breakers usually shows on the reefs.

The shoreline of Windy Bay is rocky. At the head of the bay is a sand beach about 350 yards long and a deposit of sand is near the mouth of the stream on the southern side of the bay.

The depression in which the bay lies is readily distinguished from offshore, although the surrounding peaks are high. From offshore, Windy Peak is a good landmark. The entrance is southward of the reefs. Follow the general trend of the southern shore about 330 yards off. When approaching the inner point where the bay narrows, change course so as to pass about 220 yards off the point; beyond, the bay is clear. A rock awash, marked by kelp, is 500 yards 312° from this point. Depths of 15 to 20 fathoms are carried through the channel.

Anchorage may be had in 22 fathoms, mud and sand bottom, off the stream on the southern side of the bay or near the head, but swinging room is restricted. The stream may be identified by the grassy area near its mouth. Fishing boats and other small craft may anchor in shoaler water closer in. During southeast gales the wind is felt with considerable force, and the depths throughout the bay, averaging about 30 fathoms, mud bottom, are too great for secure anchorage.

From Windy Bay to Nation Point, the northwestern point of the island, the shore line is rocky and rugged. Off the rounding point, about 1.8 miles to the southwestward of Nation Point, are two rocks about 300 yards offshore; the southern rock shows breakers in moderate weather, the northern rock is bare at low water.

Nation Point, at the northwest end of Coronation Island, is rocky, with breakers close-to on the western side. Depths of 16 to 40 fathoms were obtained 0.3 mile from the point. The land rises rather steep to an elevation of about 900 feet, then with a gradual slope to Pin Peak.

From Nation Point to Cora Point, the shoreline is cut up by numerous bays and inlets, the principal ones being Egg Harbor and Aats Bay, both affording anchorage. **Aats Point,** about 2.3 miles to the eastward of Nation Point, is a prominent rocky point. The land rises in a timbered ridge of moderate slope to an elevation of 1,305 feet, 0.8 mile from the point.

Egg Harbor lies on the eastern side of Nation Point, directly under Pin Peak. It is about 1.2 miles long, 0.3 mile wide, and is a secure anchorage, except from northerly winds. The shoreline half way to the head of the bay is rocky, beyond which it is sandy. About 0.5 mile within the entrance, on the western shore, are caves about 30 feet high, two shacks, and a white boulder beach which can usually be picked up at night. A trail leads from this place to near the summit of Pin Peak, where mining operations were formerly carried on.

Off the western point of the entrance, 0.2 mile distant, is a rock which bares at low water. Kelp extends from the shore to about 20 yards beyond the rock. In entering the bay at night, the rock off the western point is the main danger, as it can seldom be picked up and usually does not show as a breaker.

Off the eastern point of the entrance is a rock about 10 feet high. About 160 yards to the northwestward of this rock is a rock which bares at half tide and which at high water usually shows as a breaker.

The channel between the rocks off the points is about 500 yards wide. A mid-channel course, 170° between the rocks, carries in safely. Anchor off the shacks in 5 to 7 fathoms, sand bottom. During southeast gales, williwaws sweep down with considerable force, and heavy ground tackle is necessary to prevent dragging. On the east side of the bay,

halfway to the head, is a small bight used by fishing craft, as it affords better protection. Near this place is a low portage to the bay to the eastward.

Alikula Bay, to the westward of Egg Harbor, is about 1 mile long and from 0.8 to 0.2 mile wide. The bay is free from dangers and anchorage can be selected according to the size of vessel in either the outer or inner part of the bay.

Aats Bay, to the eastward of Aats Point, has two arms. The western arm is too deep for secure anchorage; the eastern arm affords anchorage in 6 to 8 fathoms, sand and mud bottom. There is a sunken rock marked by kelp in the middle of the entrance; at times, there is a kelp patch about 200 yards to the southward of the rock. Favor the eastern shore in entering. During severe southeasterly gales, williwaws are felt with considerable force, and heavy ground tackle is necessary to prevent dragging. The bay is exposed to northerly weather.

Gish Bay is about 1 mile eastward of Aats Bay; it is about 0.8 mile long and 0.5 mile wide, with sunken rocks midway between the entrance points. The bay is full of kelp in which depths of 4 to 6 fathoms were found; shoal water extends 0.2 mile from its head. It is not suitable as an anchorage. Marking the entrance 0.5 mile offshore is **Channel Island,** a small islet with a few trees on it. The islet shows up well from easterly and westerly directions and during moderately thick weather is a good landmark.

From Aats Bay to Cora Point the shoreline is irregular. Near Cora Point, on the northern shore, is **Shrub Islet,** a small rocky islet with a few scrubby trees on it. Rocks extend off the northeasterly point of the island about 120 yards. Southward of the islet is a small cove where small launches anchor in 5 to 10 fathoms.

Dangers.—The rocks off the southern end of Coronation Island are described under Helm Point. The most important dangers off the northern coast are as follows: A 2-fathom spot, which during heavy weather shows as a breaker, lies 2.2 miles 017° from Nation Point; it is not marked by kelp. A rock, awash at three-quarter tide, is 1.1 miles 347° from Aats Point. A very heavy breaker 0.2 mile southward of the rock was occasionally observed during a severe gale, but the shoalest depths found were 12 fathoms. An 8- to 10-fathom patch, marked by kelp during the summer months, is 0.4 mile westward of the rock. A rock, awash at low water, is 0.5 mile 052° from Aats Point.

The channel between Coronation Island and the Hazy Islands is clear. Spanish Islands and Cape Decision are described in Chapter 7.

Chart 8252.—Point Howard, about 5.5 miles northwestward of Cape Decision, consists of a detached rocky ledge back of which several bare mountain peaks, including **Mount McArthur,** are grouped. The wire drag passed within 0.1 mile off this point and all dangers are charted.

Howard Cove, between Cape Decision and Point Howard, is open to the westward and is not considered a secure anchorage. The channel leading to it is close to the northern, rocky islet of a group of islands that help to inclose the southwest side of the cove. It is narrow and partly covered with light kelp. A sunken rock with 1¼ fathoms of water over it is 200 yards 051° from the northern end of the rocky islet. It is on the south side of the channel but in the area of thick kelp. A rock, baring at half tide, is about 0.5 mile 270° from the rock islet. The channel is approached on a **050°** course heading to pass 50 yards off the north end of the bare, rocky islet. By keeping in the area of thin kelp, the sunken rock can be avoided. The channel could not be wire dragged on account of the kelp, and the use of the cove is recommended only for small craft with local knowledge.

Crowley Bight, a fair-weather anchorage, is an indentation in the shoreline between Point Howard and Point Crowley. It is exposed and affords poor holding ground. Follow a mid-channel course until Point Crowley Light is approximately in range with the tree line. Anchor in 20 to 23 fathoms, rocky bottom.

Point Crowley is a prominent headland on the eastern shore 8 miles northwestward of Cape Decision. The point is flat at the end, but rises rapidly by an upward sweep to a head, probably 1,200 feet high; it then slopes upward less rapidly to a cone-shaped mountain 2,060 feet high, and sparsely wooded. Most of the higher peaks in this vicinity are bare. A group of rocks, covered at high tide and on which the sea breaks at practically all stages of the tide, is about 1 mile southwestward from the point. The passage between the rocks and the point has been wire dragged and may be used safely to take advantage of the prevailing northerly current when northbound.

Point Crowley Light, 45 feet above water and visible 9 miles, is shown from a white wooden house. The light is obscured from 170° to 343°.

The north entrance point of **Table Bay** consists of an island close to a tongue of low land, which affords some shelter from the swell in the north arm of the bay. Temporary anchorage may be had in 13 to 16 fathoms, mud bottom, favoring the west shore and taking care not to anchor too close to the rocks, awash at high tide, off the north shore of the arm. In the northernmost part of the northern arm is a good place to beach a vessel in case of emergency. Fishing vessels generally anchor in the southeast arm of the bay. At high water small craft can enter the landlocked cove on the west side of the north arm by passing between the wooded island on the north side of the cove and the rocky islet south of this island. At low water there are bare rocks in this entrance.

The entrance to Table Bay is marked on each side by bold, rocky bluffs from 70 to 100 feet high. These bluffs are very distinctive in color, those on the north side being dark while those on the south side are light and show prominently when in the sun. The low gap at the east end of the bay is prominent in contrast with the high land on either side.

Chart 8299.—Port Malmesbury is on the eastern side of Chatham Strait, 18 miles northward of Cape Decision. Its entrance is a little over 1 mile wide and it extends inland in a northeasterly direction for about 5 miles. On the easterly side of the port two arms, one about 1 mile inside the entrance and the other near the head, extend for about 2 miles in a southeasterly direction. There is also a short arm on the westerly side about halfway between the entrance and the head of the port.

A reef extends about 350 yards off the point on the northern side of the port about 1.2 miles inside the entrance. A rock near the southern extremity of this reef extends a few feet above high water. The bight west of this reef affords fair-weather anchorage, protected from northerly winds, in 15 fathoms, soft bottom.

The small arm on the north side has a narrow entrance channel with dangers on both sides. The channel has been wire dragged. Vessels entering should favor the southern shore in the narrow entrance. Good anchorage is inside the arm in 7 to 10 fathoms, mud bottom. A small sawmill is at the head of the arm.

The shore near the south entrance point is irregular and foul, but only a few rocks are separated from the low-water line. The head of the first arm on the south side affords anchorage in 17 to 18 fathoms. Favor the west side near the head to avoid the 3¾-fathom shoal shown on the chart.

In the second arm on the south side, anchorage may be had in 7 to 16 fathoms, mud bottom. The channel to the basin at the head of this arm is narrow with 3¾ fathoms at its entrance, but can be entered by small vessels with safety.

At **Point Harris**, the north entrance point to Port Malmesbury, a bare rocky platform, 40 to 50 feet high, extends 0.2 mile out from the tree line. Back of the point the land rises, gradually at first and then more abruptly, to form a prominent detached peak 1,530 feet high. This mountain has a dark green growth of timber on the west slope and a large yellow landslide on the south slope. A rock bare at extreme low water, unmarked by kelp, is 0.2 mile southward of the point. Point Harris Light, 25 feet above the water, is shown from a small white house on the north side of the entrance to Port Malmesbury. The light is obscured from 181° to 308°.

One-half mile eastward of Point Harris is another prominent point. Its face is a steep bluff of light gray rock. The land rises abruptly here to form a small knob; the low land back of this knob rises uniformly to the first-mentioned peak. The knob is prominent from a northwesterly direction and is visible over Point Harris.

Harris Cove, between Port Malmesbury and Gedney Harbor, extends nearly to the basin at the northwest end of Port Malemsbury, with low land between. This bight is used by small craft for anchorage in all but westerly weather.

Point Cosmos is about 3.5 miles northward of Point Harris. It rises by several broad terraces to a bare-topped mountain. A number of bare rocks are within 0.5 mile of the point, and 1 mile below the point is a wooded islet with a number of bare rocks southward of it in the entrance to the foul bight above Point Harris. At Point Cosmos the shore trends northeastward for nearly 2 miles to the entrance of Gedney Harbor.

Chart 8271.—Gedney Harbor has its entrance on the eastern side of Chatham Strait 2 miles northeastward of Point Cosmos. The harbor is a horseshoe-shaped cove, averaging about 0.2 mile in width, which surrounds a wooded island over 1 mile long. The passage eastward of the island is blocked at its northern end by rocks and reefs.

The entrance to the harbor is on either side of a ledge about 400 yards long lying less than 0.2 mile west of the island. The northwest and southeast ends of the ledge are bare heads which show but a few feet above the highest tides. The channels on each side of the ledge have been wire dragged and are clear in mid-channel. From the south point at the entrance, a bare ledge having kelp close around it, extends a short distance. About 0.2 mile southeast of the ledge the passage southwestward of the island is narrowed to a width of 200 yards by a sharp point projecting from the main island. Kelp and shoal water extend about 50 yards off the point but no dangers were found with the drag at a greater distance offshore.

A ledge having kelp extends a short distance from the southern extremity of the island; a rock just shows at high water about 25 yards from the island. A fish buying scow is anchored in the harbor from May 1 to September 20. All supplies for fishermen, including food, fresh water, and fuels are available. There is a float 280 feet in length with 5 fathoms of water alongside. The harbor is used extensively by fishermen during season.

Anchorage is available in most parts of the harbor in 6 to 12 fathoms, mud bottom.

Tebenkof Bay is on the eastern side of Chatham Strait just north of Gedney Harbor. Its entrance, between Point Ellis on the north and **Swaine Point** on the south, is about 8

miles wide. The bay extends inland for about 7 miles and branches into three arms of irregular shape. The high regions north and south of the entrance merge into the low-lying hills that cover the entrance islands and the long projecting points of the bay. The islands inside the bay and the east shore are low; this extensive low area is a distinctive feature of the locality. Fox farms have been established on some of the islands but they are the only commercial development in the bay.

Windfall Islands are three islands lying from 1 to 2 miles northward of Swaine Point. **Troller Islands** are six islands just northeastward of Windfall Islands. They are separated from Kuiu Island by **Helianthus Passage,** a narrow passage obstructed by a 2-fathom rock near mid-channel at its south entrance. There are strong currents in this passage during spring tides. **Troller Point** is the most northerly point of the Troller Island group.

From some distance offshore in Chatham Strait the Windfall and Troller Islands appear as a continuous stretch of shoreline. The flat-topped, 350-foot hill on the northern Windfall Island, being the highest in the locality and in the foreground, is quite prominent. From the vicinity of Point Ellis, the northernmost wooded island of the Troller group stands out alone, and the Troller and Windfall groups appear separated.

Davis Rock is a bare, gray rock about 18 feet high, in the entrance to Tebenkof Bay about 1 mile northwestward from Troller Point. It forms an excellent landmark for entering the bay. Southwestward from the rock are a number of shoals and submerged pinnacle rocks as shown on the chart. A rock similar to Davis Rock in appearance is off Troller Point.

Explorer Basin lies between Kuiu Island and the off-lying Windfall and Troller Islands. It affords fair anchorage during southerly weather. The entrance is obstructed by shoals off Swaine Point and the southernmost Windfall Island, but has been wire-dragged and found clear in mid-channel.

Thetis Bay, the south arm of Tebenkof Bay, affords excellent anchorage near its head in 9 to 10 fathoms, mud bottom. The entrance has been wire-dragged and found clear.

The entrance to **Petrof Bay,** the southeasterly arm, is endangered by numerous reefs and shoals. The northern side of the entrance channel is marked by **Tebenkof Bay Light,** 14 feet above water, shown from a small wooden house on a small island. The light is obscured from 158° to 323°. A beacon, 14 feet high, is on a rock awash, 1.7 miles 144° from the light.

Good anchorage can be selected in various parts of Petrof Bay; the chart is the best guide.

Piledriver Cove is a small cove on the north side of Tebenkof Bay, 4 miles eastward of Point Ellis. A number of dolphins have been established in the cove for use in mooring pile drivers.

Happy Cove, on the north side of the bay 3 miles eastward from Piledriver Cove, is well sheltered. Its entrance is marked by two islands, one bare and one wooded. The inner cove, separated from the lower part by a narrow channel, has sand bottom and beach. It is much used by fishermen for beaching their vessels.

Gap Point is the southernmost extremity on the north shore about 1.5 miles southeastward from Happy Cove. From the entrance to Tebenkof Bay, it is distinguished by a gap in the tree line back of the point.

Elena Bay, the north arm, affords good anchorage at various places. The western entrance channel has been wire-dragged.

Directions.—Vessels may avoid the dangers and enter south of Davis Rock by steering **092°** with Troller and Gap Points on range until abreast Davis Rock and then heading halfway between Davis Rock and the islet off Troller Point. The entrance north of Davis Rock is clear and may be navigated easily with the aid of the chart. In approaching this entrance from southward, care must be taken to avoid the dangers southwestward of Davis Rock. Both entrances have been wire dragged. Small craft can enter the bay via Explorer Basin and Helianthus Passage.

Chart 8241.—The bight which is the entrance to the Bay of Pillars and to Rowan Bay is about 7 miles wide at its entrance between Point Ellis and Point Sullivan and indents the coast 2.5 miles in its main part. The two bays have secure anchorages. There are many islands, rocks, and reefs in the bight, especially between the two arms, but a deep channel leads into each arm.

Point Ellis, the south point of Bay of Pillars, is 16 miles northward of Point Harris. The point is low and rocky, with a high wooded ridge rising steep and bluff back of it, having two prominent landslides on its southern face, the easterly one being inverted V in shape. These slides are bare and can be seen for long distances from south or southwest. A bare reef is 0.6 mile northwestward of the point, with kelp between. Kelp extends 0.5 mile northward from the reef, and is marked at its extremity by a lighted bell buoy. A temporary exposed anchorage can be had about 0.2 mile from shore northward of Point Ellis in 10 to 12 fathoms, rocky bottom.

Bay of Pillars extends about 10 miles northeastward from Point Ellis, and is comparatively clear for 4½ miles, or 1 mile above the cannery. Above this the bay is foul and must be navigated with caution. To enter beyond 1 mile above the cannery keep the northerly of four small islands about 100 yards on the starboard hand and steer **066°** for the end of the point on the south side of the small bight in the center of the island directly ahead. Approach to within 150 yards of the point, then change course to starboard, following the south and east shore of the island, keeping it 150 yards on the port hand. From the northeast point of the island continue on approximate course **335°** until 300 yards beyond the point. Change course to **059°** and head for the two lone tree islets in mid-channel. Keep the lone tree islets on the port hand and follow a mid-channel course until near the larger wooded island lying in mid-channel. When the western end of the island is abeam on the port hand favor its shoreline until past the island, then to avoid the dangerous reef ahead on the port hand, favor the shore on the starboard side until the inner bay opens. The inner bay is clear of dangers and deep.

Anchorages can be found in the cove to the south just before entering the inner bay in 10 to 4 fathoms, mud bottom, and good anchorage in 2 to 7 fathoms, mud bottom, is found in any part of the arm leading to the south at the head of the bay.

There are strong tidal currents in the narrow entrance to the inner bay and it should only be entered at slack water.

A herring reduction plant and cannery are on the southeast side of the Bay of Pillars about 3.5 miles above Point Ellis. The reduction plant wharf has a face 120 feet long with a depth of 19 feet at the southwest corner, gradually increasing to 34 feet at the northeast corner. It is reported that a rock on which there is from 4 to 5 feet at mean lower low water, lies about 30 feet beyond the southwest corner and constitutes a danger should a vessel swing its bow inshore of the line of the face of the wharf.

The cannery wharf has a face 165 feet long, with a depth of 20 feet at the south corner, gradually increasing to 24 feet at the north corner. There is a depth of 10 feet at the end of the narrow wharf which extends offshore from the oil wharf, and a depth of 20 feet at the dolphin which lies off the narrow wharf.

Large vessels usually make a port landing at the reduction plant and cannery wharves. Fresh water can be had at either wharf. A general store and radio station are maintained during the season. Local mail boats stop here on regular schedule.

Anchorage can be had 300 to 400 yards northward of the cannery in 12 to 20 fathoms, but the bottom drops off abruptly, and care should be taken at high water to keep off the flat which extends 250 yards from the mouth of the stream northeast of the cannery.

Four small islands are on the southeast side of the bay 1 mile above the cannery, and a secure anchorage for small vessels is about 400 yards eastward of them and the same distance from the southern shore, in 10 to 11 fathoms. It is safer for a stranger to enter at low water. The channel is about 200 yards wide between the northern end of the islands and a group of bare rocks which show much larger at low water than at high. It then follows the east side of the islands at a distance of about 150 yards to avoid a sunken rock marked by kelp about halfway between these islands and the larger island 600 yards northeastward.

Rowan Bay has a very irregular bottom and much kelp and is suitable only for small vessels. Strangers should preferably enter at low water and exercise care.

A shoal of small extent, with a depth of 4 fathoms and deep water around it, is about 0.8 mile southwestward of the narrow entrance to Rowan Bay. It is marked by kelp.

The entrance to Rowan Bay, 5 miles northward of Point Ellis, is 600 yards wide, with depths of 10 to 20 fathoms and foul shores. Thence the arm trends about northeastward, curving northward, and widens to 0.5 mile. At 1.2 miles within the entrance there is an island in the middle and irregular bottom and kelp nearly across. The deep channel follows the southwest and southeast sides of the island at a distance of about 200 yards. The passage northward of the island has kelp across it and much foul ground.

Northward of this island the arm has a northerly direction for 2 miles, an average width of 1 mile, depths of 6 to 12 fathoms, and is a secure anchorage. Two large streams enter the head, and an extensive flat borders the entire north shore between them to a distance of over 0.5 mile, but the shoaling is gradual up to 3 fathoms.

Point Sullivan is low and wooded. The land rises gradually back to a ridge about 2,800 feet high, with the tree line 500 to 800 feet below the top. A chain of islands and bare rocks extend 1 mile southeastward from the point. Eastward of these islands is a bight 0.8 mile long and 0.4 mile wide, in the middle of the northern end of which temporary anchorage, open southward, can be had in 13 to 15 fathoms.

Washington Bay, on the eastern side of Chatham Strait, 2.5 miles northward of Point Sullivan, is 1.5 miles long and 0.2 mile wide, with deep water and high, steep sides. The entrance is not visible far from shore. The southern point at the entrance is marked by Washington Bay Light, 13 feet above water, shown from a white wooden house. The light is obscured from 248° to 055°. Rocks lie close to the northern point of the entrance, but the channel to the southward is clear.

A herring reduction plant is on the northern shore of Washington Bay, a little more than 1 mile from the entrance light. The wharf has a face 135 feet long, with depths of 30 feet and more alongside. Vessels usually make a port landing. Fresh water can be obtained

on the wharf. The reduction plant operates a general store. Mail boats and planes stop here on regular schedule.

The head of the bay is not recommended as an anchorage on account of insufficient swinging room. In winter the wind draws down the north side of the head of the bay with violence. There are no known dangers in the bay. If entering the only directions necessary are to give the shores a berth of 100 yards.

Chart 8252.—Kingsmill Point is on the eastern side of Chatham Strait at its junction with Frederick Sound. It is marked by Kingsmill Point Light, shown from a white wooden house. The light is 25 feet above water and visible 9 miles; it is obscured from 207° to 003°. Frederick Sound is described in Chapter 8.

Chart 8261.—Breakfast Rock is about 0.4 mile off the western shore of Chatham Strait at a point 4 miles northward of Cape Ommaney. It is small in extent, 5 feet high, bare, and has deep water close-to. There is a passage used by small boats, with local knowledge, between this rock and the reef extending out from the shore.

Port Alexander, about 5 miles northward of Cape Ommaney, is a small basin with an entrance 150 yards wide. The Federal project provides for a channel 15 feet deep and 150 feet wide through ledge rock at the main entrance and a channel 6 feet deep and 40 feet wide at the entrance to the inner lagoon. In 1939 the controlling depths were 15 feet in the main entrance and 2 feet in the entrance to the inner lagoon.

Point Alexander Light is on the high bare rocky point at the south side of the entrance. The light, shown from a white wooden house on a skeleton tower, is 68 feet above the water and visible 8 miles. It is obscured from 347° to 061°. A lighted range bearing 334°, leads through the center of the entrance channel, and about 15 yards to the left of an entrance obstruction buoy which is in 22 feet of water and is 150 yards 055° from the light. The buoy marks the outer edge of a rock shoal.

The north point at the entrance is bare and rocky and there is a rock which bares on extreme low tides about 75 yards northeastward of the point. The rock is usually marked by kelp. A channel, less than 25 yards wide and sometimes used by local boats approaching from northeastward, is close to the northern entrance point.

The harbor affords good anchorage for small craft but is not a feasible anchorage for large vessels. In heavy southeast weather the boats seek shelter in the inner lagoon.

Port Alexander, with a post office and general merchandise store, is on the east side of the harbor. There is a wharf with 12-foot depth at the face, and two floats for small craft. An oil company has a station here, and gasoline distillate, and lubricating oils can be obtained. Galley coal, fresh water, provisions, fishermen's supplies, and a few articles of ship chandlery can be obtained. A radio station is maintained during the summer months. Mail planes and boats call here on schedule. There is a grid for beaching small craft and minor repairs to machinery of vessels can be made.

The entrance range leads about 60 yards northeastward of Breakfast Rock. Enter the harbor on this range, course **334°**, keeping the obstruction buoy on the starboard hand. To go to the inner lagoon pass close off the wharves, heading for the small wooded islet in mid-channel to northward. When about 60 yards from the islet change course and pass in mid-channel to eastward of the islet.

Speed regulations for Port Alexander have been prescribed by the Secretary of the Army as follows:

§207.790 *Port Alexander, Alaska speed of vessels.*—(a) *Definition.*—The term "Port Alexander" includes the body of water so indicated on United States Coast and Geodetic Survey Chart No. 8261, from its head to its entrance from Chatham Strait.

(b) *Speed.*—The speed of all vessels of five tons or more gross, ships register, shall not exceed 3 miles per hour either in entering, leaving, or navigating within Port Alexander, Alaska.

(c) *Effective date.*—This section shall take effect and be in force on and after July 15, 1930.

Point Conclusion, 6.5 miles northward of Cape Ommaney, is low, flat, and wooded. The point is the northern extremity of the comparatively low peninsula lying between Port Alexander and Port Conclusion. A small island, 120 feet high, is close off the point. **Graveyard Cove** is an open bight on the south side of the point. **Flotsam Islet** is in the eastern part of the cove.

Port Conclusion has its entrance westward of Point Conclusion. At its entrance it is 1 mile wide, and it is about 2 miles long in a southerly direction to its head, where it is less than 0.2 mile wide. The soundings are deep and somewhat irregular, but the port and approaches have been wire-dragged and found clear of dangers. On the east shore of the port, 0.3 mile south of Point Conclusion, is a cove about 0.2 mile wide with a sandy beach at its head. About 0.5 mile farther southwestward, on the same shore, is **Ship Cove** where Vancouver moored his vessels. A few piles on the eastern side of the cove mark the site of a former saltery. The cove affords protected anchorage for small craft in 2½ to 4 fathoms. The only ship anchorage in Port Conclusion is in mid-channel, about 0.3 mile northward of Ship Cove and southward of the 5¾-fathom spot, in 13 to 20 fathoms, rocky and uneven bottom. The holding ground is poor and its use is not recommended. **John Bay** on the western side opposite Point Conclusion, is a deep open bight of no importance.

A herring reduction plant is on the west side of Port Conclusion at its head. The wharf has a face 125 feet in length, with a least depth of 24 feet at the southern corner. Vessels make a port landing. Mail planes and boats call here on schedule.

Port Armstrong is 1.5 miles northward of Point Conclusion. Port Armstrong Light, on a white wooden house, marks the north point at the entrance; the light is 40 feet above water and visible 9 miles. The light is obscured from 070° to 211°. A large white target is just back of the light to aid in identifying the entrance when approaching from southward in the daytime. Kelp extends about 100 yards from the south side of the point. From **Point Eliza,** the south point at the entrance, a narrow ledge, mostly uncovered shortly after high water, extends eastward for about 200 yards in a continuation of the point. Vessels should keep about 0.5 mile offshore until abreast of the entrance.

The narrow entrance to Port Armstrong is nearly 0.5 mile long and about 150 yards wide, with bold shores. Port Armstrong Channel Light, shown from a white davit and 15 feet above the water, maintained from June 1 to September 30 each year, marks the north point at the narrowest part of the entrance channel. The light is obscured between the bearings 056° to 232°. Within this entrance is a landlocked basin about 1 mile long and 0.2 mile wide, which affords the best anchorage in the vicinity. The best anchorage is in the west end of the basin in 15 to 20 fathoms, soft bottom. A mid-channel course carries in safely. The port and approaches have been wire dragged and all dangers are shown on the chart.

A herring reduction plant is on the north side of the basin at Port Armstrong. The wharf has a depth of 24 feet alongside. Northeastward of the reduction plant is an abandoned whaling station. The reduction plant maintains a general store and radio station during the season. There is no post office but mail boats and planes stop here on regular

schedule. Vessels usually make a port landing at the wharf. On the ebb the wash of the current from the creek westward of the wharf has a tendency to set a vessel off the wharf. Fresh water, fuel oil, and Diesel oil are piped on the wharf.

Miner Cove, about 0.8 mile northward of Port Armstrong entrance, is an open bight which might afford temporary anchorage for small craft.

Chart 8264.—Port Lucy has its entrance on the western shore about 4 miles northward of Point Conclusion. The port has a southwesterly direction for 3 miles, narrowing from 1.2 to 0.3 mile; it then trends slightly southward for 2 miles, first expanding somewhat and then narrowing to 0.2 mile at its head. The anchorage for large vessels is near the head, abreast a deep gulch on the west side, in about 20 fathoms; the port is about 0.3 mile wide here. Small vessels can go a little farther in and anchor in about 10 fathoms. From the head of the port low land extends through to the western side of Baranof Island at Puffin Bay, and winds from those quarters may draw through in consequence but without any sea. The port is easy of access, and there are apparently no dangers.

Chart 8263.—Toledo Harbor is a small, horseshoe-shaped bay with depths of 5 to 8 fathoms, mud bottom, which lies 0.8 mile northward of Port Lucy. It is considerably used by small local fishing craft. It has an entrance about 75 yards wide with a mid-channel depth of 5 fathoms. The northern part of the harbor is shoal. Enter on approximately a westerly course.

Port Walter has its entrance about 7 miles northward of Point Conclusion and 9 miles southward of Patterson Point. The south point at the entrance is marked by Port Walter Light, shown from a white wooden house. The light is 20 feet above water and visible 9 miles; it is obscured from 308° to 037°. The port is about 0.2 mile wide at its entrance and has an outer part 0.3 to 0.4 mile wide and 2 miles long in a westerly direction, with deep water. Near its head is a wooded islet, a little south of mid-channel, between which and the northwestern shore anchorage in 14 fathoms, sandy bottom, can be made. A number of rocks, bare at various stages of the tide, extend about 100 yards off the northwest side of the wooded islet. A high-water rocky islet, from which a reef extends about 50 yards in a northerly direction into the channel, is 100 yards northward of the wooded islet. A vessel using this anchorage is liable to be in the way of ships entering Big Port Walter. The anchorage and channels have been examined with the wire drag.

Little Port Walter, westward of the southern entrance point, consists of an inner and outer harbor with a narrow connecting channel. A flat, grass-covered rock and two wooded islets are on the western side of the entrance. The narrow connecting channel has a width of about 30 yards with a depth of 3¼ fathoms and is subject to shoaling.

Vessels should enter between half and high tide only and preferably on a rising tide. They should pass along the southern side of the channel and make a slow turn to enter the inner harbor. Too sharp a turn may throw the stern into shoal water. The current in the entrance is estimated to be 1 knot.

Good protected anchorage for small craft can be had in the inner harbor in 6 to 8 fathoms, muddy bottom. A creek enters the head of the harbor. Southwesterly winds draw down the creek and across the harbor, but no other winds are felt. The Fish and Wildlife Service has a float and laboratory in the lower end of the harbor. The laboratory and dwelling combined is a large white building which is prominent when entering Port Walter.

New Port Walter, a small cove with a stream at the head, is on the north side, about 1 mile from the entrance. The saltery and fertilizer plant in this cove are abandoned and the wharves are in ruins. The flat at the mouth of the stream extends to the inner end of the wharf ruins. A rock, bare at extreme tide, is close to the eastern point of this cove. A rock, bare at high water, is off the western point of the cove, with a reef extending part way from the shore.

Big Port Walter is entered through a narrow passage 0.5 mile long leading from the anchorage westward of the wooded islet. In the summer the northern point of the entrance is marked by a light 11 feet above the water, shown from an arm on post. The light is maintained from May 1 to November 1. The passage is nearly straight, about 100 yards wide at its entrance and 0.2 mile wide at its western end, with a depth of 25 fathoms at its narrowest part. The maximum current in the entrance is estimated to be 2 knots. Big Port Walter is a basin 0.5 by 1 mile in extent, with depths of 25 to 50 fathoms. A large stream enters in the northern part and two streams empty in the southwestern part of the bay. One of the latter is a cascade from a lake about 800 feet high. The shores are steep-to, and there are apparently no dangers. The basin is too deep for good anchorage and freezes in winter. With the accumulation of snow the ice becomes 8 to 10 feet thick during the severe winters and lasts until the first of April.

A herring reduction plant is at the head of Big Port Walter. The wharf has a least depth of 35 feet alongside, and vessels make either a port or starboard landing as desired. Fresh water can be obtained on the wharf. A float for small craft is on the eastern side of the wharf. The reduction plant maintains a general store and radio station during the season. There is no post office but mail boats and planes stop here on regular schedule.

Chart 8265.—Port Herbert has its entrance about 9.5 miles northward of Point Conclusion and 6.5 miles southward of Patterson Point. The southern side of the entrance is marked by Port Herbert Light. The light, shown from a small white house, is 25 feet above the water and is obscured from 295° to 113°. It is maintained from May 15 to November 1. The port has a width of 0.2 to nearly 0.5 mile and a length of 3.5 miles in a westerly direction to its head. The water is too deep for anchorage and there are apparently no dangers. There are no islets or rocks at its entrance, which distinguishes it from Port Walter.

Chart 8266.—About 4 miles northward of Port Herbert and 2 miles southward of Patterson Point is a small bight used for anchorage by small local fishing craft during the summer months. A rock, covered at three-quarters tide, is reported to lie off the south point at the entrance.

Patterson Point, on the west side of Chatham Strait 16 miles northward of Point Conclusion, is the north point at the entrance to Patterson Bay. It is high, bluff, and bold, and is the southern end of a high mountain ridge included between the north arm of Patterson Bay and Chatham Strait, extending northward to a series of high rugged peaks. The point is conspicuous from southward, Patterson Bay showing as a deep gulch in the high rugged mountains.

Mist Cove, about 1.2 miles southward from Patterson Point, is an open bight too deep for anchorage. A waterfall on the south side of the cove is visible from well northward in Chatham Strait.

Deep Cove has its entrance 1 mile westward of Patterson Point. The cove has an average width of 0.4 mile and extends 3 miles westward. A narrow peninsula makes out from the northern shore 2 miles within the entrance. A stream with a flat at its mouth empties at the base of the peninsula on its northern side. Another stream with a waterfall empties at the head of Deep Cove. Anchorage can be made near the small flat below this waterfall in 20 to 25 fathoms, soft bottom. The water in the cove is otherwise too deep for anchorage.

A reduction plant is at the head of Deep Cove northward of the waterfall. The wharf has a face 114 feet long with a depth of 32 feet at the northeastern corner, gradually decreasing to 27 feet at the southwestern corner, with less water off the wharf to southwestward. Fresh water can be obtained on the wharf. There is no post office, but local mail boats stop here on regular schedule. The reduction plant operates a small machine shop and stores fuel oil and Diesel oil for its own use.

Patterson Bay has its entrance westward of Patterson Point, and extends northward for nearly 6 miles, with a width varying from 0.8 mile to 200 yards. Contracted anchorage in 22 to 24 fathoms can be made below the wooded islet at the head and abreast a small green point on the west side formed by the debris from the cliffs above it. Several streams enter. No directions are necessary and there are apparently no dangers in the bay.

Chart 8242.—Gut Bay is on the west side of Chatham Strait, about 11.5 miles northward of Patterson Point. At 0.2 mile eastward of the narrow entrance and 250 yards from the south side is a rocky patch with 4½ fathoms; vessels should pass northward of it. The entrance is about 100 yards wide with bold shores, and the bay is from 0.2 to 0.8 mile wide and 4.2 miles long. The sides are bluff, bold, and rocky, in some places almost perpendicular for 1,000 feet or more. On the south side, 2.5 miles from the entrance, are some small islands, and just past these is the narrow opening of a little bay, between high ridges, with a depth of ¾ fathom. A small craft can enter this bay at high water and anchor in about 3 fathoms.

The water in the main bay is deep, but a temporary anchorage can be had on the south side 0.5 mile within the entrance, off a rocky ledge and small stream, in about 20 fathoms, but it is not good, as the bottom is rocky and the wind draws through. A fair anchorage can be had near the head in 10 to 20 fathoms.

Hoggatt Bay is 2 miles northward of Gut Bay and extends back into the mountains of Baranof Island 3 miles with an average width of 0.5 mile. The sides are steep and bold and the water deep, over 100 fathoms through the middle.

Red Bluff Bay is 4.5 miles northward of Hoggatt Bay and 9 miles westward of Kingsmill Point, and is named from the prominent rocky, red hills north of it, which come down to a low point on the north side of the entrance, and which with some small islands in the mouth, almost close it. The bay extends back into the mountains 4 miles in a general northwesterly direction, with an average width of 0.5 mile, though about the middle it chokes to less than 100 yards between high cliffs, but the channel is good. On the south side at the head is a large stream; a flat extends 0.4 mile from the head and 0.2 mile eastward from the mouth of the stream. The entrance is about 100 yards wide, though the channel is less; it is crooked but clear between the lines of kelp, which are close to the shore.

A small vessel may anchor just inside the entrance in the channel between the islands and the south shore. An anchorage can be had 1.8 miles from the entrance, where the

bay begins to narrow, in 8 to 12 fathoms nearly in mid-channel; but the bottom is rocky; and the wind sucks through strong when blowing in the strait. At the head, favoring the north shore and north of the flat at the mouth of the stream, is a good anchorage in 12 to 16 fathoms with soft bottom and perfect protection.

In the bight 0.5 mile northward of the westernmost island at the entrance are the ruins of a saltery and wharf. A reef extends from the shore about 100 yards to the westward. The outer end of the reef is bare at nearly all stages of the tide and should be given a berth of at least 50 yards. The channels and areas close to the wharf and reef have been examined with the wire drag.

Local magnetic attraction.—In Red Bluff Bay the direction of the compass needle has been observed on shore to differ in places as much as 5° from the charted values.

To enter Red Bluff Bay follow the south shore, keeping about in mid-channel between it and all the islands and clear of the kelp. Two daybeacons mark the south shore westward of the outer entrance island. A shoal with a least depth of ¾ fathom, not marked by kelp, is about 75 yards south-southeastward of the southeast point of the westernmost island. The channels on both sides of this island have been wire dragged, but the southern channel, being straight, is considered safer for long vessels than the wider, rounding channel eastward of the island. There is little or no kelp marking the shoal area along the south shore in this vicinity, and great care should be taken to keep in mid-channel and to avoid the shoal mentioned above.

Chart 8252.—Between Red Bluff Bay and Cascade Bay, 11 miles northward, are four small bays, the largest being 1.2 miles long and 0.5 mile wide, where small craft may find a depth suitable for anchorage in smooth weather, but only one, Nelson Bay, has protection. None of the bays are important.

Nelson Bay, about 6.8 miles northward of Red Bluff Bay, is an open bight at the head of which is a circular cove having two islets across the entrance. The entrance to the cove is between the north islet and the point north of it, and is 75 yards wide with a depth of 5 fathoms. The cove is 250 yards in diameter between the 10-fathom curves, and the general depth is 15 fathoms, soft bottom. This cove is suitable only for small craft.

Cascade Bay is on the west side of Chatham Strait, about 4.5 miles westward of Point Gardner. It is about 1 mile long and 0.3 mile wide, with deep water, rocky bottom, and no good anchorage. Temporary anchorage can be had in the middle of the bay in 27 fathoms. At its head is a prominent cascade seen from a distance in Frederick Sound. South of this bay 1.8 miles is a waterfall about 300 feet high which also shows well in Frederick Sound.

Chart 8239.—Warm Spring Bay, on the west side of Chatham Strait, 7 miles northwestward of Point Gardner, has good anchorage for small craft, but the anchorage for large vessels is indifferent. The bay is 2 miles long and 0.8 mile wide at its entrance, but is narrowed to less than 0.3 mile just inside by a projecting peninsula from the north shore. A bare rock about 6 feet high, surrounded by kelp, is in the middle of the entrance 0.2 mile off the eastern point of the peninsula.

Two small bights in the southern shore afford anchorage for small craft. The western one is preferable because of shoaler water—12 to 15 fathoms. A detached, high-water rock about 4 feet high, dark-colored and of rough broken appearance, is 20 yards offshore

300 yards east from the western bight. A sunken rock, depth 1 foot, is 160 yards 352° from the high-water rock.

The only anchorage in the bay for large vessels is in midbay abreast the western bight on the south side in 25 fathoms, but the bottom is rocky and the current from the cascade usually sets out, making a vessel lie broadside to southeast winds which draw into the bay.

The point on the south side of the entrance is marked by Warm Spring Bay Light on a white wooden house, 27 feet above the water, and visible 9 miles. The light is obscured from 311° to 102°. A shoal with a least-found depth of 6 fathoms is about 275 yards offshore 700 yards eastward of the light. There may be less water, and it should be avoided in entering. At the head of the bay is a waterfall, visible from Chatham Strait, and near the waterfall are several warm mineral springs.

Baranof is a village with a post office and general store on the north side of Warm Spring Bay at its head. Warm spring baths may be had here. Two floats afford sheltered mooring for small craft. The store float (the eastern one) is marked by a private light at its end. Mail boats and planes call regularly on schedule. Care should be taken to avoid the reef which makes out 60 yards from the north shore at a point a short distance eastward from the store float.

Ruins mark the site of a saltery which stood on the north shore near the head of the bay. A 3-fathom spot is 30 yards offshore and 80 yards westward of the ruined wharf.

Approach the entrance of Warm Spring Bay with the south tangent of the peninsula extending from the north shore of the bay in range with the waterfall at the head of the bay, course **279°**. When the light is on the port beam, distant 350 yards, change course to **266°**. When the middle part of the peninsula is abeam, distant 300 yards, head for the waterfall on a **285°** course until abreast of the point just east of the saltery site.

Takatz Bay has its entrance on the western side of Chatham Strait about 10.5 miles northwestward of Point Gardner and 15.5 miles southward of Point Thatcher. It extends in a general southwesterly direction with an average width of 0.2 mile for 2 miles, then narrows to 150 yards. It then turns abruptly northwestward for 1 mile, with an average width of 0.2 mile, terminating in a flat 0.5 mile in extent, formed by a mountain stream emptying as a waterfall.

The bay affords secure anchorage 2 miles within its entrance in the basin that opens out just before reaching the narrows in 15 to 18 fathoms, soft bottom. The anchorage is 600 yards in diameter with bold shores. Small vessels may pass through the narrows and anchor in mid-channel 0.2 to 0.4 mile beyond, in 9 to 10 fathoms, soft bottom. The width of this anchorage is about 400 yards.

The southern point at the entrance to Takatz Bay is the northern point of a high wooded promontory forming the southeast side of the bay. Off this point are four bare rocks about 25 feet high. The two inner rocks are close together, 400 yards from the point, with reefs bare at low water between. The two outer rocks are 0.2 mile southeastward of the two inner rocks with kelp between.

The promontory on the southeast shore of the bay also forms the northern shore of a bight, with the **Takatz Islands,** a group of islands, in its entrance. The bight has no anchorage, the water being very deep and bottom irregular. Off the southern point of the bight and southward of the Takatz Islands is a rock, bare at low water, 400 yards from shore.

A rock, bare at low water and with kelp close around it, is 300 yards southward of the large white rock close to Point Turbot.

A rock, awash at lowest tides and having no kelp, is 150 yards from the northern shore and 350 yards northward of the two inner rocks off the south point at the entrance to Takatz Bay.

A sunken rock, with 2½ fathoms over it and marked by kelp, is in the middle of the bay about 500 yards westward from the south point at the entrance.

A rock, awash at low water, is about 570 yards south-southeastward from Point Turbot.

Point Turbot, the northern point at the entrance to Takatz Bay, is marked by **White Rock,** a large white rock about 75 yards off. A high waterfall about 2 miles northward of Point Turbot is visible from northward a considerable distance.

The entrance of Takatz Bay is not visible until close southward of Point Turbot. Give Point Turbot a berth of not less than 0.2 mile when eastward of it and pass in mid-channel between Point Turbot and the outer bare rocks off the south point at the entrance on a **262°** course. Leave the two inner bare rocks off the south point at the entrance about 150 yards on the port hand and then steer **236°,** favoring the south shore for about 0.5 mile to avoid a sunken rock in mid-channel. Then follow a mid-channel course for 0.8 mile to the anchorage northward of the narrows.

Small craft may pass through the narrows in mid-channel and anchor 0.2 to 0.4 mile beyond them, but should not pass the first small islet 0.5 mile beyond the narrows, as the flat at the head begins there.

Kasnyku Bay, on the west side of Chatham Strait about 14 miles northwestward of Point Gardner, has deep water and no anchorage. The **Hidden Falls** Lumber Company has a sawmill and wharf at the head of the bay behind the small wooded island on the southern side. A daybeacon marks a rock awash at the south side of the approach to the wharf. Another daybeacon marks a rock on the south side of the channel. The wharf, reported in 1951 to be in poor condition, has a face 125 feet long, with a depth of 19 feet at the inner, or northern end, gradually increasing to 26 feet at the middle with deeper water at the southern end.

To enter, pass in mid-channel between **North Point,** the northern point at the entrance, and **Round Island** and the group of wooded islets and rocks off the southern point, and keep to northward of several islets farther in. Pass to eastward and southward of the wooded point and to northward of the daybeacons. The approach to the wharf is narrow and large vessels would have to make a port landing and back out.

Caution.—The harbor has not been thoroughly surveyed and caution should be used in entering.

Cosmos Cove, on the west side of Chatham Strait about 5.5 miles northward of Takatz Bay and 2 miles southward of Kelp Bay, is 1.8 miles long and 0.2 mile wide. A rocky, wooded islet is close to the northern point at the entrance, with which it is connected at low water. A bare rock is 200 yards southeastward of the islet and a ledge extends 150 yards farther southward. The entrance is south of the rock and ledge, and the cove affords anchorage with good shelter in 10 to 15 fathoms, soft bottom, for small vessels; the clear width of the anchorage is about 250 yards. The head of the cove is shoal for a distance of 0.8 mile.

Kelp Bay has its entrance on the western side of Chatham Strait, between North Point and South Point, 10.5 miles southward of the eastern entrance to Peril Strait and 17.5 miles north-northwestward of Point Gardner. It is 1.8 miles wide at its entrance and the main bay is 3.5 miles long in a northwesterly direction. From the main bay three arms extend several miles farther. The water in the bay is deep and the shores abrupt and steep, but ledges extend from the shores in places, and there are several detached dangerous rocks. On the south side of the bay west of **South Point** are several low, wooded islands, south of which is **The Basin**, in the southeast corner of which is the best anchorage in the bay. Good anchorage may also be found at the head of the Middle Arm, but it is somewhat contracted except for small vessels.

Caution.—The chart of the bay is from an early survey which is incomplete, and a reexamination has not yet been made.

Pond Island, the largest of the islands in Kelp Bay, is about 1 mile in diameter, and between it and South Point is a boat channel. A series of sunken reefs are 400 yards off the southeastern shore of the island. The western side of the island should be avoided, as the bottom is irregular, and soundings of 6 and 8 fathoms were found 0.3 mile from shore.

Crow Island is the westernmost and largest of a group of three islands which lie west of the north end of Pond Island. **Yellow Rock** is off the northern end of this group. A sunken rock with 2 fathoms over it and marked by kelp, is about 0.4 mile eastward of Yellow Rock and the same distance northward of the northwest point of Pond Island. Midway between this and Yellow Rock is another sunken rock with 3 fathoms over it, and there is kelp between this second rock and Yellow Rock. A sunken rock with 2 fathoms over it and marked by kelp is about 0.3 mile northeastward of the northwestern end of Crow Island and nearly 0.5 mile west-northwestward of Yellow Rock.

Zubof Rock, awash at lowest tides, is 400 yards long north and south. Its northeast edge is about 0.4 mile westward of the south side of Crow Island, and the same distance from the west shore.

Between Pond Island and Crow Island is a fair channel which may be used at high water. The only directions that can be given for it are to keep near mid-channel and clear of kelp. In the channel are two sunken rocks with 2 fathoms over them and marked by kelp. One is described above; the other is in mid-channel in the narrowest part between the northwest point of Pond Island and Crow Island. The bottom shelves off for 200 yards from the southeast side of the island at the west end of the passage and has kelp; the passage northwest of this island should be used with caution.

North Point has a wooded islet about 100 feet high close-to. A shoal, with 5 fathoms on it and marked by kelp, extends nearly 0.5 mile southward from North Point. Two sunken rocks are 350 yards from the western shore of the point, 0.5 to 0.8 mile northwestward of North Point. Two miles from North Point, on the north shore of Kelp Bay, is a prominent whitish cliff 500 feet high.

Portage Arm, the northern arm of Kelp Bay, begins about 3.5 miles from North Point and extends northwestward for 3.5 miles. At its head is an extensive flat that runs through, and at high water connects with Hanus Bay, Peril Strait. At 2.2 miles within the entrance to the arm is a wooded island connected with the northern shore at low water, with several bare rocks close to its southeastern end. A small vessel can find temporary anchorage a little northward of mid-channel 400 yards northwestward of this island in about 10 fathoms with scant swinging room; but this anchorage is

exposed to southeast winds which draw through. A flat extends 300 yards from the south shore at the anchorage. The mid-channel is clear to the anchorage.

Middle Arm of Kelp Bay is separated from Portage Arm by **Portage Point.** The arm is clear from its entrance to its head, where there is a flat 0.5 mile in extent. It is about 5 miles in length in a westerly direction, curving slightly southward. The arm has good anchorage about 1 mile from its head in 22 to 25 fathoms, soft bottom. There is an indentation on the southern side about 1.5 miles within the entrance, with a flat at its head and no anchorage.

South Arm of Kelp Bay extends 3.5 miles in a southerly direction. It has no anchorage on account of the great depth of water, and there are no dangers except a sunken rock marked by kelp 200 yards off the east point at the entrance. A flat extends 0.8 mile from the head of the arm. On the west side, within the entrance to the arm, are several landslides on the face of a steep hill which show from Chatham Strait.

Plover Rock lies off the entrance to South Arm, 1.2 miles northwest of Yellow Rock. It is small, bare, and prominent, and has ledges on its north and south sides to a distance of 300 yards. A reef, with 2 fathoms over it and no kelp, lies 0.2 mile southward of Plover Rock; it is 350 yards long, north and south, and there is no safe passage between it and Plover Rock. A rock, bare at low water and with little kelp, lies southwestward of this reef and 0.4 mile southward of Plover Rock.

Entering Kelp Bay, Chart 8239 is the guide.

Point Lull is the northern point at the entrance to Kelp Bay, off which a sunken reef marked by kelp extends southward 0.6 mile. Between Point Lull and North Point is **Echo Cove,** a narrow bight extending 0.8 mile in a northerly direction. It is open southward, and affords temporary anchorage for small craft only.

Chart 8252.—Point Thatcher, the southern point at the eastern entrance to Peril Strait. Peril Strait and Sitkoh Bay are described in Chapter 13.

Point Gardner and Yasha Island are described with Frederick Sound in Chapter 8.

Wilson Cove, 8 miles northward of Point Gardner, is an open, shallow bight about 1 mile long, with a width at its entrance of 2 miles. A flat extends about 0.8 mile from the northern end of the cove. Two small wooded islands and foul ground with kelp extend 0.4 mile off the southern shore. In the entrance is an extensive reef covered at highest tides. Wilson Cove should be avoided as it affords no protection as an anchorage except from easterly winds, and is very foul, bottom showing in 4 or 5 fathoms in places; but should it be necessary, stand in parallel to the south shore, passing southward of the reef in the mouth of the cove, keep clear of the kelp on both sides, and anchor in 8 to 10 fathoms.

Table Mountain, on the southern shore of Whitewater Bay, is 2,438 feet high and peculiarly eroded near the summit. It is the first prominent peak northward of Point Gardner.

Chart 8246.—Whitewater Bay has its entrance on the eastern side of Chatham Strait between Point Caution and Woody Point, 15 miles northward of Point Gardner and 13 miles southward of Killisnoo Island. The bay is about 3 miles long, with an average width of 1 mile, and at high water connects by a narrow passage with a lagoon, bare at low water. Secure anchorage can be had near the head of the bay.

Point Caution is marked by **Lone Tree Islet** with a single dead tree which lies 350 yards off the point. Foul ground and kelp extend over 0.5 mile westward and northward

from the point. A ledge with 2 fathoms at its end and marked by kelp extends almost 0.4 mile northward from Lone Tree Islet; a rock, awash at low water, is on this ledge 0.3 mile from the islet. The width of the clear channel between this ledge and the bare ledge off Neltushkin is over 0.5 mile.

Healy Rock lies 0.2 mile northward from **Flag Point**, on the southern shore of the bay and 1.2 miles southeastward of Point Caution; it is low and bare and surrounded by ledges of small extent, marked by kelp. **Sand Point** is on the north shore about 0.8 mile northeastward of Healy Rock; it is named from its formation and marks the entrance to the anchorage. A shoal with 1¾ fathoms at its end extends 300 yards southeastward from Sand Point. **North Island**, low and wooded, lies close to the north shore, 0.5 mile eastward of Sand Point.

Woody Point, the north point at the entrance, has a small, rocky, wooded islet about 400 yards northwestward of it. On the north shore about 0.8 mile southward of Woody Point, is the old native village of **Neltushkin.**

Foul ground marked by kelp extends about 0.3 mile from the north shore of the bay for a distance of 1.2 miles southward of Woody Point. The most projecting is a bare ledge extending 600 yards westward from the point westward of Neltushkin, and kelp surrounds the ledge to a distance of 250 yards.

Caution.—No recent surveys have been made of the bay. It has not been wire-dragged. The bottom is very irregular, and there is no certainty that all dangers have been discovered.

Directions.—Sailing directions as follows have been used:

Enter Whitewater Bay on a **144°** course with Healy Rock ahead. Pass about 0.3 mile northward of Healy Rock on a **127°** course, and when 0.7 mile past it, head for North Island. Anchor in 10 fathoms, soft bottom, about 0.2 mile from North Island with Sand Point in line with **Black Point.** The **144°** course on Healy Rock passes over the southern edge of a 7- to 10-fathom shoal, marked by kelp. By rounding this shoal to the southward deeper water will be carried and kelp avoided.

Local magnetic disturbance.—It has been reported that a local magnetic disturbance of between 5° and 6° to the westward is experienced on mid-channel courses in Chatham Strait between latitudes 57° 17′ and 57° 22½′ N.

Russian Reef is 1 mile northward of Woody Point and nearly on line between Point Caution and Distant Point. The reef extends about 0.4 mile in a northwest direction and rises abruptly from very deep water. It shows partially at low water and is marked by kelp. Tide rips form off Russian Reef.

Chaik Bay, 19 miles northward of Point Gardner, extends in an easterly direction for 2 miles, with a width of 1.5 miles; from its eastern end two arms continue over 1 mile farther. A bare islet is 0.9 mile northwestward of **Rocky Point,** the southern point at the entrance, and a ledge covered at half tide extends 600 yards northward from the islet. A bare ledge is nearly 0.5 mile from the northern shore of the bay inside **Village Point.** A kelp-marked patch with 4¼ fathoms is 600 yards northwestward of the wooded island in the middle of the bay 1.5 miles within the entrance. The northern arm has good anchorage in 12 fathoms, sticky bottom, but is open southwestward. The southern arm has considerable foul ground and should be avoided by strangers. A sunken rock has been reported on the bar across the entrance to the southern arm midway between the two small islets.

Approaching Chaik Bay from southward, give the eastern shore a berth of about 1.5 miles to clear Russian Reef. Enter the bay between the islet off Rocky Point and the bare ledge inside Village Point. When about 0.4 mile southward of the ledge steer **053°** with the islet off Rocky Point astern until about 0.5 mile from the north shore and the wooded island near the middle of the bay is abeam. Then steer for the mouth of the northern arm and anchor in the middle of the arm in 10 to 12 fathoms, soft bottom.

Chart 8247.—Distant Point is the southern point at the entrance to Hood Bay. Directly behind it are two mountains which lie between Chaik and Hood Bays. The larger mountain is about 2,300 feet high and rounded on top; 2.5 miles southward of Distant Point a spur of this mountain runs toward the water and terminates in a whitish cliff 800 feet high.

Hood Bay has its entrance on the eastern side of Chatham Strait, between Distant Point and Killisnoo Island, where it is 4 miles wide. It has a general southeasterly direction from its entrance, curving to about east for 7 miles and then divides. **North Arm** has a length of 2.5 miles and a flat 0.5 mile wide at its head. **South Arm** has a length of 3.5 miles and is free from mid-channel dangers inside its entrance. Anchorage is available in each arm for large vessels in suitable depths. Small craft find anchorage at the head of each arm in 5 to 10 fathoms, mud bottom.

A rock with 2½ fathoms over it and marked by kelp lies about 0.6 mile northwestward of Distant Point and 0.3 mile offshore. A rock with 2 fathoms over it and lying 0.5 mile northeastward of the first-mentioned rock is marked by a lighted buoy. About 0.6 mile southeast of this rock is a bare ledge 0.3 mile offshore. A buoy marks a rock with 2½ fathoms over it 1.4 miles northwestward of **House Point.**

About 3.5 miles southeastward of the entrance buoys and extending from the northern shore of the bay is **Cabin Point.** The cove westward of the point is foul and has several shacks at its head; the cove northward of the point is shoal but offers anchorage for small craft and shelter from northerly weather in 4 to 10 fathoms, hard sand bottom. Two bare rocks are about 350 yards southward of the point. A lighted buoy marks the edge of shoal water southward of the rock.

Ruins of a saltery are in the bight on the northern shore about 1.5 miles eastward of Cabin Point. Two rocks bare at low water are 400 yards from the eastern point of the bight which is on the north shore about 1.5 miles eastward of Cabin Point. A buoy marks the western limit of the shoal.

A ledge, bare at low water, extends 300 yards south from the small, bare, rocky islet on the north side in the entrance to the southern arm, 250 yards southward of the point dividing the arms.

A cannery is on the north side of the entrance to North Arm. The wharf has a face 300 feet in length with a depth of 24 feet alongside. The northeastern 60 feet of this wharf is used as an oil wharf, and gasoline, Diesel oil, fuel oil, and lubricating oil can be obtained. The cannery operates a general store and radio station during the season. Some machine shop facilities are available. Fresh water can be obtained on the wharf. There is scheduled passenger and mail air service with Juneau and Sitka. A rock with 2¾ fathoms over it and marked by a buoy is off the southwestern corner of the wharf.

Ice.—During January, February, and part of March, ice in South Arm makes navigation there unsafe and quite often impossible. Ice also forms in North Arm from its head to within 0.2 mile of the cannery.

Chart 8285.—Killisnoo Harbor is on the eastern side of Chatham Strait and on the north side of the entrance to Hood Bay. It is about 1 mile long east and west and nearly 0.5 mile wide, but the anchorage is reduced by shoals extending from the shore. The 3-fathom curve is about 300 yards from shore on the north and east sides of the harbor, and there are many rocks inside this depth.

Killisnoo Island is wooded and about 300 feet high; **Point Samuel** is its western end. A ledge, well bare at low water, extends about 125 yards off the southeast end of Killisnoo Island. Killisnoo Harbor Light, shown from a white wooden house on a skeleton structure on concrete pier, marks a rock off the northeast point of Killisnoo Island. The light is 16 feet above water and visible 6 miles. A buoy marks the reef off the north side of the west end of Killisnoo Island.

Table Island, about 30 feet high, sandy, and grass-covered, is about 0.5 mile south of Killisnoo Island. It is surrounded by reefs to a distance of nearly 0.3 mile. On its north side the 3-fathom curve is fairly close to the island, but kelp extends out 300 yards into 6 and 8 fathoms.

Sand Island, 1 mile southeastward of Table Island, is about 10 feet high and is the northwest end of a chain of reefs 2 miles long parallel to the east shore of the bay. A straight but narrow channel lies between these reefs and the east shore. A bar with 6 to 10 fathoms over it is between Sand Island and Table Island.

Lone Rock, bare at low water, is 0.3 mile southeastward of the southeast end of Killisnoo Island. It is surrounded by kelp and is marked on its western side by a buoy. The bottom is foul and considerable kelp is between the rock and the eastern shore and no safe channel between. This foul ground is contained between the bearings 082° and 144° from the rock; sunken rocks with 1¾ to 2¼ fathoms over them are about 350 yards southeastward of Lone Rock between these bearings.

Killisnoo, on the north side of the east end of Killisnoo Island, is the site of a former native village and cannery.

The anchorage is in mid-harbor off the east end of Killisnoo Island in 14 to 15 fathoms. The harbor is somewhat exposed to southeast and southwest gales but no considerable sea makes into the anchorage.

The tidal currents at Killisnoo are irregular, but the averages show that the current on the last half of the falling tide and the first part of the rising tide sets from Hood Bay westward through the harbor and northern channel, and that the current on the second half of the rising tide and first half of the falling tide sets eastward through the northern channel and the harbor into Hood Bay. Slack water occurs about 1½ hours after the time of slack water at Wrangell Narrows, daily predictions for which are given in the *Current Tables, Pacific Coast.*

The current follows the channel, and the velocity is not important except in the narrow part of the northern entrance.

Channels.—The southern channel leads between Table and Killisnoo Islands and between Lone Rock buoy and the east end of Killisnoo Island.

The northern channel leads between Killisnoo Island and Kenasnow Rocks and between the island and Admiralty Island. In summer kelp extends entirely across the channel. At the eastern end of the channel, Killisnoo Harbor Light is placed to mark the north end of the rocks which bare on the south side of the channel. The channel is north of the light. At 200 yards southwest of the light a spur makes out from the north side,

with about 2½ fathoms nearly 150 yards from shore. The kelp is useful in defining the channel. The least depth in the channel is about 4 fathoms.

Chart 8285 is the guide for both channels.

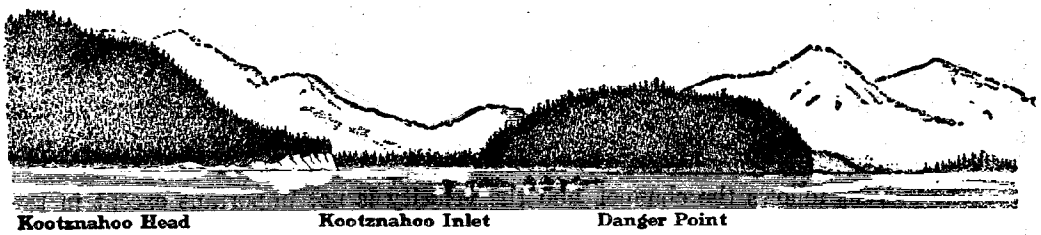
Kootznahoo Roads is on the north side of Killisnoo Island and forms part of the northern channel leading to Killisnoo. A ledge, mostly covered at three-quarters flood and surrounded by kelp, extends about 300 yards off the north side of the western end of Killisnoo Island. The northern end of the ledge is marked by a buoy. From the head of the bight in the north side of Killisnoo Island, 0.5 mile eastward of the buoy, a ledge makes out nearly 350 yards.

Angoon is a post office and native village on the eastern shore of Chatham Strait, 1.8 miles northward of Killisnoo Island. There is a general store and a float for small craft, but no wharf.

Kenasnow Rocks are an extensive ledge about 0.5 mile offshore southwestward of Angoon. Portions of the ledge are always above water, and it is surrounded by heavy kelp, especially on its inshore side. There is a channel between it and the shore, the latter being fringed with kelp for some distance. The south end of the ledge is 0.8 mile north of Killisnoo Island.

Chart 8247.—Danger Point, on the eastern shore of Chatham Strait, 2.5 miles northward of Point Samuel, the western extremity of Killisnoo Island, forms the southern point at the entrance to Kootznahoo Inlet. Danger Point Light, shown from a white slatted daymark on post, is near the end of the reef which extends about 400 yards northward from the point; the light is 24 feet above water and visible 6 miles.

Kootznahoo Inlet, comprising an area of about 15 square miles, is an intricate group of narrow passages, lagoons, and bays on the eastern shore of Chatham Strait 2.8 miles northward of Killisnoo Island. It is full of rocks and reefs, and through the narrow passages the tidal currents rush with great velocity. The navigation of Kootznahoo Inlet is such that it should not be attempted except by small craft of short length and ready turning qualities, and then only at slack water and with local knowledge. Fishing vessels are the only ones that navigate the inlet.



Kootznahoo Inlet; Danger Point bearing W by S, distant 4 miles

(Original sketch made before 1883)

The entrance is 0.5 mile wide between Danger Point, marked by a light, and **Kootznahoo Head.** It extends southeastward 1 mile, gradually narrowing, to **Turn Point,** where it divides into three arms; the southernmost continues in a southeasterly direction 2 miles to Favorite Bay; the northernmost extends eastward for 5 miles to Mitchell Bay; the middle arm, also extending eastward, leads among the islands, is obstructed at its

entrance and navigable only for small craft. The lagoons between the islands are full of rocks and reefs, and are not navigable except for small craft.

From Danger Point, the south point at the entrance, a ledge, bare at low water and marked by a light, extends 400 yards west-northwestward. From its entrance the inlet is free from obstructions until Village Rock is reached. **Village Rock** is a large low-water ledge extending toward Turn Point halfway across from the native village of Angoon on the south side; large swirls occur here, caused by the great velocity of the tidal currents.

Eastward of Village Rock, the south shore is clear for nearly 0.5 mile. The north side is obstructed by a ledge marked by kelp at slack water, which extends almost 0.4 mile southeastward from Turn Point and terminates in **Rose Rock,** covered at high water and sometimes marked by a daybeacon placed by local interests. In mid-channel between Rose Rock and the southern shore is a shoal with 1½ to 2½ fathoms over it.

The passage to Favorite Bay extends nearly 2 miles southeastward from Rose Rock, with a varying width of 0.1 to 0.2 mile. It is obstructed at its northwestern end by a series of rocks, bare at low water, which begin near the northeastern shore 0.3 mile southeast of Rose Rock and extend southeastward in a curve, nearly reaching the north shore, to the south shore again in a distance of 0.6 mile. There are deep passages among these rocks. The eastern end of the passage is obstructed by a rock in mid-channel about 0.3 mile southeastward of the fishing village on the southwest shore and 0.3 mile from the entrance to Favorite Bay.

Favorite Bay has anchorage near the southwestern shore anywhere westward of a high bluff, marking the end of the flat that extends 1 mile from its head, in 10 to 17 fathoms. The bay is used as a fishing ground for herring.

The northern channel, from the daybeacon on Rose Rock, turns sharply westward along the north side of the reef making out from **Channel Point,** between it and an extensive ledge on the north side of the channel, for about 0.3 mile, to Stillwater Anchorage.

Stillwater Anchorage is about 1.2 miles long from Turn Point northeastward to Pillsbury Point, and 300 to 600 yards wide, with general depths of 16 to 20 fathoms. West of Pillsbury Point a short arm makes northward about 0.5 mile.

From Stillwater Anchorage the channel leads close to an islet on the south side, between it and a ledge extending 200 yards southwestward of **Pillsbury Point.** The channel then narrows to 200 yards, with reefs on both sides, and extends northeastward for 0.5 mile to **Point Bridge** where it passes between a reef on the north side and a bold bank on the south side. The channel then has a northeasterly direction for about 0.8 mile, with a width of less than 200 yards and bold shores, and then widens to 0.2 mile and continues in the same direction 1.5 miles, and then turns easterly for 1.2 miles to **North Point,** eastward of which is Mitchell Bay. At 0.2 to 0.8 mile westward of North Point the channel is narrowed to 100 yards between a system of high-water islets on the south side and extensive ledges on the north side which extend westward from North Point.

Mitchell Bay is 4.5 miles long in an easterly direction and 0.5 to 1.5 miles wide. It connects at its western end with a lagoon so full of rocks, reefs, and shallow water that soundings were considered unnecessary. At its southwest end it is connected by Davis Creek with Kanalku Bay and Lighter Creek. Several islands lie in the bay 1 mile from its west end, and the water is foul between them and the west end of the bay. From its entrance at North Point, the channel follows the north shore for 1 mile, where it passes between it and **Diamond Island,** the northernmost island in the western part of the

bay. Beyond Diamond Island, Mitchell Bay is clear, and has a general depth of 20 fathoms, near Diamond Island, decreasing to 10 fathoms at its eastern end.

Davis Creek extends southwestward from Mitchell Bay for 2 miles, with a width of about 250 yards, and then turns to eastward and widens into Kanalku Bay. **Lighter Creek** makes westward from Davis Creek about 0.5 mile from its north end, and has depths of 1 to 3 fathoms. Davis Creek is very foul. At its north entrance a ledge, partly bare at low water, extends eastward from the western shore, inclosing **Passage Islet** and nearly closing the channel. At 0.8 to 1 mile southwestward of the entrance to Lighter Creek a ledge, mostly bare at low water, extends halfway across the channel from the southeastern side. At the south end of Davis Creek is **Stone Islet;** an extensive ledge crosses the channel at this point, with a narrow passage through.

Kanalku Bay is a clear open basin with depths of 6 to 10 fathoms. In the bay are two islands and at its head two large streams and a flat, 0.5 mile wide. On the south side are extensive coal croppings and a deposit of marble.

The **tidal currents** have great velocity in Kootznahoo Inlet, and it should be navigated at slack water, the safest condition being low-water slack. For times of slack water the *Current Tables, Pacific Coast,* should be consulted. The flood current at the entrance sets in nearly parallel to the northeast shore, and so continues until it reaches Village Rock, where it divides, one part going northeastward around Turn Point and the other continuing southeastward south of Rose Rock, where it again divides. One part continues southeast into Favorite Bay, while the other turns short around the rock and divides again, one part going northeast and the other following the northern channel. The velocity off Turn Point at the time of strength is about 6½ knots, but may at times be much greater.

Vessels rounding Rose Rock at slack water can carry slack water all the way to Mitchell Bay.

At Village Rock, the currents have a velocity of 5 to 8 knots; at Point Bridge, as high as 10 knots; and at Passage Islet, as high as 7 knots. Rapids begin at Village Rock and continue until well past Rose Rock.

From Pillsbury Point to Point Bridge the current is very swift, probably reaching 10 knots, with much boiling and swirling, the worst place being at Point Bridge. This can be passed only at slack water, which lasts only a few minutes.

Through all the narrow channels leading into the various bays the currents have great velocity, and they should not be attempted in any kind of a boat except at slack water.

Caution.—The navigation of Kootznahoo Inlet is such that it should not be attempted by strangers. A guide can be obtained at Angoon.

Chart 8252.—Kootznahoo Head marks the northeast side of the entrance to Kootznahoo Inlet. From here the coast extends northward for 33 miles to Point Marsden.

Chart 8202.—The bight 26 miles northward of Kootznahoo Head and on the north side of **Point Hepburn** affords anchorage for small craft in 5 fathoms with shelter from southeast winds. A stream enters the head of the bight.

Square Cove, on the east side of Chatham Strait, 2 miles northward of Point Hepburn and 7 miles southeastward of Point Augusta, is on the north side of **Cube Point.** It affords anchorage for small craft with protection from southeast winds. The cove is

about 500 yards in length and of half that width, and there is a depth of about 3 fathoms within 200 yards of its head and deeper water farther out. There are no dangers. A stream enters at each end of the sand beach at its head, the eastern one forming a cascade.

On the east side of Chatham Strait about 1.5 miles northward of **Point Marsden** and close southward of the entrance to Hawk Inlet, is a small cove with good anchorage, except with northwest winds, for small craft, in 9 to 10 fathoms. The clear width of the anchorage is about 400 yards. A flat extends 400 yards from the head of the cove. From the southwest point at the entrance a reef, bare at half tide and marked by kelp, is in the middle at the entrance. A deep channel is on either side of the ledge but the best is on its northeast side. The anchorage is in mid-cove about 300 yards southward of this ledge.

Chart 8302.—Hawk Inlet has its entrance on the east side of Chatham Strait 10 miles southeastward of Rocky Island. For a distance of 5 miles from its mouth it has a northerly direction and a width of 0.5 mile. It then contracts to a width of 0.3 mile and changes to a northeasterly direction, terminating in a basin nearly 1 mile in diameter. Five small streams enter the basin forming extensive mud flats along its shores. Anchorage can be had in 6 to 7 fathoms nearly in the middle of this basin.

The entrance to Hawk Inlet is narrowed by ledges, bare at low water, which extend 350 yards southward from the north point at the entrance, and kelp extends outside the ledge to a distance of about 0.2 mile southward and eastward from the point. The limits of the kelp and dangers are marked by buoys. On the south side of the entrance are two small islets in the mouth of a small cove dry at low water.

About 0.8 mile up Hawk Inlet, on its east side, two streams enter, forming an extensive mud flat extending two-thirds the distance across, leaving a channel 200 yards wide, with 7 fathoms in the middle, between it and the west shore. Here the tidal currents have considerable velocity, causing swirls. The outer point of the shoal is marked by Hawk Inlet East Shoal Light on a red wooden house on a 5-pile dolphin; the light is 20 feet above the water. The greatest depth in Hawk Inlet, 45 fathoms, is off the cannery.

A cannery and post office are on the eastern side of Hawk Inlet about 1.2 miles northward of the light. The cannery wharf has a face 160 feet long with a depth of 28 feet at the northern corner, gradually decreasing to 20 feet at the southern corner. A pile marks the outer limit of a shoal area lying close-to southward of the wharf. There is a float for small craft on the northern side of the wharf. An oil wharf is northward of the cannery. The face of this wharf is 60 feet in length and has a depth of 15 feet alongside. The cannery operates a general store and radio station during the season. Daily passenger and mail air service is maintained during the summer. Diesel oil, gasoline, and fuel oil are stored for cannery use. Fresh water can be obtained at the wharf. The ebb current at the wharf has very little velocity; the flood is reported to set slightly toward the wharf.

In entering Hawk Inlet pass 100 to 250 yards southward and eastward of the buoys near the entrance and 100 yards westward of the light marking the point of the shoal. Favor the west shore for 0.2 mile past the light and then head for the cannery. The local mail boat stops in the inlet.

Lynn Canal is described in Chapter 10.

Chart 8283.—Point Hayes is the northern point of the eastern entrance to Peril Strait. A lighted buoy marks the southeastern extremity of Morris Reef which lies off

Point Hayes. Point Craven Light is about 1.2 miles southwestward of Point Hayes. They are described in Chapter 13.

Peninsular Point, about 1.5 miles northward of Point Hayes, is formed by a wooded hill about 325 feet high, which lies off the general trend of the shore and to which it is connected by a low, narrow valley. A rock is nearly 0.4 mile offshore from the northern side of the point.

White Rock is a prominent, 35-foot, light-colored rock, lying off the edge of a flat at the mouth of a stream about 2 miles northward of Point Hayes. A prominent valley extends inshore to westward of White Rock.

Basket Bay, on the west side of Chatham Strait, 11 miles northward of Point Hayes and 6 miles southward of South Passage Point, is about 1.3 miles long and 0.4 mile wide at its entrance, narrowing slightly at its head, where there is a flat 250 yards wide and a large stream. The bay is exposed to southeast, the bottom is rocky, depths 24 to 40 fathoms, and is not recommended as an anchorage. The mid-channel course up the bay is clear; a reef and some detached rocks extend nearly 350 yards from the south shore, just outside the entrance. A reef extends nearly 200 yards off the northern point at the entrance.

Chart 8202.—Tenakee Inlet, on the west side of Chatham Strait between South Passage Point and East Point, is 2.5 miles wide at its entrance and has a general westerly direction for 10 miles and then north-northwesterly for 25 miles, narrowing near its head to 0.5 mile. At its head is a flat 0.8 mile in extent, and on the south shore 4 to 7 miles from its head, are three bights filled by flats. At 1.8 miles from the head of the inlet is a portage of about 70 yards at high water, and about 8 feet high, connecting with Port Frederick in Icy Strait. The depths in the inlet are great and the dangers easily avoided. A number of bays on the south side afford anchorage.

A small islet off **South Passage Point** is marked by South Passage Point Light, shown from a white wooden house. The light, 50 feet above the water and visible 9 miles, is obscured from 325° to 088°. A rock, awash at lowest tides and surrounded by kelp, is 0.5 mile northward of the light in the direction of East Point. The rock is marked by a buoy.

It is reported that in **Trap Bay** a 3-fathom shoal is 2.7 miles 258° from South Passage Point Light.

East Point, the northern point at the entrance to Tenakee Inlet, can be identified by a grassy knoll about 20 feet high, at its outer end. A rocky shoal, with a least depth of 2½ fathoms, is about 0.5 mile southwestward of East Point.

Cannery Point is on the north side of the inlet 4.5 miles westward of South Passage Point. A cannery with a wharf is in the first bight west of Cannery Point. The wharf has a face 305 feet long with a depth of 24 feet alongside. A sunken rock with about 3 fathoms over it, marked by a private barrel buoy, is about 100 yards southwestward of the western end of the wharf. Fresh water can be obtained at the wharf. The cannery operates a general store and radio station during the season. Vessels usually make a port landing at the wharf. The flood current is reported to set on, and the ebb current off, the wharf.

The ruins of a cannery are in the second bight west of Cannery Point. A daybeacon marks a rock awash about 0.5 mile offshore.

Tenakee Light, shown from a white wooden house, marks the small islet close to the northerly shore about 0.8 mile eastward of the wharf at Tenakee Springs. The light is 30 feet above water and visible 9 miles.

Local magnetic disturbance.—It is reported that a local magnetic disturbance of 3° to the eastward is experienced immediately after passing Cannery Point when on a mid-channel course from Cannery Point to Tenakee Springs. Opposite the canneries the declination again becomes normal.

Tenakee Springs has a wharf, post office, and health resort at the warm springs on the northerly side of Tenakee Inlet about 9 miles inside the entrance. It has regular communication by small craft with Juneau. A scheduled air passenger and mail service is maintained with Juneau. The wharf has an 100-foot face with a controlling depth of 22 feet alongside.

Tenakee Reef, two rocks covered at high water and marked by a light, lies nearly 0.8 mile southward from Tenakee Springs, and another similar rock, marked by a daybeacon, lies 0.5 mile northwestward of these rocks. Tenakee Reef Light, shown from a white wooden house on a skeleton structure on a concrete pier, is 23 feet above water and visible 6 miles.

Kadashan Bay (Chart 8252), on the southern side of Tenakee Inlet opposite Tenakee, is filled with a flat which bares.

Crab Bay, 4 miles westward of Tenakee Springs, is 5 miles long in a westerly direction and 0.5 mile wide. On its south side is an extensive flat surrounding a high-water island. At its head is a flat 0.8 mile in extent and a small stream. There is anchorage 1 to 1.8 miles from its head in 15 to 20 fathoms.

Saltery Bay, 3 miles northwestward of Crab Bay, is a small bay and inlet the entrance to which is clear; a flat extends 0.5 mile from the head of the inlet. It affords anchorage for small vessels near its head in 7 to 10 fathoms.

Two small rocks, covered at half tide, lie 0.7 mile from the northeast shore of the inlet and 7.5 miles northwestward of Tenakee Springs. In passing them the south shore should be favored somewhat. A rock has been reported to lie midway between these rocks and the northern shore.

Seal Bay, on the south side of the inlet 10 miles westward of Tenakee Springs, is 3 miles long and 0.5 mile wide. A flat extends 0.8 mile from its head, and a rock, covered at high water, is near the middle of the bay 1.5 miles inside the entrance. The depths are 25 to 30 fathoms, soft bottom, between the rock and the flat, a distance of 0.8 mile.

Long Bay, on the south side 2.5 miles westward of Seal Bay, is about 2.5 miles long and 0.4 mile wide. From the west point at the entrance a reef, covered at half tide, extends eastward nearly 0.5 mile, leaving a clear channel between the reef and the south shore 0.2 mile wide and 12 fathoms deep. The depths within the bay are 5 to 15 fathoms, mud bottom, affording secure anchorage. A flat extends 0.8 mile from its head.

Anchorage may be made at the head of Tenakee Inlet near the sand flat in 7 to 15 fathoms, and in the four bays described above; otherwise there is no anchorage in the main inlet.

Currents.—In Tenakee Inlet, south of Tenakee Springs, the velocity of either flood or ebb stream is about 1 knot.

Freshwater Bay.—This bay has its entrance on the west side of Chatham Strait between East Point and North Passage Point; it is 2 miles wide, and extends 11 miles northwestward, terminating in a sand flat with a large stream. There is a bare rock about 8 feet high nearly 0.5 mile from the north shore 3.5 miles inside North Passage Point, and two islands in mid-channel farther westward; a rock, bare at low water, lies

0.8 mile westward of them. The main bay has no anchorages, but small vessels may find temporary anchorage at the head of the bay or off the flats at mouths of streams, of which there are several. Pavlof Harbor is the only desirable anchorage in the bay.

North Passage Point, the north point at the entrance to Freshwater Bay, is long, low, level, and wooded, and is distinctive from other points in the vicinity, which are all high. Kelp extends for more than 100 yards off the end of the point.

Wachusett Cove is a small bight on the southwest side of Freshwater Bay, 2 miles northwestward of East Point. The cove is almost filled with a flat and there is a small stream at its head. A fair-weather anchorage may be made between the points at the entrance in 8 to 10 fathoms.

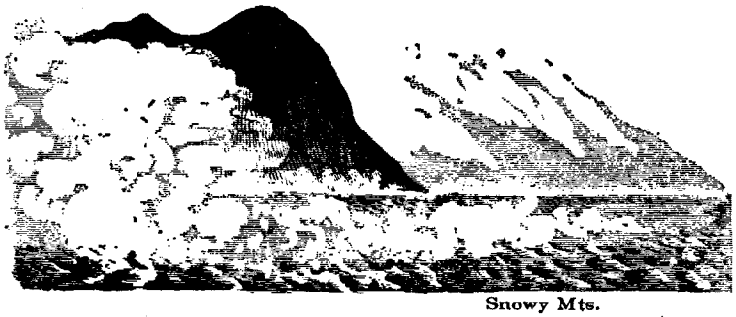
Pavlof Harbor, 1.5 miles westward of Wachusett Cove, is 0.3 mile in extent. A large stream enters the southwestern part of the harbor. A reef, covered at half tide, extends 90 yards from the east point at the entrance, and the entire east side of the bay is bordered by a flat 250 yards wide. A pinnacle rock, covered at half tide, is 220 yards from the west side halfway up the bay. Anchorage may be made outside the rock in about 15 fathoms and in the middle between the rock and the southeast shore, the clear anchorage being 350 yards wide in 5 to 12 fathoms, sand and rock bottom. The shelter is good, and the harbor is easily entered, though in strong westerly weather the wind draws down the bay with considerable force.

Cedar Cove, on the south side 1.2 miles westward of Pavlof Harbor, affords shelter for small craft, but its entrances are very narrow and foul.

Iyoukeen Cove is close northward of the entrance to Freshwater Bay, from which it is separated by a long, narrow, wooded peninsula, terminating in North Passage Point. It does not afford shelter except from offshore winds, but can be used temporarily by anchoring about 0.5 mile from the south shore in 23 fathoms. **Gypsum** is an abandoned gypsum mine at the head of Iyoukeen Cove.

False Bay, 5 miles northward of Iyoukeen Cove, is an open bight with deep water. Fair emergency anchorage for small craft may be found in its southern part in 3 to 5 fathoms, rocky bottom.

Point Augusta, on the west side of Chatham Strait at its junction with Icy Strait, is marked by Point Augusta Light, shown from a red wooden house at a height of 45 feet above water and visible 9 miles. The light is obscured from 328° to 135°.



Point Augusta bearing N, distant 20 miles

(Original Sketch made before 1883)

CHAPTER 12

West Coast of Baranof Island

Chart 8252

BARANOF ISLAND, the west coast of which is described in this chapter, forms about one-third of the outer coastline of southeastern Alaska between Cape Muzon and Cape Spencer. Baranof Island is almost 90 miles long and has a greatest width of about 22 miles. The west coast from Cape Ommaney at Chatham Strait to Point Kakul at Peril Strait is about 80 miles. **Annahootz Mountain,** 4,700 feet high, in the northern part of the island, is the greatest elevation on the island. This chapter also describes the coasts of Kruzof Island and Sitka Sound. The eastern coast of Baranof Island has been described with Chatham Strait in Chapter 11.

Characteristics of the coast.—Vessels making the land at Cape Edgecumbe in thick rainy weather may be aided in their determination of position by the color of the rocks. The rocks and cliffs northward of Cape Edgecumbe are decidedly black in color as far as Cape Georgiana, and the rocks southward of Cape Edgecumbe are a decided whitish gray from Biorka Island to Whale Bay. The shore for 3 miles north of Cape Edgecumbe rises in a precipitous cliff of dark brown lava about 200 feet high and forms a prominent landmark. There are numerous large caves or blowholes to be seen in this lava cliff.

From Cape Ommaney, the western coast of Baranof Island trends northwestward to Biorka Island, a distance of 50 miles. For a distance of about 20 miles from the cape there are numerous inlets and indentations in the shoreline which, as anchorages, furnish poor protection except to very small craft. The shore is of gray, storm-swept rock. From the headlands and points along the coast, which range from 200 to 800 feet in elevation, the land rises to peaks and ridges 2,000 to 4,000 feet high in the interior of the island. The lower slopes are timbered, while the ridges and summits are snow-covered until well into the summer months. The shoreline to the northward of Biorka Island has the same general features but is of a less forbidding appearance. During foggy weather along the coast it is often clear in Chatham Strait.

Chart 8253.—Cape Ommaney and Wooden Island are described in Chapter 11. **Ommaney Bay** is an open bight on the west side of Cape Ommaney and is of no importance. **Eagle Rocks** are a group of bare rocks close off the first point westward of Cape Ommaney.

Bobrovoi Point, about 1.8 miles northwestward of Cape Ommaney, is the southeast point at the entrance to Larch Bay. It terminates in a wooded hummock which may be mistaken for Wooden Island when approaching from northwestward.

Larch Bay is a large open bay about 2.5 miles wide, about 1.5 miles deep, with an arm 0.5 mile wide and 1 mile long in a northeasterly direction. Anchorage may be found

in about 20 fathoms in this arm. Small launches use this arm during the fishing season when fair weather prevails. Rocks extend about 500 yards off the western point of the entrance to Larch Bay. There are low depressions between Larch Bay and Chatham Strait.

Little Puffin Bay, about 5.8 miles northwestward of Cape Ommaney, is about 0.2 mile wide and 0.8 mile long. It has depths of 18 fathoms at the entrance, decreasing to 7 fathoms about 0.2 mile from the head, and then shoals rapidly. At the head of the bay is a stream and a gravel beach with outcropping rocks. Exposed anchorage for small vessels may be had in 11 fathoms, rock bottom. In entering, favor the northern shore to avoid breakers off the southern shore near the entrance.

Sealion Rocks, about 7.5 miles above Cape Ommaney and directly off the entrance to Puffin Bay, are a cluster of four dark rocks, 30 to 40 feet high, and several smaller outlying rocks close-to. The central rock is pyramidal in appearance with steep sides; the others are somewhat more massive. The depths are good on all sides of the rocks, but it is better to pass southward of them in entering Puffin Bay.

Puffin Bay, 2.5 miles long, about 0.8 mile wide at the entrance narrowing to 0.2 mile at the head, is about 7.5 miles northwestward from Cape Ommaney. On the northwestern shore near the entrance is a massive patch of white rock. Depths within the bay range from 90 fathoms near the entrance to 40 fathoms close to the head. A small bight in the northwest shore 1 mile within the bay furnishes temporary anchorage with limited swinging room for very small craft; the southern part of its entrance is obstructed by a 4-fathom patch marked by kelp and rocks. It furnishes little protection from southward. The small cove in the southeastern shore near the head of the bay furnishes anchorage for small craft in 6 or 7 fathoms in the middle of the cove. The very narrow entrance channel has depths of 4 fathoms. Williwaws blow with considerable force during southeasterly gales.

Driftwood Cove, 1 mile northward of Sealion Rocks, is about 0.2 mile wide and 0.4 mile long in an easterly direction. Its entrance is obstructed by kelp patches and the cove is exposed. A reef extends about 200 yards from the northern shore just within the entrance. The cove has depths of 6 to 12 fathoms, hard bottom. A breaker in a depth of 2½ fathoms is about 300 yards 224° from the islet off the south entrance point.

Big Branch Rock, a massive, dark-colored, round-topped rock 50 feet high, is about 1.8 miles northward from Sealion Rocks and about 2 miles southeastward of Redfish Cape.

Redfish Cape is a narrow peninsula appearing as a comparatively low, wooded, hummocky ridge parallel to the coast; it is the only apparent low ridge in the vicinity. Coming from northward a short distance above Redfish Cape, a white, conspicuous cliff is seen in the midst of the timber. A chain of barely separated wooded islets extends 0.5 mile southward from the end of the cape; the southernmost one is conical and wooded; outside and close to it are two large bare rocks which appear as one. Between Redfish Cape and Big Branch Rock is the entrance to Little Branch Bay, Big Branch Bay, and Redfish Bay.

Redfish Breaker is 160 yards 150° from the outer rocks southward of **Redfish Point.** It breaks except in smooth weather. A rocky patch with a least-found depth of 3½ fathoms is 0.4 mile 124° from the same point and 0.6 mile 244° from the point separating Little Branch Bay from Big Branch Bay.

Little Branch Bay is about 0.3 mile wide and 1.9 miles long to the narrows, which are barely 75 yards wide, then widens out to a basin nearly 0.2 mile wide and 0.3 mile long. There is an island 0.4 mile southwestward of the narrows, separated from the eastern shore by a channel 100 yards wide. Mid-channel depths in the bay range from 85 fathoms near the entrance to 25 fathoms off the island, 13 fathoms in the narrows, and 19 fathoms

in the middle of the bight at the head. A rock, awash, is close to the small island at the western point of the entrance. About 0.8 mile within the entrance a narrow channel in the eastern shore which can only be entered at high water leads to a lagoon which has depths of 1 to 7 fathoms.

Little Branch Bay Light marks the point of land between Little Branch and Big Branch Bays. The light, shown from a small white house 109 feet above the water and visible 9 miles, is obscured from 111½° to 338°.

Big Branch Bay, separated from Little Branch Bay by a high narrow ridge, extends in a northerly direction about 5 miles and is about 0.3 mile wide, narrowing to 0.1 mile in width 2.5 miles from the entrance, then widening again. An arm indenting the western shore about 0.9 mile from the western entrance point is 250 yards wide with depths from 10 to 20 fathoms, where small boats can find good shelter. Two islets are close to the northern shore in the entrance. About 2 miles from the entrance is an islet close to the western shore. A reef extends 0.1 mile from the southern point of the islet. The bight on the eastern shore eastward of this islet affords indifferent anchorage in 27 fathoms. Above the narrows, depths up to 60 fathoms are found. Small boats get ice from a glacier on the east shore 0.5 mile from the head of the bay.

Redfish Bay has its entrance between Redfish Cape and **Beavertail Island.** From its entrance the bay extends in a general northerly direction for 3 miles, narrowing in places to 100 yards and in one place to 80 feet. The channels are probably safe but too narrow for safe steering and until wire-dragged there is no certainty that dangers do not exist. The use of the bay by other than small craft is not recommended.

Tenfathom (Keough) Anchorage, within the entrance of Redfish Bay, about 1 mile eastward of Redfish Cape, furnishes secure anchorage for small craft. It is about 250 yards wide and has an entrance about 75 yards wide.

The small bay 2.6 miles northward of Redfish Cape furnishes good shelter for small boats, but the entrance is so narrow and the turns are so sharp that a vessel of any size cannot enter, especially if there is any swell.

Byron Bay, about 1.1 miles long in a northerly direction, is 4 miles northward from Redfish Cape. It is apparently clear but too deep for secure anchorage. Indifferent, temporary anchorage may be obtained in 22 fathoms close to the western shore about 0.8 mile within the entrance. Close to the western shore, near the head, is a small island above which small craft can find indifferent anchorage. A thin, high waterfall visible from offshore empties into a lake northward of the bay. A flat over 100 yards wide is at the head of the bay. In entering, favor the eastern shore, which is bold and steep-to.

Kekur Point is about 4.5 miles north-northwestward of Redfish Cape. It is a rounded point backed by a flat-topped ridge about 700 feet high. **First Kekur,** a group of black rocks 35 feet high, is off the southern extremity of this point. A small rock about 10 feet high is 0.4 mile 128° from the First Kekur. A breaker over a least-found depth of 2¾ fathoms, surrounded by deep water, is 0.4 mile 306° from the First Kekur.

Chart 8254.—Snipe Bay, about 1.8 miles northward from Kekur Point, is about 0.3 mile wide and 2.5 miles long in a northeasterly direction. It is deep and clear except for the rocks close to the shore outside the narrow entrance. The islets off the southeast entrance point are wooded. A group of rocks about 30 feet high is close to the northwest entrance point. About 1.4 miles within the entrance in the southeastern shore is a sheltered bight with 35 fathoms in the middle. At the head of the bay are two short branches.

A conspicuous waterfall empties into the valley at the head of the northwest branch. Depths of 35 fathoms were obtained in the small bight southward of the northeast branch.

Snipe Head, the northwestern entrance point of Snipe Bay, is a conspicuous straight-topped headland 550 feet high.

Sandy Bay, 3 miles northward of Snipe Bay, about 0.2 mile wide at the entrance, extends in a northerly direction. It divides into two arms 0.8 mile from the entrance, a long, narrow arm extending northward for 2.5 miles, and a second arm extending eastward for 1.3 miles.

Good anchorage may be had in 22 to 24 fathoms at the northeastern head of the eastern arm off the waterfall. About 0.8 mile within the arm a group of islets extends off the northern shore. Pass well southward of these to avoid a 1½-fathom spot, not marked by kelp nor showing any surface indication, which is about 200 yards southward of the islands. Anchorage may be had either in the bight westward of the islands or in the arm which extends north-northwestward from the northeast arm.

Fishermen anchor in the cove behind the islands off the entrance near the southeast shore. A 7½-fathom spot in the middle of the entrance causes the seas to pile up dangerously in southeast weather. Fish buyers anchor in both Snipe and Sandy Bays during the fishing season. All supplies for fishermen, except fresh water, are obtainable from them.

The **Third Kekur,** a conspicuous conical rocky islet about 120 feet high, is 1.6 miles northward of the northwest entrance point of Sandy Bay.

Close Bay consists of an open bight and a lagoon which can only be entered on the flood. Several breakers are about 270 yards off the north point of the entrance.

Whale Bay has its entrance between Point Lauder and North Cape. It is about 1.8 miles wide, extending in a northeasterly direction for about 4 miles, where it divides into two arms.

Point Lauder, low and wooded, the southeastern point of the entrance to Whale Bay, is about 15 miles north-northwestward of Redfish Cape. A breaker, visible most of the time, is 1 mile southward of Point Lauder, about 275 yards offshore.

North Cape, the western point of the entrance to Whale Bay, 4 miles northwestward of Point Lauder, is an island close to shore with three hills on it, the middle one, 205 feet high, being the highest. A breaker, visible only during a heavy southwesterly swell, is 0.6 mile 114° from North Cape. A second breaker, visible only during heavy weather, is 0.8 mile 126° from the cape.

Still Harbor, at the entrance to Whale Bay about 1.5 miles northward of Point Lauder, is about 2 miles long in a southeasterly direction and about 0.2 mile wide. The entrance, about 225 yards wide, is to the northward of **Tikhaia Islands,** the chain of rocky islets which extends northward from Point Lauder. The northeastern shore at the entrance is foul.

About 1 mile from the entrance a group of islets and rocks extend from the southwestern shore restricting the channel to about 150 yards. A 1-fathom rocky spot is about 240 yards northward from the northern point of the 30-foot island which lies close to the southwestern shore about 1.2 miles from the entrance. A sunken rock with about 1¼ fathoms of water over it has been reported by local authorities about halfway between the north point of the 30-foot island in Still Harbor and the opposite shore to the northward. The area between the rock and the northern shore is shoal. The only secure anchor-

age is at the head of the bay, and even here the swell is felt in heavy weather; this anchorage is not recommended.

Port Banks, about 0.3 mile wide and 2.3 miles long in a southeasterly direction, has its entrance 3 miles northeastward of Still Harbor. A sunken rock on which there is a depth of 1¾ fathoms, is about 0.6 mile 012° off the southwest point of the entrance; it is reported to break in a moderate swell. Deep water surrounds this rock. A reef, bare at low water, extends about 0.2 mile in a northwesterly direction from the southwestern point of the entrance. A small islet is close to this point and a larger islet, with a rock bare at low water, about 50 yards off its eastern shore, is almost in mid-channel. A small rocky islet is about 1 mile within the entrance a little to the southwestward of mid-channel. Good anchorage in depths from 8 to 20 fathoms, mud buttom, may be had. Port Banks is used extensively during the fishing season.

It is recommended that vessels bound for Port Banks favor the northwest shore of Whale Bay until clear of the off-lying dangers, then head into Port Banks, favoring the eastern shore. The Makhnati Islands can usually be identified in thick weather; they furnish a good leading mark for clearing the off-lying rock. It is reported that breakers extend from this rock to the southwest point of the entrance during very heavy weather; under such conditions it probably would be better to make Rakovoi Bay. After passing the islet at the entrance to Port Banks the only obstruction is the small rocky islet 1 mile from the entrance. Pass to the eastward of this islet. About 0.5 mile beyond, the bay widens and forms a basin almost 0.5 mile in diameter which has depths of 16 fathoms.

Kritoi Basin, between Port Banks and Rakovoi Bay, affords excellent shelter, but on account of the narrow entrance is used mostly by small craft. It is used extensively during fishing season. The entrance between **Finger Point** and **Krishka Island** is deep and clear but is only about 75 yards wide. Good anchorage in desired depths from 5 to 20 fathoms, mud bottom, can be had.

Rakovoi Bay, 1.2 miles eastward of Port Banks, is about 1.6 miles long and 0.2 to 0.4 mile wide. An island close to the eastern entrance point makes the channel about 275 yards wide. A rock, awash at half tide, is about 75 yards off the western shore of the island; this is the only known danger in the entrance. The channel to the eastward of the island is suitable only for small boats. Anchorage may be found southward of the island at the entrance in about 18 fathoms or farther up the bay in 20 fathoms.

Great Arm is 9.5 miles long and about 0.5 mile wide to the narrows, 5 miles from the entrance, where it is less than 0.3 mile wide. A small bay idents the eastern shore 3.5 miles from the entrance and another at the narrows; depths of over 30 fathoms are found. Great Arm is clear; depths are too great for anchorage. **Kakovo Island** is off the northern entrance point.

Small Arm extends in a northerly direction for 5.5 miles with a general width of about 0.4 mile. At its head it turns northeastward for 0.6 mile. The **Makhnati Islands,** a group of wooded islands, are off the entrance to Small Arm. Anchorage may be found among them but it is exposed and not recommended. The depths in Small Arm are too great to afford anchorage. If the western shore is favored when passing the Makhnati Islands, no obstructions will be encountered throughout the length of the arm.

Necker Bay, 3.5 miles northward of North Cape, has its entrance between the Yamani Islets and the Guibert Islets. It extends more than 8 miles in a northeasterly direction and is about 0.5 mile wide. A chain of rocky islets, steep-to on the southern side, extends 0.3 mile southward from the northwest entrance point. A ledge which covers at high water

is about 0.8 mile 244° from the northwest entrance point. Off the point, 0.4 mile eastward of the northwest entrance point, is a reef which bares at low water, and foul ground extending about 100 yards southward. A rocky patch on which 10 fathoms was found, is about 0.5 mile 000° from the most northerly of the Guibert Islets and in the middle of the bay; it is reported to break in extremely heavy weather. With the exception of the foregoing, deep water is found throughout the bay. About 6 miles from the entrance the bay widens and anchorage can be found in 30 fathoms on the eastern side of the bay.

The **Guibert Islets,** consisting of three low, bare, rocky islets and several small rocks, are about 3 miles northward of North Cape and 0.5 mile off the southeastern point at the entrance to Necker Bay.

Yamani Islets, a group of wooded islets about 4 miles northward from North Cape, form the northwestern headland of Necker Bay. Good anchorage for small craft can be had northward of the islets in **Yamani Cove.**

Two remarkable headlands are about 2 miles northeastward of the Guibert Islands, one on either side of Necker Bay. They are about 800 feet high. The rocky outcrop shows well offshore and makes a good landmark.

Toy Harbor, on the southeastern shore about 5 miles from the entrance to Necker Bay, is reported to afford shelter for small boats.

Dorothy Cove, about 6 miles from the entrance to Necker Bay, affords excellent anchorage for small craft. It is about 250 yards wide, 0.4 mile long, and has depths of about 10 fathoms. The entrance is about 125 yards wide.

Secluded Bay is separated from the northern part of Necker Bay by a large island. The southern entrance is extremely narrow, not over 40 yards wide for over 0.2 mile and 30 yards at one place, and a least known depth of 6½ fathoms. The northern entrance is wider but is obstructed by a ledge which extends eastward about 100 yards from the northern point of the island, leaving a clear channel of about 100 yards. The bay is about 2 miles long and about 0.4 mile wide. A large stream enters the northern part of the bay and an extensive flat strewn with boulders makes off the mouth of this stream. Anchorage may be found in 17 fathoms in the northern part of the bay off this stream and small craft can find good anchorage in 6 fathoms in the southern part of the bay.

A small bay extends about 0.5 mile northward from the head of Necker Bay where anchorage may be found in 20 fathoms.

Slate Islets, a group of rocky islets, parallel the shore between Necker Bay and Crawfish Inlet. One of the southern islets has a few trees on it. Between the islets and the main shore is deep water, but many rocks make navigation without local knowledge danger us. A sunken rock is about 170 yards northward of the most northern of the Slate Islets in the entrance to Crawfish Inlet.

Chart 8255.—Crawfish Inlets, with entrances 6.5 to 11 miles northwestward of North Cape, consists of two principal arms connected 5 miles inland by Cedar Pass, suitable only for small craft. The inlets and entrances are deep and clear, but between the two principal entrances are off-lying dangers.

Walker Channel is the name applied to the southern entrance to Crawfish Inlet. **Aspid Cape,** low and wooded, forms the southern point at the entrance.

Jamboree Bay, 1 mile long and 300 yards wide, extends southeastward from the head of Walker Channel. In entering, keep in mid-channel, and anchor near the head of the

bay in 10 to 17 fathoms with good holding ground. Southeast winds sweep through the anchorage with considerable force.

Rakof Islands are a group of wooded islands lying between Walker Channel and the entrance to West Crawfish Inlet. **Beauchamp Island**, the largest island of the group, forms the northwestern side of Walker Channel. **Scow Island**, the southwesterly island of the group, is 150 feet high and lies westward of Beauchamp Island. A rock, awash at half tide, lies 0.3 mile 090° from the southern point of Scow Island.

Scow Bay indents the western shore of Beauchamp Island; it is about 1.2 miles long and 200 yards wide. It is much used by local fishermen as an anchorage. Favor the southeastern shore throughout, passing southward of all the islands near the entrance. When passing through the narrows leading into the basin at the head of the bay, keep as close as possible to the south shore, especially at low tide. There is good anchorage off the cabin on the north shore of the bay in 10 fathoms, muddy bottom; also in the basin in 4 fathoms, muddy bottom.

Middle Channel is a passage leading to Crawfish Inlet from the sea, and lies mid, way between Walker Channel and West Crawfish Inlet. A course from southwestward-passing close to the northwest side of Scow Island, will lead clear of the off-lying rocks up to this entrance. One mile inside this entrance, near mid-channel, is a sunken rock with 1½ fathoms over it and marked by kelp, which should preferably be passed to the southward.

Biali Rock is the extreme western islet of a chain of bare islets extending westward from Rakof Islands. It is bare, about 115 feet high, and white in color. Foul ground extends for about 1 mile to southward and eastward of the rock. **South Rocks** are a group of rocks, awash at high water, lying near the southeastern limit of the foul ground.

An inside passage furnishes protection for small craft bound for Sitka. Pass eastward of Scow Island, avoiding the rock in mid-channel, and through **Cameron Pass.** Favor the southeast shore of Middle Channel until up to **Second Narrows.** Pass eastward of a large rock off the point, then favor the south shore and take mid-channel course through the narrows. A shoal of 2½ fathoms is in Second Narrows. Head northward until up to an opening leading northwestward. Favor the east shore of this opening past a bare rock near the shore avoiding a sunken rock in the center. Then head northward for about 0.5 mile and turn westward around a point, passing in mid-channel through **First Narrows.** Cross West Crawfish Inlet and enter Windy Passage.

Crawfish Inlet is deep and clear except for a rock, bare at quarter tide, in mid-channel, 8 miles from the entrance. The inlet can be entered from seaward through Walker Channel or Middle Channel, the former being the safer.

Cedar Pass, connecting Crawfish Inlet with West Crawfish Inlet, is suitable only for small craft. In using Cedar Pass, favor the west shore up to the narrows, through which mid-channel should be kept. **Lodge Island** is the large island which forms the western side of Cedar Pass.

West Crawfish Inlet extends northeastward for about 8 miles and has two arms. The northern arm, opposite Cedar Pass, is clear in mid-channel except for a landslide shoal with 4½ fathoms over it which lies off the western shore about 0.8 mile from the entrance. **Shamrock Bay** leads eastward from a point near the head of the inlet. The inlet and bays are too deep for good anchorage.

The **Necker Islands** are a group of low, wooded islands extending northwestward from the entrance to West Crawfish Inlet. Between the islands are many passages. An inside passage for small craft leads through Windy Passage, Dorothy Narrows, and Hot Springs Bay, which lie between the islands and Baranof Island.

The most prominent landmark in the Necker Islands is **The Beehive**, a knob 430 feet high at the southwest end of **Golf Island**, the long narrow island westward of Gornoi Island.

Rachek Island is the fairly large, wooded island at the south end of the Necker Island group. It has high, light-gray cliffs on its seaward side. There is clear water to the southwestward of this island.

North Rock, having a breaker 200 yards southward, is an isolated, black rock, block-shaped, awash in a heavy sea, 1.4 miles west-northwestward of Rachek Island. Fishermen trawl a great deal southward of this rock.

John Rock is the large, light-gray, 90-foot rock 2 miles northwest of North Rock.

Windy Passage is the south approach to Hot Springs Bay from West Crawfish Inlet. It has clear water except for a rock awash at quarter tide and a sunken rock extending 200 yards from the eastern shore at President Bay. Kelp marks these rocks. Three small bays are on the east side of the passage.

President Bay, at the southeast end of Windy Passage, is 1.8 miles long and 200 yards wide. Entrance can be made on either side of the wooded islands in the entrance by keeping in mid-channel. Good anchorage is afforded small craft in muddy bottom well toward the head of the bay. A basin at the head of the bay is accessible only to skiffs.

Sevenfathom Bay, the middle bay, is a better anchorage than President Bay. It is 0.8 mile long and 200 yards wide. A bare rock and two rocks awash lie southward of the entrance. Keep in mid-channel until near the head of the bay, then avoid a ledge, bare at three-quarter tide, which is off the southern shore near the head of the bay, which also has a sand flat 100 yards wide, bare at low tide. Good anchorage for small craft in 7 to 10 fathoms, muddy bottom, can be found here.

Big Bay, at the northwest end of Windy Passage, is 1.2 miles long, 250 yards wide at the entrance, with greatly increased width inside. A rock, awash at low tide, is 100 yards southwesterly from the wooded islet in the bay. Anchorage is good in 5 to 10 fathoms, muddy bottom, some little distance off the stream at the southeast end of the bay.

Dorothy Narrows, between Windy Passage and Hot Springs Bay, has ½ fathom of water at lowest tides. A rock, awash at quarter tide, is in mid-channel north of the narrowest part. Coming from the south, keep mid-channel through the narrowest part, then swing right and head for the northern of two fishing-limit signs, the southern of which is on a wooded islet and the northern one on the point 650 yards northerly from the rock mentioned. When past this rock, swing left to avoid a rock awash at half tide, 200 yards south of the southern fishing-limit sign.

The passage between **Gornoi Island** and the group of islands southeastward is clear except for a rocky islet and two rocks awash southeastward of it, which lie halfway from Windy Passage to the outside. To avoid this danger, keep close to the southeast shore. Do not use this passage to reach the outside on account of offshore rocks.

The passage between Gornoi Island and Golf Island is very foul and should not be used.

The passage along the west shore of Golf Island, between this island and the **Jackknife Islands**, has good water close along the shore of Golf Island. A foul area is north-

eastward of the Jackknife Islands. The breakers 600 yards westward of the south end of Golf Island break in a slight swell.

The passage between the Jackknife Islands and **Elovoi Island** is clear if vessels keep close to Elovoi Island, passing west and north of the wooded islet 500 yards westward of the north end of Golf Island.

The passage between **Legma Island** and **Maid** and **Tava Islands** is clear in mid-channel. Small craft can pass between Maid Island and Tava Island with local knowledge.

The passage between **Torsar Island** and **Fragrant Island** is dangerous and should not be used except by those with local knowledge.

These passages are for small craft only and should be used with caution. The only ship route into Windy Passage is through West Crawfish Inlet.

The best route into Hot Springs Bay from the south or southwest is to pass 800 yards eastward of North Rock in a northerly direction, passing westward of Elovoi Island and the three small, wooded islands 300 yards off its shore and eastward of Fragrant Island. Keep midway between visible objects.

Herring Bay, in Elovoi Island, is 0.8 mile long and 200 yards wide. The westerly approach is not passable. In entering by the eastern approach, pass westward of a bare rock off the east point of the entrance and follow mid-channel. Excellent anchorage can be had for small craft in 3 to 4 fathoms, muddy bottom.

Biorka Island is the most westerly and largest of the group. **Point Woodhouse,** the southern point of the island, is moderately high and wooded. Rocks and islets are close to the point. **Kaiuchali, Terbilon,** and **Impassable Islands** are three that have been named. A shoal, with a least depth of 2 fathoms, is 0.3 mile 247° from the southerly tip of Point Woodhouse. **Little Biorka Island** is northwest and close to Biorka Island with a narrow passage between. This pass is foul, but in good weather small boats can use it with local knowledge. The southern neck is a bare, rugged rock cliff. The western and northern sides are bare rock cliff. This island is 140 feet high and wooded in its center. A 60-foot bare islet is at the southern point.

Vasilief Rock is about 0.9 mile southward of Point Woodhouse. Breakers are reported visible in this section in rough weather.

Golovni Island has two parts, the inshore half being high and wooded; the outer half being a high, bare, gray rock, rounded on top, with a perpendicular south face.

Jacob Rock, about 0.8 mile southward of Golovni Island, is a large outstanding rock of dark-gray color 80 feet high.

Biorka Channel, east of Biorka Island, furnishes a short route into Sitka Sound from the southwest. Vessels should keep between the 30-fathom curves on entering from southward until past the north end of Wrangell Island, then head north. This channel is clear except for rocks and shoals as indicated on the chart. The greatest velocity of the current is about 1 knot. Predictions may be obtained from the *Current Tables, Pacific Coast.*

Gunboat Rock, about 1 mile northeastward of Vasilief Rock, which has two pinnacles, and looks when seen from certain directions, like a gunboat, is a good landmark. A small reef, awash at low water, which breaks in all but dead calm weather at high water, is 0.45 mile 198° from Gunboat Rock. Depths of 4 and 9 fathoms are 0.6 mile southeastward and on the opposite side of the channel from Gunboat Rock and a depth of 3 fathoms is 1 mile northeastward.

Symonds Bay is the eastern cove indenting the north side of Biorka Island, and is sometimes a convenient anchorage for small vessels deterred from entering the sound

by thick weather. It is 0.8 mile long, 0.5 mile wide at the entrance, and 0.3 mile wide at its head. **Entrance Islet** is northward of and close to the western point of the entrance.

Hanus Islet is northward of and close to the eastern point of the entrance. A shoal with 3½ fathoms over it is 175 yards northwestward of Hanus Islet, and a rock awash is 0.2 mile southeastward. The depths range from 20 fathoms at the entrance to 5 and 6 fathoms at the anchorage near the head. A sunken rock, with ¼ fathom over it and marked by kelp, is 200 yards from the western side at a point halfway up the bay. A shoal with ½ fathom over it is at the head of the bay. It is marked by a small white globular buoy maintained by the Biorka Island Coast Guard Station.

The bay is open northward, but affords anchorage with shelter from southerly winds, bottom, sand and shells. The best shelter is near the head inside the 2-foot rock in 5 to 6 fathoms, but it is suitable only for small craft. Large vessels should anchor in mid-channel just inside the entrance in 12 to 13 fathoms. A mooring buoy, in 5 fathoms, is maintained near the head of the bay by the Coast Guard station for use by supply vessels and barges. A small wharf, 16 feet wide and 178 feet long with 5½ feet of water along the face, is on the west side near the head of the bay.

Biorka Reef is 1.2 miles 282° from the southernmost point of Little Biorka Island. It is a sunken rock, nearly awash at low tides, with deep water around it, and breaks in moderate weather; it has no kelp. The channel between the reef and Little Biorka Island is 1 mile wide, clear, and practicable for vessels of any size.

Hot Springs Bay is between the northernmost Necker Island and Baranof Island. Torsar Island marks the northwest point of the entrance to the bay. Fragrant Island is the large island southeast of Torsar Island. **Kolosh Island** is the large island on the north side of the bay. An abandoned saltery and small wharf are at the south end of the sand beach on the east side of the island.

Goddard, at the hot springs on the northeasterly side of the bay, has a post office, hotel, and health resort. Regular communication is had with Sitka. The hot springs have a temperature of about 145° F., and the water contains sulphur, chlorine, iron, and magnesia. The landing float on the north side of the point west of the hotel has a least depth of 25 feet at low water.

To reach Goddard, from a position midway between Peisar and Hanus Islands, steer **121°**. After passing the eastern tangent of Torsar Island, Viesokoi Rock will come on range with the west tangent of Kita Island. Steer this back range, course **169°**, until the south tangent of Fragrant Island is abeam; then head between a prominent bare rock and Kolosh Island on course **093°** to an anchorage in 12 fathoms.

Chart 8252.—Sitka Sound has its entrance from sea between Biorka Island and Cape Edgecumbe. It extends in a northerly direction about 14 miles, with a width east and west of 7 to 10 miles. The east and north shores are fringed with numerous islands and rocks and indented by bays and inlets. At its north end, the sound connects with several bays and estuaries extending northward, and with Olga Strait, which is part of a navigable inland passage connecting Sitka Sound through Neva and Peril Straits with Chatham Strait. The shores are everywhere wooded, rendering it difficult to distinguish from a distance the wooded islets when they are on with the land, which usually rises rapidly a short distance from the sea, culminating in broken mountains. The islands are mostly small, low, and more or less wooded.

Chart 8256.—Cape Edgecumbe, the southwestern extremity of **Kruzof Island,** is formed by a cliff of black lava, about 100 feet high. Foul ground extends 300 yards off the shore of the cape and there are banks with depths of 8 to 9 fathoms, about 0.8 mile southward of the cape, on which the sea breaks in very heavy weather. The rocks and cliffs northwestward of Cape Edgecumbe are decidedly black in color as far as Cape Georgiana, while those southward of Cape Edgecumbe, from Biorka Island to Whale Bay, are whitish-gray, and this characteristic is of considerable assistance in identifying the locality when making the coast in thick weather.

Cape Edgecumbe Light, shown from a red wooden house, is 100 feet above the water and visible 11 miles. The light is obscured from 164° to 321°. A 16-fathom bank has been reported about 5 miles southwestward of Cape Edgecumbe, on the range, St. Lazaria Islands slightly open of Shoals Point.

Sitka Point, about 1 mile eastward of Cape Edgecumbe Light, is marked by a daybeacon. Foul ground extends about 500 yards southward from the beacon and for about 300 yards westward of Cape Edgecumbe Light. Outside of these reefs the water is clear. Fishing vessels frequently anchor on the eastern side of Sitka Point, anchoring close inshore and northward of the reef, marked by kelp, extending 300 yards off the eastern side of the point. This anchorage is exposed in easterly or southerly weather.

Mount Edgecumbe, on Kruzof Island, is the prominent landmark for Sitka Sound and is 3,271 feet high. From any point seaward, it is easily distinguished by its isolated position, its flat top, its peculiar streaked appearance, and its reddish color. The upper part is a bare volcanic cone, usually snow-clad. Extending down the sides of the cone are numerous deep gullies or ravines, in which the snow lies until late in the summer, giving it a peculiar streaked appearance. The crater is from 300 to 400 feet deep.

St. Lazaria Islands, about 1 mile off the southern shore of Kruzof Island, form the St. Lazaria National Wildlife Refuge. These islands are of a peculiar volcanic formation and are frequently visited by tourists. Deep water is close-to on all sides of the islands except for a reef extending 125 yards off the northeastern point. Small craft frequently anchor close inshore on the northern side of the islands in 8 to 10 fathoms, rocky bottom, which affords protection in moderate southerly weather.

Low Island is a bare flat island about 250 yards wide and surrounded by a large area of shoals and breakers marked by kelp, extending to Shoals Point. The highest part of the island is only 7 feet above high water and is swept over by heavy seas in southerly storms. The island is of lava formation partly covered by sand and shells and is difficult to identify at a distance.

Chart 8255.—Vitskari Island is a bare rock about 20 feet high, about 5.4 miles eastward of St. Lazaria Islands. Vitskari Island Light, shown from a small white house is 45 feet above the water, and visible 9 miles.

Vitskari Rocks are a group of bare rocks northward of Vitskari Island. Between the rocks and Low Island is a channel 1 mile wide; however, the channel between the rocks and Kulichkof Rock is always used by vessels bound for Sitka.

Camel Mountain, about 1.5 miles northward from the hot springs on the east side of the sound, is a prominent landmark with two humps at its summit. When seen from westward it shows a perfect cone-shaped outline. A range through Camel Mountain tangent to the north point of Biorka Island will clear Biorka Reef.

Peisar Island is about 2.4 miles northeastward of Hanus Islet. Rocks lie 0.2 to 0.5 mile off its shores.

Viesokoi Rock is about 0.7 mile southeastward from the southern extremity of Peisar Island.

Kanga Bay, the entrance to which is about 1.8 miles eastward of Peisar Island, is about 2.5 miles long and 0.3 mile wide. Depths of 11 to 18 fathoms are found in the inner bay, the channel to which passes northward of the small islet lying about midway between the entrance and the head of the bay. A shoal with a least depth of 4¼ fathoms is about 275 yards off the hook on the south shore of the inner bay. Foul ground extends 0.2 mile in a northwesterly direction from the south point of the entrance.

Redoubt Bay is northeastward of Kanga Bay. The head of the bay has two arms which are deep. **Redoubt Lake** empties into the eastern arm. The entrance to Redoubt Lake is not navigable by any type craft, as there are the remains of a rock dam across the entrance and the lake level being about 9 feet above high water level of the bay, the three outlets from the lake have very steep rapids. A boat skid has been built along the north side of the northern outlet by which a small boat could be manhandled into the lake.

Islet Passage, in which depths of 11 to 20 fathoms are found, leads from Kanga Bay to Redoubt Bay. **Fankuda Islet** is at the northern end of the passage. Soundings of 12 fathoms were found westward of the islet and 12 fathoms in the channel to the eastward. Various channels lead to the bay through the numerous islands at the entrance; these are shown on the chart.

A group of wooded islands are off the entrance to Kanga and Redoubt Bays and southward of **Povorotni Point**, which is low and wooded. **Kita Island** is the outermost of the larger islands of the group. Many islets and rocks are offshore between Povorotni Point and **Cape Burunof**. Sunken rocks are reported to be nearly 0.5 mile westward of Cape Burunof. The entire area of rocks and islets has not been thoroughly surveyed and should be navigated with caution. The latest edition of the chart should be used.

Vasilief Bank is marked by two rocks, 0.5 mile apart, which are awash at high water.

Kulichkof Rock is about 2.2 miles northward of Vasilief Bank. It is about 200 yards long, 38 feet high, steep-to and bare. A small group of rocks, awash at high water, lie about 0.2 mile northward of the rock; a rock which covers 1 foot at MLLW is 450 yards 287° from the rock. Rocky patches, marked by some kelp at low tides, are charted eastward of the rock. Kulichkof Rock is eastward of the main ship channel entering Sitka and is a prominent landmark. Kulichkof Rock lighted whistle buoy is about 0.5 mile north-northwestward from the rock.

Zenobia Rock is about 2 miles east-northeastward of Kulichkof Rock and nearly 1 mile west-southwestward of **Liar Rock**, the westernmost rock of the Eckholms; it has 2¼ fathoms over it.

The shoreline from **Caution Island** northward to Deep Inlet is rocky with heavy spruce timber growing to the storm high-water line. Many off-lying islets, rocks, awash and sunken, are found along this coast, making it dangerous to traverse without local knowledge. A pass, carrying 1 fathom at low water, is used by small boats and fishing craft between Povorotni Point and the islets off it, but should not be attempted without local knowledge.

Three Entrance Bay, the long narrow shallow bay to the south of Cape Burunof with three entrances, is a protected anchorage for small boats, but is very little used. The north

entrance is the best and will carry 1 fathom. In westerly weather all entrances are exposed to the open sound. Caution, do not use without local knowledge.

Pirate Cove, the first cove east of Cape Burunof, is a protected anchorage at the head but is constricted and shoal. Two to three small boats can anchor.

Samsing Cove, the second cove east of Cape Burunof, is a well-protected anchorage for small boats with easy access from the west side and good holding ground of mud and sand in 3 to 8 fathoms.

Sandy Cove, the cove southwest of Deep Inlet, is a protected anchorage for small craft in 7 to 9 fathoms, mud and sand bottom.

The Eckholms are a small group of islets and bare rocks; the easternmost islets are wooded. The Eckholms Light, shown from a white wooden house, is 33 feet above the water and visible 6 miles; it is obscured from 288° to 324°. The **Belknap Islands** are southeastward of The Eckholms.

Deep Inlet, the narrow entrance of which is southeastward of The Eckholms, has no anchorage. A large flat rock with ¾ fathoms is on the southern side and partly blocks the entrance.

Aleutkina Bay, northeastward of the entrance to Deep Inlet, offers fair anchorage in 15 to 17 fathoms, muddy bottom. The bay has two entrances. The west entrance, between **Emgeten** and **Error Islands,** is clear and a mid-channel course will lead to the anchorage. The east entrance is between **Fassett Island** and **Silver Point** and a mid-channel course will likewise lead safely to the anchorage.

Leesoffskaia Bay affords anchorage for small vessels in any desired depth. The entrance is about 250 yards wide. Vessels desiring to make use of this well sheltered anchorage should follow the northern shores close-to in order to avoid the extensive sand and mud flats bordering the southern shores. The bottom is muddy in the middle of the bay but rocky near the shores.

Camp Coogan Bay, on the southeastern side of Eastern Channel, has a narrow but clear entrance, and a landlocked anchorage inside for small vessels in 7 to 12 fathoms, muddy bottom. Several streams enter at its head, where a flat makes out nearly 0.2 mile. **No Thorofare Bay,** north of Camp Coogan Bay, is composed of two landlocked bodies of water connected by narrow, shallow channels. Only small boats can enter and then only at high-water slack.

For high-water time difference at Sitka, add ¾ hour; for low-water time difference, add 2½ hours, and for high-water height, subtract 3.8 feet. Caution, do not use without local knowledge.

Birds Nest Bay is a small shoal bay near Camp Coogan and No Thorofare Bays. A small foul passage connects with Camp Coogan Bay, but can be used only by small boats at half tide or more. Caution, use only with local knowledge.

Silver Bay, at the eastern end of Eastern Channel, extends in a northeasterly direction for 0.8 mile, then southeastward for 4 miles, with an average width of 0.5 mile. **Herring Cove** is on the north side about 1.5 miles within the entrance. **Bear Cove** is on the east side halfway up the southeastern arm. Small vessels can find contracted anchorage in Herring Cove in depths of 14 to 15 fathoms, muddy bottom, but should pass with caution the 1½-fathom spot in the center of the entrance. In Bear Cove the anchorage is deep, 23 fathoms, and swinging room is contracted. On the south side at the head of Silver Bay is a small island, **Arguello Island,** inside of which anchorage can be had by small vessels in 15 fathoms. Enter to the west of Arguello Island, as a shoal with 1¼

fathoms is nearly in the center of the entrance from the northeast. Small vessels can anchor just below the waterfall at the head of the bay in 16 to 20 fathoms.

Chart 8244.—Simpson Rock, with 1¾ fathoms over it, is about 0.3 mile southeastward of the easternmost Kayak Islands and 350 yards southward of **Whale Island.** A lighted bell buoy is moored on the southern edge; the rock is not marked by kelp.

Tsaritsa Rock, awash at low water, is about 0.6 mile eastward of Simpson Rock and 600 yards southward of the southern extremity of Galankin Island. A lighted bell buoy is moored southward of the rock which is not marked by kelp.

The passage northward of Simpson Rock and Tsaritsa Rock buoys should be avoided because of the many dangers and indications of dangers.

Rocky Patch is about 600 yards in extent in an easterly direction and 300 yards wide. The shoalest water near the western edge of Rocky Patch is 3½ fathoms and is marked on its western side by a lighted bell buoy. The shoalest water near the eastern edge of the patch is 3¼ fathoms.

The Twins are a group of small islets which lie about 0.4 mile eastward of **Galankin Island,** the largest of the islands on the northern side of Eastern Channel. A ledge extends over 100 yards southeastward of The Twins. A light, shown from a white wooden house at a height of 14 feet above the water, is on the southeasternmost islet of the group. The light is obscured westward of 025°.

Sheep Island, small and wooded, is westward of Galankin Island. The area between Sheep and Galankin Islands is foul. **Katz Island,** small and wooded, is about midway between Galankin Island and The Twins.

Gilmore Islands, a group of small wooded islands, are northwestward of Katz Island. The passages between the islands of this group are foul. **Morne Island,** northward of Gilmore Islands, is small and wooded. The area between The Twins and Morne Island is foul.

Kutkan Island is at the southeastern end of Middle Channel. **Breast Island,** small and wooded, is westward of Kutkan Island.

Cannon Island is a small wooded island on the northern side of the Eastern Anchorage and at the western entrance to Jamestown Bay. **Ring Island,** about 625 yards long and wooded, is at the east entrance to Jamestown Bay. **Dove Island,** small and wooded, is about 150 yards northward of Ring Island. **Minett Island,** small and wooded, is about 300 yards northward of Ring Island. **Guertin Island,** the largest of the islands in Jamestown Bay, is eastward of Ring and Dove Islands.

Jamestown Bay, about 1.5 miles eastward of Sitka, affords anchorage in 11 to 13 fathoms, muddy bottom, about 400 yards from shore and 300 yards westward of the rocks awash at high water in the northeastern part of the bay.

Enter Jamestown Bay on course **027°,** passing midway between Cannon and Minett Islands, with a rocky point on the north shore of the bay dead ahead. Anchor at a position about equally distant from this point and each of the two islands previously mentioned, in 12 fathoms, mud bottom.

Harris Island is about 0.5 mile southeastward of Jamestown Bay. **Marshall Island** is eastward of Harris Island.

Kayak Islands, about 0.8 mile northward of The Eckholms, are a narrow group of small, partly wooded islands, on the northern side of Eastern Channel.

The passage between Kayak Islands and Whale Island is foul and the bottom very irregular. **Pritchard Rock,** which bares 1 foot at low water, is 330 yards westward of the **McClellan Group,** which are northward of Whale Island.

Beardslee Islands are about 0.5 mile northward of Whale Island. **Volga** and **Fritz Islands,** small and wooded, are on the northern side of Middle Channel. Volga Island Light, 35 feet above the water, is shown from a small white house on the southern side of the island. The light is obscured from 086° to 241°.

Passage Islands, about 0.3 mile northwestward of Kayak Islands, with a clear channel between are a group of low, sparsely wooded islands.

Surf Rock, about 0.3 mile northwestward of Passage Islands, bares 2 feet at high water. A deep channel is between Surf Rock and Passage Islands. A rock with 2¾ fathoms over it is 265 yards 316° from Surf Rock. The passage westward of Surf Rock is sometimes used by vessels proceeding from Middle Channel to Western Channel.

Keene Rock, about 0.4 mile northeastward of Surf Rock, has a depth of 2¼ fathoms over it. This danger must be taken into account when entering or leaving Middle Channel by the passage westward of Surf Rock.

Rose Rock, about 350 yards southward of Volga Island, bares 2 feet at low water. **Mitchell Rock,** about 350 yards east-northeastward of Rose Rock, has a depth of 1 fathom over it.

Turning Island, about 0.4 mile northeastward of Volga Island, is small and its western part is wooded. It is the easternmost island on the north side of Middle Channel. Turning Island Light, 16 feet above the water and visible 9 miles, is shown from a small white house on the eastern side of the island. The light is obscured from 062° to 211°. **Alexander Rock,** about 4 feet high, is about 125 yards westward of the island.

Aleutski Island, northwestward of Turning Island, is small and wooded. A small-boat passage is between Turning Island and Aleutski Island. The area between Aleutski and Harbor Islands is foul.

Makhnati Island, on the east side at the entrance to Western Channel, is the southernmost of the group of islands lying southwestward of Japonski Island. **Makhnati Rock,** with 1½ fathoms over it, is about 500 yards 233° from the southern extremity of Makhnati Island; the rock is marked by a lighted whistle buoy on its western side.

Makhnati, **Mogilnoi, Kirashkin, Sasedni, Gold, Virbublennoi, Reshimositi,** and **Nevski Islands** have been connected together by a solid fill to Japonski Island.

Signal Island, which is wooded, is on the east side of Western Channel, about 0.3 mile northward of Makhnati Island. Signal Island Light is on the western point of the island. It is shown from a small white house, 48 feet above the water and visible 6 miles. The light is obscured from 211° to 010°.

The sunken rocks and shoals on the east side of Western Channel, northward of Signal Island and westward of Sasedni Island, are marked by some kelp which shows only at low tides.

Sentinel Rock, 15 feet high and bare, is the southernmost islet on the west side of Western Channel; it is about 0.6 mile westward of Signal Island. A number of rocks, which bare at low water, are southward of Sentinel Rock, the outer one lying 0.3 mile 204° from Sentinel Rock. There is deep water between the rocks, and these passages are used by small fishing boats with local knowledge.

Usher Rock, 10 feet high and bare, is about 0.6 mile north-northwestward of Sentinel Rock, with a number of rocks which bare at low water, between. A rock with 2¼ fathoms

over it and marked by a lighted buoy at its eastern edge, is 270 yards 159° from Usher Rock.

Neva Island is northwestward of Usher Rock. The **Apple Islands** and the **Parker Group** are northwestward of Western Channel; the area around these islands is foul.

Black Rock, 41 feet high and bare, is about 0.6 mile west-northwestward from Sentinel Rock. **Bare Rock** is about 350 yards southeastward of Black Rock, with deep water between.

Battery Island, the northernmost island on the east side of Western Channel, is heavily wooded. Battery Island Light, 16 feet above the water and visible 9 miles, is shown from a small white house at the northern end of the island. The light is obscured from 269° to 063°. **Line Island,** sparsely wooded, is southward of Battery Island.

Whiting Harbor, westward of Japonski Island, affords anchorage, exposed to westerly and northwesterly winds and swells, in about 12 fathoms, mud bottom, with the southwest tangent of Japonski Island bearing 110°, distant about 500 yards, and the group of bare, rocky islets off the west shore of Japonski Island bearing 020°. In mid-channel, off the group of bare, rocky islets previously mentioned, is a 4¼-fathom rocky patch. This anchorage is seldom used as most vessels prefer the Eastern anchorage at Sitka.

Channel Rock is about 0.4 mile eastward of Battery Island and nearly in mid-channel between the west end of Japonski Island and **Watson Point.** The rock is of small extent and bares about 4 feet. Channel Rock Light, shown from a white house on skeleton tower on concrete pier, is 25 feet above the water and visible 6 miles. The channel northeastward of Channel Rock Light is about 125 yards wide, with depths of 4½ to 8 fathoms, and is marked on its northerly side by a buoy.

Japonski Island, the largest of the islands westward of Sitka, is about 1 mile long in an easterly direction, and is wooded. Wharves are along the east side of the island. The post office of **Mount Edgecumbe,** a hospital of the Alaska Native Service, and a large school with the necessary housing for students and staff, are here. A ferry connects Japonski Island with Sitka. Ledges extend 150 yards from the north shore and about 200 yards from the northwestern extremity of the island. **Charcoal, Alice, Fruit, Harbor,** and **Love Islands,** and numerous small rocky islets are southward of Japonski Island. The area among these islands is foul. A fill connecting Japonski, Charcoal, and Alice Islands forms the west and southern sides of a shallow basin. Harbor Island has been connected to Japonski Island from the eastern side of the basin. Fruit Island has been connected to Charcoal Island by a fill.

Shoal Island Light is shown from a small white house on a white skeleton tower on a concrete pier on the northernmost rock of a group of three southeastward of Harbor Island. The light is 19 feet above the water and visible 9 miles. It is obscured from 033½° to 138°.

Harbor Rock is in the channel eastward of Japonski Island. It bares about 4 feet. Harbor Rock Light, 15 feet above the water and visible 8 miles, is shown from a small white house on a square whiteslatted tower on the rock.

Sitka, the site of an early Russian settlement and former capital of the Territory, is on the eastern side of Sitka Sound. Two oil companies, a sawmill, two canneries, and a cold storage plant are here. Sitka also has an Indian industrial school and home, a native village, a National Military Cemetery, and a National Monument.

Channels.—From the sea three channels lead to Sitka among islands and reefs on the north side of Sitka Sound. **Eastern Channel** is the widest and main entrance; the

principal dangers are marked by buoys. **Middle Channel** has its entrance between Kayak Island and Passage Islands; it is not recommended. **Western Channel** is used by vessels entering from the sea and desiring to go alongside a wharf heading southeastward; the channel has its entrance westward of Makhnati Island.

Passage northward of Simpson Rock and Tsaritsa Rock should be avoided on account of the numerous obstructions southward of Kayak, Whale, and **Bamdoroshni Islands.**

Middle Channel has numerous shoals and dangers and should be used only by small vessels with thorough local knowledge. The passage between Kayak Islands and Whale Islands is foul and the bottom very irregular. A ¾-fathom depth is near the center of this passage.

A Federal project provides for a channel 22 feet deep and 150 feet wide on the easterly side of Harbor Rock. In May 1948 the project depth was available.

A channel has been dredged on the westerly side of Harbor Rock and is marked on its easterly side by lighted buoys. In September 1951 this channel had a minimum depth of 26 feet. The width is about 120 feet.

Caution.—After passing Harbor Rock, boulders with 3 fathoms lie 31 yards 281° from the northwestern corner of the Pyramid Packing Company wharf. A boulder with 2¾ fathoms over it lies 66 yards 169° from the opposite corner of this wharf. The boulders are close-to and eastward of the courses followed by ships.

Anchorage in 12 to 14 fathoms, muddy bottom, can be had at the Eastern Anchorage about 0.25 mile east-northeastward of Turning Island Light and about 0.4 mile east-southeast of the Standard Oil Company wharf. The swell from outside makes this anchorage uneasy in southerly weather.

Anchorage can also be had at the **Western Anchorage,** eastward of Channel Rock, but it is not very convenient because of its distance from the landing.

During the winter months northeast gales sometimes sweep across the Eastern Anchorage with considerable force and render it rather unsafe. In southerly gales the sea is considerably felt at both the Eastern and Western Anchorages.

There are other anchorages which may be used by large ships, and many others are suitable for small fishing vessels and other small craft, provided local knowledge is obtained regarding off-lying rocks and dangers. One of the best ship anchorages is just off the channel courses for the northwest approach to Sitka. The average depth is 9 fathoms, mud bottom, with Channel Rock Light bearing 289°, distant about 0.2 to 0.3 mile.

A Federal project provides for the improvement of **Crescent Bay** by dredging an area of about 13 acres to a depth of 10 feet and constructing protective breakwaters. In June 1951 no work had been done on this project.

Tides.—Daily tide predictions for Sitka are given in the *Tide Tables.*

Currents.—In the open sound the tidal currents are weak and somewhat rotary turning clockwise. Among the islands stronger currents may be expected.

In Sitka Harbor the flood sets northwestward and the ebb southeastward. Velocities are small. In mid-channel off the wharves velocities of 0.5 knot were observed at strength of flood and ebb. For predicted times of slacks and times and velocities of strength see the *Current Tables, Pacific Coast.*

Winds.—The following observations relative to winds are from an early report.

When at the anchorage at Sitka, if the wind blows east-northeast and no breakers are visible on Vitskari and Kulichkof Rocks, the wind outside will be found to come from the southeast or northeast, but probably the latter. On the other hand, if the surf be visible

on these reefs, when the wind at the anchorage is east-northeast the wind outside and within the sound as far easterly as Vitskari Rocks will be found to proceed from the south or west, and it is not advisable for a sailing vessel to attempt to go to sea.

In the spring and summer, when easterly winds prevail outside, they are nearly always found to blow northwest inside the sound. See also Climatological Tables in the Appendix.

Directions.—Courses and distances from Salisbury Sound to Sitka, outside by the way of Eastern Channel, are given in Chapter 3.

In approaching from southeastward, bring the northwest end of Biorka Island to bear 081°, distant 4 miles, and steer **036°** for 10.5 miles to a mid-channel position between Vitskari Island Light and Kulichkof Rock. Then bring Vitskari Island Light to bear 261°, distant about 2 miles, and steer **081°**. Continue with directions given in Chapter 3.

The southeastern shore of Sitka Sound has many deep indentations with numerous off-lying islands, rocks, and reefs. Between these are deep channels which, by reason of their tortuous courses and detached rocks, are unfit for navigation by any but small vessels.

Inside route, Sitka to Hot Springs Bay, for small craft.—From Tsaritsa Rock lighted bell buoy 3 steer **226°** to the east tangent of Belknap Island; thence mid-channel between Belknap and **Long Island,** heading for Vitskari Island on **267°**. Change to Chart 8255. When 0.2 mile beyond rock awash off northwest end of Long Island change course to **209°**, heading just off islet lying 0.2 mile west of Cape Burunof Island. When abeam of this islet, 165 yards distant, change course to **198°**, heading slightly off the islets off Povorotni Point until **Calming Island** is abeam on starboard hand, 300 yards off islet off Calming Island, then change course to **212°**, heading for the rock awash, which bares 5½ feet at low water, 0.8 mile distant. This rock when covered breaks except in a calm sea.

Give the islets off Povorotni Point a berth of 435 yards. When abeam the south tangent of these islets change course to **165°**; this course passes 175 yards west of a 9-foot shoal and 220 yards east of an 8-foot reef; continue this course for 0.7 mile until abeam of a conical-shaped rocky islet to port, then change course to **132°**, heading for left tangent of Korga Island. Run 0.58 mile and change course to **206°**, passing mid-channel between **Ulmoi** and **Kamennoi Islands** for 0.3 mile, change course to **141°**, running mid-channel between **Korga** and **Taigud Islands** for 0.5 mile.

Change course to **175°** for 0.77 mile, passing 125 yards off the daybeacon, barrel atop iron pipe on concrete block, then change course to **180°** and run 0.6 mile until abeam south tangent of large unnamed island to west; change course to **234°** heading for largest islet off Peisar Island with lone tree atop; run for 0.85 mile until abeam most off-lying rock of **Frosty Reef** extending northeasterly, south of Kanga Bay. Deep water is off this reef. Change course here to **195°**, heading in mid-channel between south end of Peisar Island and Viesoki Rock into the open channel leading to Biorka Island and Goddard.

These courses have been run in all kinds of weather; however, when a heavy swell is running in Sitka Sound local knowledge is essential as the seas appear to break on all the reefs in the locality. The various courses necessary for safe passage require positive identification of the dangers. The appearance of the locality changes strikingly between high and low waters.

Fishermen with local knowledge pass between Povorotni Point and the islands close offshore. They also pass through a gap in the reef southwestward of the entrance to Kanga Bay and then head for Kolosh Island, passing through the line of rocks extending inshore

from Viesokoi Rock and eastward of Kolosh Island into Hot Springs Bay. This route is not recommended for strangers.

Hospitals.—The Alaska Native Service has a large, well-staffed hospital on Japonski Island. These facilities are available to the public for emergency cases.

Customs and Immigration.—Sitka is a customs port of entry and marine documents are issued. Sitka is a Class A port of entry of the Bureau of Immigration and Naturalization.

Other Government offices.—The Coast and Geodetic Survey maintains a Magnetic and Seismological Observatory at Sitka. A deputy marshal, a commissioner, and representatives of the Coast Guard, Forest Service, Fish and Wildlife Service, National Park Service, Civil Aeronautics Administration, and Bureau of Public Roads are stationed here.

Wharves.—The depths at the wharves along the Sitka water front vary from 16 to 27 feet and those at the floats vary from 9 to 18 feet. The larger wharf on Japonski Island has a depth of 40 feet alongside.

Supplies.—Provisions, fishing supplies, and a limited amount of ship chandlery can be obtained at several stores. A chart agency of the Coast and Geodetic Survey is in the central part of the town. Fresh water is available at all the wharves. Diesel oil, gasoline, and lubricating oils are available at the oil wharves.

Repairs.—Limited repair service to machinery of vessels is available. Along the water front are several grids where small boats may be repaired. A small marine railway is about 1.5 miles southeast of Sitka on Jamestown Bay. The two ways can accommodate vessels not exceeding 70 feet in length and a beam of 18 feet.

Communications.—Sitka has regular passenger, express, and freight service by ship to Puget Sound, Canadian, and Alaska seaports and towns. Airlines carrying passengers and mail connect Sitka with Juneau and Ketchikan. The Alaska Communication System maintains radio-telephone and telegraph connections through Juneau with points in Alaska and the States as well as points in Canada.

The **National Military Cemetery** is about 0.2 mile northward of Crescent Bay.

Sitka National Monument, 57 acres in area, is on the peninsula west of **Indian River.** It is the site of Indian stockade where the Kik-Siti Tribe made their last stand against the Russian settlers. At the southwestern end of the peninsula is a restored Russian blockhouse.

Chart 8281.—A rocky ledge extends about 150 yards off shore at **Watson Point,** about 1.4 miles northwestward of the Standard Oil Company wharf at Sitka. When approaching from the northwestward, care must be exercised to give this point a berth of about 300 yards, passing about 50 yards to the westward of lighted buoy 1.

A reef well marked with kelp extends from the eastern side of **Kasiana Islands** about 1,100 yards in a southeast direction, and terminates in a rock bare at lowest tides. This rock is on a line from the east tangent of Kasiana Islands to the middle of Battery Island and nearly midway between.

A shoal with a least depth of ¾ fathom and marked by a buoy is westward of mid-channel about 0.3 mile northward of Kasiana Island.

Old Sitka Rocks are a group of eight rocks which bare at all stages of the tide and extend 0.5 mile from the eastern shore. The northern and largest one has two or three scraggy trees and the rest are bare. The westernmost rock of the group covers only at highest tides and is marked by Old Sitka Rocks Light. The light, 36 feet above the water

and visible 6 miles, is shown from a white house on a horizontally slatted skeleton structure. The main channel is westward of Old Sitka Rocks, but a narrow channel lies between them and an island near the shore. The shore from Old Sitka Rocks to Western Anchorage should not be approached closer than 300 yards.

The channel passing westward of Old Sitka Rocks and eastward of Middle Island and Kasiana Island is the main channel for Sitka for all vessels coming via the inside route. This route contains deep water and the only danger is the ¾-fathom shoal northward of Kasiana Island.

Starrigavan Bay (Old Sitka Harbor) is a bight, open westward, on the east side about 1.5 miles northward of Old Sitka Rocks, and just southward of the entrance to Katlian Bay. Some Indian shacks are on the point dividing the two coves on the east side of the harbor. The north cove is filled by a flat, and a rock, bare at low water, is 150 yards off the north shore westward of the end of the flat. The anchorage is abreast the south cove, about 400 yards from shore, in 18 to 20 fathoms, soft bottom. Westerly winds and some sea have a fair sweep into this bay.

Katlian Bay has its entrance nearly 2 miles northward of Old Sitka Rocks and extends in a northeasterly direction, curving westward at its head, for 4 miles, with a width of 0.5 mile at its entrance, widening to nearly 1 mile at its head. There are no dangers except a flat which extends 0.2 mile from the head of the bay. At 2.5 miles within the entrance to the bay an arm extends northwestward 1.5 miles; fair anchorage can be had in this arm northwestward of the group of islands on the north side in 15 to 20 fathoms, and very small vessels can anchor in the narrow part at the head of this arm in 5 to 10 fathoms.

Promisla Bay, on the northwest side of Sitka Sound 2 miles westward from **Siginaka Islands,** indents the southeast shore of Krestof Island. It is 1 mile long and 0.5 mile wide and there is a small wooded island in its mouth with a bare rock 0.2 mile eastward of it. The depths in the bay range from 15 to 20 fathoms, and a fair anchorage can probably be had near its head in 16 fathoms, muddy bottom, with good protection in almost any weather.

Olga Strait, between **Krestof** and **Halleck Islands,** is 4 miles long in a northwesterly direction, with an average width of 0.2 mile, and forms a part of the inside route from Sitka to Salisbury Sound. It is in general clear, with ruling depths ranging from 5 to 20 fathoms in mid-channel, and a vessel can anchor anywhere in its length. On both sides of the channel are small flats where streams empty and the shores are fringed with kelp except off these flats. In Olga Strait the tidal current sets northwestward on the flood and southeastward on the ebb. Velocities of 2½ knots have been observed off **Creek Point.** For predicted times of slacks and velocities of the strengths of current see *Current Tables, Pacific Coast.* About 100 yards off **Eastern Point** is a rock with a least depth of ¾ fathom. About 0.8 mile within the southern entrance is a shoal about 175 yards across, located about one-third the way across the channel from the western shore. Scattered kelp grows all over the shoal.

Middle Shoal is 2.2 miles from the southern entrance to Olga Strait mid-channel between two small streams, one on each side. It is 400 yards long in the direction of the channel, with lumps having 2¾ to 3 fathoms over them. At each end of the shoal is a buoy, the northern one is lighted. Kelp grows all over the shoal, but usually shows only at slack water.

Nakwasina Passage separates the north side of Halleck Island from Baranof Island. It has a northeasterly direction from the northern entrance of Olga Strait. The western part of the passage is about 0.8 mile wide, with 15 to 25 fathoms, affording anchorage; there are no dangers if the shores be given a berth of 300 yards, except a flat, 0.5 mile long and 300 to 400 yards wide, extending from the southeast shore, which begins 1 mile northeastward of **Halleck Point** at the entrance. Beginning about 1.5 miles from the entrance, it has an easterly direction for about 3.5 miles to its junction with Nakwasina Sound. The navigable channel is winding and contracted in places to 30 yards by extensive flats. The limits of the channel are distinguishable at low water. The effective depth in the best channel is about 2¼ fathoms; this passage is suitable only for small craft. In general the currents in Nakwasina Passage are weak. However, where the channel narrows about 1.5 miles westward of **Allan Point** velocities of over 3 knots have been observed. For predicted times of slacks and velocities of the strengths of current see *Current Tables, Pacific Coast.*

Nakwasina Sound separates the east side of Halleck Island from Baranof Island. It extends from the south entrance of Olga Strait in a general northerly direction and connects with Nakwasina Passage. The sound has a width of about 1 mile except at its southern entrance where it is contracted to about 0.2 mile by **Crosswise** and **Beehive Islands.** Small vessels can anchor in the cove westward of Beehive Island in 5 to 8 fathoms.

Krestof Sound is westward of Krestof Island and connects Neva Strait with Sitka Sound, through Hayward Strait. **Sound Islands** are at the northeastern part of the sound. The sound is out of the line of travel and is of no commercial value. At its northwest end the sound connects by a high-water passage with Sukoi Inlet. At its south end the sound is filled by **Magoun Islands,** with a narrow channel east and west of them and a boat channel through them. **East Channel** is clear in mid-channel, except a kelp-marked rock, covered at one-third flood, which is just westward of mid-channel about 0.2 mile southward of the point where the channel changes direction. **West Channel** should not be attempted except by small craft.

De Groff Bay opens northward of East Channel; its entrance is narrow, has a depth of 3½ fathoms, is overgrown with kelp, and should only be attempted by small craft. **Port Krestof** is a broad bight on the south side of West Channel; an anchorage can be had in 7 to 15 fathoms, taking care at high water not to get on the flat which fills the south end of the port to a distance of 0.5 mile out to an islet. A better anchorage can be had in **Mud Bay,** west of the Magoun Islands, taking care to avoid the ½-fathom shoal about 130 yards off the southeast point of the bay. **Hayward Strait** has a good channel through it, but the shores are fringed with rocks and reefs, especially at its south entrance, where they extend almost to mid-channel from the western side and well off from the northeast side.

Currents.—The flood current enters Krestof Sound from Salisbury Sound through Neva Strait and, when the water has risen high enough, through Sukoi Inlet; also from Sitka Sound through Hayward Strait, they meet somewhere in the sound. There is not much current in the northwest part of the sound but it has considerable velocity through Hayward Strait and the narrow channels at the southeast end. For predicted times of slacks and velocities of the strengths of current see *Current Tables, Pacific Coast.*

Neva Point Reef extends about 75 yards southward from **Neva Point** on the east side of the southeast entrance to Neva Strait. It is marked by Neva Point Light which, shown from a small white house, is 7 feet above the water and visible 9 miles.

Neva Strait, between Baranof and **Partofshikof Islands,** is 4 miles long in a general northwesterly direction and varies in width from about 0.1 mile at Whitestone Narrows to 0.3 mile at its northwest end at Entrance Island; it is narrow throughout and foul, requiring careful piloting, especially in the Whitestone Narrows, where the channel is only 40 yards wide and will not permit any deviation. The least depth in the channel is 4 fathoms at Whitestone Narrows. The limits of the channel, for the most part, are well marked with thick kelp, which shows when the current is weak. At low-water slack the limits are best defined by bare rocks and kelp. In Neva Strait the flood sets southward and the ebb northward. Velocities of 2½ knots have been observed. For predicted times of slacks and velocities of the strengths of current see *Current Tables, Pacific Coast.*

Whitestone Narrows is between 0.6 mile and 1 mile from the southeast end of Neva Strait. The west shore of the narrows is foul for a distance off of 250 to 400 yards. This foul ground has numerous ledges bare at low water and is covered with kelp at slack water. The channel side of these ledges is marked by buoys some of which are lighted.

Whitestone Rock, at the south end of the narrows, is 3 feet high. A shoal area extends 175 yards to the westward, and 100 yards to the northward, with general depths of 1 to 1½ fathoms. A rock, with 1¾ fathoms over it and marked by kelp, is 100 yards southeastward of Whitestone Rock and is marked on its easterly side by a lighted buoy. Abreast this buoy, on the east shore, is a ledge with kelp and depths of 1¾ fathoms, extending 100 yards from the high-water mark, contracting the channel to 100 yards. Three hundred and seventy yards southward of this ledge, close to the east shore, is a rock that uncovers at high water.

Whitestone Point is 350 yards northeastward of Whitestone Rock, with a good channel between; it is low and rocky close-to, with a ledge extending 150 yards northward. The southern side of the point is marked by Whitestone Point Light, shown from a white wooden house at a height of 14 feet above the water. The light is obscured from 173° to 340°. Four hundred yards northward of Whitestone Point is a mid-channel ledge, awash at lowest tides, and covered with kelp. It is marked on its north and south sides by buoys. About 0.4 mile in the same direction from Whitestone Point, a flat extends 250 yards from the northeast shore, and is marked at its western edge by a buoy.

There are two channels through Whitestone Narrows, both of which are buoyed. The usual channel leads close eastward of buoys 1, 3, and 3WC, westward of buoy 2WC. This channel is about 100 feet wide with 3½ to 4 fathoms at low water. It is used by all ships and fishing boats. The limits of the channel are defined by kelp which is visible when the current is weak. The older and deeper channel follows the northeasterly shore, passing northeastward of all buoys except the northernmost buoy marking the western edge of the flat; the turns in this channel are sharp and hard to make with a long vessel when the current is running. A ledge that bares at low tides and is covered by kelp extends 85 yards north of the point on the west side of Whitestone Cove.

The tidal current sets through Whitestone Narrows parallel to its axis, but divides on the middle ledge, and a part of it passes around Whitestone Point northward of the ledge.

Whitestone Cove, northward of Whitestone Point, is a good anchorage for small craft in 7 fathoms.

Columbine Rock, about 3 feet high and marked by a daybeacon, is close to the west shore of Neva Strait, about midway of its length. On the opposite side of the channel,

distant 250 yards, is a kelp-marked shoal with ¼ fathom over it, the outer end of which is marked by a buoy.

From Columbine Rock to Highwater Island the east shore is foul and the course usually followed leads along the west shore at a distance off of about 150 yards.

Wyvill Reef, about midway between Columbine Rock and Highwater Island, extends to mid-strait, and its highest point is covered at mean high water. The south edge of the reef is marked by a lighted buoy. A rock that bares at low water, marked by a small kelp patch, is 125 yards northwest of the reef. From the bight in the west shore opposite the buoy a flat makes out 150 yards.

Highwater Island is wooded, prominent, and connected with the east shore at low water. Anchorage for small craft is found south of Highwater Island in 8 fathoms.

A rock with 2½ fathoms over it, surrounded by kelp and marked by a buoy, is midway between the northwest end of Highwater Island and the west shore. The channel is between the buoy and the island, a width of about 125 yards.

From Highwater Island to Entrance Island the usual track is in mid-channel. A reef extends 80 yards off the east shore about halfway between Highwater Island and Entrance Island. Its northwestern limit is marked by a rock surrounded by kelp and covered at three-quarters tide. A flat extends 150 yards from the bight in the west shore opposite. A shoal with 2½ fathoms over it and well marked by kelp is 400 yards west-southwestward of Entrance Island 200 yards off the southwest shore. The channel is between the island and this shoal.

Entrance Island, small and wooded, is close to **Zeal Point,** the eastern point at the northern entrance to Neva Strait. Entrance Island Light, shown from a small red house on the southwest point of Entrance Island, is 30 feet above water and visible 9 miles. It is obscured from 159° to 328°.

St. John Baptist Bay is to the eastward of Entrance Island. It is 2 miles long by 0.5 mile wide for the first mile, then narrows to 0.2 mile, and terminates in a flat 0.2 mile wide and 0.3 mile long. The north shore is clear and bold for 1 mile, then is irregular with two small bights that are flats at low water. The south shore from Entrance Island to where the bay narrows is irregular with deep water close by the points. A timbered islet is 200 yards off the south shore 0.6 mile east of Entrance Island with rock ledges covered at high water extending eastward to the next point. A rock with least depth of ½ fathom is in the channel 80 yards north-northeast of the timbered islet, and a rock covered at high water is 40 yards west of the islet. South of the islet the bight is clear, furnishing good anchorage for small craft in 7 to 8 fathoms. After passing this point, the south shore is clear except for flats from small streams. A shoal with depths of 4½ fathoms is 275 yards west of the point on the north side at the narrow part of the bay. A rock with ½ fathom is 150 yards west of the point.

Anchorages for moderate-sized vessels are near the center of the narrow part of the bay in 12 to 14 fathoms, and on the north side just west of the narrow part in 11 to 14 fathoms. This bay is open to the sea through Salisbury Sound, which gives prevailing northwest winds a clear sweep to the anchorages, and in southeast weather it is said to be subject to severe williwaws, which make the anchorages undesirable.

Gilmer Cove is on the southwest shore 1.2 miles northwestward of Entrance Island. It is 250 yards long by 75 yards wide, with a flat 150 yards wide at the head, and is a fit anchorage only for small craft in 7 fathoms.

Kane Islands are two principal islands, low and wooded, with several rocks and reefs close-to, except on the southeast side, where they extend 300 to 400 yards in a direction parallel to the channel. They are surrounded by kelp and there is good water close to its edge. The channel is good on either side of the islands, but that on the northeast side is always used, as being more direct.

Sukoi Inlet has its northern entrance about 0.8 mile westward of Kane Islands. It is about 4 miles long in a southeasterly direction, 0.2 mile wide, and affords good anchorage. At its head it connects at high water by a canoe passage with Krestof Sound. The inlet is comparatively clear until near its head but the shores are foul. Anchorage may be selected in any place desired, according to depths of water and swinging room required. The best anchorage is 2.8 miles inside the entrance, opposite a small stream and flat on the west side, in 10 fathoms. Only small craft should go into the narrow arm beyond this.

Scraggy Islands are 1.8 miles northwestward of Kane Islands and 0.5 mile from the west shore. The largest island is about 40 feet high and scantily wooded with two clumps of trees. Ledges with bare heads extend 800 yards southward from the island. The channel westward of the island is not recommended. The island is surrounded by ledges, bare at low water, to a distance of 100 to 200 yards.

Salisbury Sound is described in Chapter 13. Courses and distances from Juneau to Sitka are given in Chapter 3.

Chart 8256.—The west coast of Kruzof Island trends northward and is indented by Shelikof and Gilmer Bays. Mount Edgecumbe occupies the southern third of Kruzof Island and is an unmistakable landmark for this part of the coast. There are no hidden outlying dangers until Cape Georgiana is reached. Sunken rocks do exist, however, in the bays and bights. The 100-fathom curve is 8 miles from shore abreast Cape Edgecumbe, 12 miles abreast Cape Georgiana, and the soundings decrease regularly to the coast.

The shore from Cape Edgecumbe to Neva Bay rises in a precipitous cliff of brown lava about 200 feet high and forms a prominent landmark. Numerous large caves or blowholes are to be seen in this lava cliff. From Neva Bay to Beaver Point the shore is lower and rises in gradual wooded slopes. The shore between Cape Edgecumbe and Beaver Point is fringed with ledges extending 200 to 300 yards offshore, and shoal water, marked by thick kelp, extends from 0.2 to 0.5 mile offshore. The bottom slopes regularly out to beyond the 50-fathom curve and is uniformly rocky. There are no dangers more than 0.5 mile offshore. Cape Edgecumbe and Mount Edgecumbe have been described earlier in this chapter.

Neva Bay, 2.5 miles northward of Cape Edgecumbe, is of no importance. It is open to the sea and the entrance is choked with kelp.

Beaver Point, 5.5 miles northward from Cape Edgecumbe, is low and wooded and forms the southern point to Shelikof Bay. A reef, marked by thick kelp and having numerous rocks which bare, extends for 0.8 mile northward of Beaver Point. The open bight close to eastward of the point is full of rocks and kelp.

Shelikof Bay is 4.5 miles wide at its entrance and 3 miles long. The bay is open westward, and is not recommended as an anchorage. The depths range from 10 to 20 fathoms. Off Beaver Point and along the south shore kelp grows thick out to 6 and 10 fathoms. In the southeast corner there is a sand beach 1.5 miles long. The north side of Shelikof Bay is foul, numerous rocky islets and ledges extending 0.3 to 1 mile offshore.

Port Mary, at the head of Shelikof Bay, has general depths of 3 to 5 fathoms except at its northern end where it is shoaler. A large bare rock, about 20 feet high, lies off the southern entrance point. A shoal, marked by kelp and with 2½ fathoms over it, lies 200 yards northwestward of this rock. The only known danger in Port Mary is a rock, which bares at half tide, lying 300 yards off the eastern shore and 0.7 mile northeastward of the southern entrance point. Small craft can find protected anchorage in southerly weather in the small bight, with a high bare rock in its center, on the southern side of the port.

Small vessels can find partially protected anchorage in the bight called **Cuvacan Cove**, located on the northern side of Shelikof Bay, about 1.6 miles eastward of Slaughter Island, and lying eastward of a group of islands and westward of a bold, wooded point. To enter the cove, pass to southward and eastward of the group of islands at a distance of about 200 yards, being careful to avoid the sunken rock and the rock awash which lie to southeastward. Anchor in 3 to 4 fathoms, sand bottom.

On the northern side of Shelikof Bay, about 1.1 miles eastward of Slaughter Island, is **Goleta Cove.** This cove affords protected anchorage for small craft and is much used by local fishermen. A large bare rock lies in the middle of the entrance, and the passage eastward of the rock is choked with rocks and kelp. A rock which bares at half tide lies in the middle of the western passage. To enter, pass very close to westward of the large bare rock and to eastward of the rock which bares at half tide.

Point Mary, the northern point at the entrance to Shelikof Bay, is high and wooded.

Slaughter Island, lying off Point Mary, is grass-covered and connected with the shore at low water. A rock which bares at extreme low tides lies about 0.3 mile westward of Slaughter Island. Two rocks, baring at half tide, lie 200 and 250 yards southwestward of the island.

Point Amelia, 3.5 miles north-northwestward of Slaughter Island and 13.7 miles northward of Cape Edgecumbe, is the northwest point at the entrance to Gilmer Bay and is the most prominent point between Capes Edgecumbe and Georgnaia. The point is the terminus of a peninsula 1,655 feet high. Two small knolls are at the seaward end of this peninsula, the inner one wooded and about 400 feet high, the outer one a cone-shaped rock 117 feet high. Rocks bare at half tide are about 200 yards offshore.

In the bight 2 miles northward of Point Amelia is a conspicuous sand beach 0.8 mile long.

Gilmer Bay, on the southeast side of Point Amelia, is 3 miles long in a northerly direction. About 1 mile inside Point Amelia the bay contracts to 0.6 mile; it then expands to about 1 mile in a distance of 1 mile, and terminates in a narrow arm 0.8 mile long by 300 yards wide.

The anchorage for large vessels is in mid-channel halfway up this arm in about 15 fathoms, sticky bottom. In summer the swell does not come much beyond the entrance of the arm, but there is no record of the value of the anchorage in winter gales. The bight on the eastern side of the bay affords the best anchorage for craft up to 150 feet in length. An anchorage, eastward of the reef, has depths of 5 to 6 fathoms, hard bottom.

A sunken rock is on the east side in the approach to the bay, on line from Point Amelia to a white rocky islet about 58 feet high and close to the east shore. The rock is about 0.4 mile from the islet, has 2¾ fathoms over it, and shows a breaker at low water with a moderate swell. A shoal with depths of 5 and 5½ fathoms is in the middle of the entrance to the bay and on line from Point Amelia to the white rocky islet described above. This shoal has been swept by a wire drag set to a depth of 28 feet.

Approaching from southward give the eastern shore a berth of over 0.8 mile to clear the sunken rock off Slaughter Island and the sunken rock described above. Otherwise there are no dangers and a mid-channel course leads safely through the bay.

Sealion Islands are 3.5 miles northward of Point Amelia. They are five in number, the easternmost about 0.8 mile from shore. The two largest are 132 and 210 feet high, both covered with grass, the eastern one having a number of dead trees. The easternmost of the group is 70 feet high and partially covered with grass; the remaining two are bare rock.

Eagle Rock is about 1.6 miles northward of the westernmost Sealion Islands and 1.2 miles southward of Cape Georgiana. It is 65 feet high, dome-shaped, and bare.

Sealion Cove is a small cove about 2 miles southward of Cape Georgiana. A sand beach at the head is nearly 1 mile in length. A small peninsula 0.4 mile long forms its southern point.

Cape Georgiana is described in Chapter 13. Directions from Salisbury Sound to Sitka Sound along the outside coast are given in Chapter 3.

CHAPTER 13

Salisbury Sound and Peril Strait

Chart 8252

SALISBURY SOUND (Chart 8248) has its entrance from sea in latitude 57°22′ N., longitude 135°54′ W., and connects Peril Strait and Neva Strait with the Pacific Ocean between Cape Georgiana and Klokachef Island. It is about 4.5 miles long in a general easterly direction, 2 miles wide at the eastern end, and 4.5 miles wide where it joins the ocean. About 1.8 miles from the eastern end the channel is contracted to 1 mile by Goloi Islands on the north side and Sinitsin Island on the south. Vessels from Cross Sound, Yakutat Bay, and the coast westward bound for Sitka commonly enter through Salisbury Sound, as the distance is less than by way of Cape Edgecumbe and it puts them sooner into smooth water.

The shores of the sound are foul, especially the north side, which is studded with islands, rocks, and reefs with more or less kelp. It is open to the prevailing wind and sea, and there is generally a southwest swell rolling in and breaking along the northern shore, which sometimes reaches to Baranof Island. There are no dangers through the middle of the sound, but the depths are irregular and the bottom rocky, banks with depths of 6 to 20 fathoms having been found in the middle of the entrance. The areas of irregular bottom through the sound and its approaches have been swept by a wire drag and no dangers found.

The country back of the north shore is steep, rugged, and about 3,000 feet high. The shouthern shore is more undulating, though quite high near the ocean, and is covered with trees from the top to the water's edge.

Approaching Salisbury Sound from seaward, especially from westward, it is sometimes difficult for a stranger to recognize the entrance until close-in. The bare, rugged mountains on the north side of the sound are prominent, and the sand beach at the head of Sealion Cove, 2 miles southward of Cape Georgiana, is at times useful in identifying the cape.

The **tidal current** sets into Salisbury Sound with a velocity of 1 to 2 knots. At the eastern end the floods divide, one part setting into Peril Strait. Slack water in Kakul Narrows occurs about ½ hour after the time of slack at Sergius Narrows. The other part flows southward through Neva Strait, and when not influenced by the wind is slack about ¾ hour before slack water at Wrangell Narrows, but may be carried much longer if the wind is with the old current.

The **wind** draws through Salisbury Sound, generally from sea. **Fog** sometimes banks into the sound very thick, but frequently disappears at the mouth of Fish Bay and Neva Strait.

Cape Georgiana is the southern point at the entrance to Salisbury Sound. Eastward of the cape, about 0.8 mile distant, is a rounded hill 1,315 feet high, and 2 miles southeastward from the cape is the first prominent peak which, from southward and westward, seems to rise from the low point gradually, by a series of steps, and is 2,094 feet high. This is a prominent landmark from southwestward for Salisbury Sound. In approaching from northwestward the sand beach at the head of Sealion Cove, 2 miles southward of Cape Georgiana, is at times useful in identifying the cape.

Sea Rock is an irregular, bare ledge, 0.5 mile northwestward of Cape Georgiana, which extends about 6 feet above high water. A clear channel, 20 fathoms deep and 250 yards wide, lies midway between Sea Rock and Cape Georgiana. The axis of the channel extends in a 040° direction. The only danger is a 3¾-fathom spot 300 yards eastward of Sea Rock.

Morskoi Rock, 0.6 mile westward of Sea Rock and 1.1 miles from the extreme point of Cape Georgiana, is a sunken rock with 1 fathom over it, not marked by kelp, and over which the sea usually breaks. Morskoi Rock is marked on its northwest side by a buoy.

A deep channel is between these two rocks, and between Sea Rock and the cape, but neither is recommended. Strong tide rips are found around the cape and these two rocks when the wind is from northwest or northeast, while with a southerly wind they are more prevalent around **Point Leo.**

Klokachef Island, on the north side at the entrance to Salisbury Sound, is of triangular shape and over 1 mile in extent. On its south side bare cliffs, 1,000 feet high, have the appearance of the northern half of an old crater, and are prominent from well out to sea southwestward. Reefs bare at low water extent 200 to 300 yards from the south and west sides of the island. At the east point are several bare rocks, and a reef which extends about 0.4 mile southward, and over which the sea generally breaks. From the northwest point of the island the **Fortuna Reefs** extend as a partially submerged reef for 600 yards northwestward to two bare rocks 20 feet high; and thence from these rocks for 0.5 mile westward as a sunken reef, showing more or less kelp and on which the sea always breaks. **Klokachef Point,** the south point of Klokachef Island, is the north point at the entrance to Salisbury Sound, and is marked by Klokachef Island Light, shown from a small white house. The light is 85 feet above the water and visible 10 miles. It is obscured from 155½° to 291°.

Olga Rock, about 1.2 miles westward of Klokachef Point, on line with Klokachef Point and the north shore of Salisbury Sound, has ½ fathom over it at low water, and, except at high tide and a very smooth sea, always shows a breaker. Deep water is between Klokachef Island and the rock.

Kalinin Bay, on the south side of Salisbury Sound 2.5 miles inside the entrance, has anchorage near its head which is considerably used by small fishing craft, but its entrance is obstructed by rocks and is narrow. A shoal marked by kelp, with a least depth of 3¼ fathoms, is about 0.5 mile off the entrance and 0.6 mile westward of Sinitsin Island. Large craft should favor the southwestern shore in approaching the entrance in order to avoid this shoal. A rock with 1½ fathoms of water over it is 150 yards off the eastern shore close inside the entrance. Favor the western shore in entering until nearly up to the first bend, then steer mid-channel courses. A large rock, covered at high tide and marked by a day-beacon, is about 100 yards off the eastern shore at the narrowest part of the channel, just before the bay widens to form the main anchorage.

A submerged rock with 1 fathom over it is 100 yards off the western shore and about 100 yards northwestward of the large rock. This rock is usually marked by a halibut float

during summer months. Strangers should enter at half or low tide when the large rock mentioned above is showing, passing about 30 yards westward of it. Well-protected anchorage in any weather can be found at the head of the bay in 4 to 5 fathoms, soft mud bottom. About 0.6 mile inside the bay on its eastern side a fish buying scow is anchored. Fishermen supplies, including food, Diesel oil, and gasoline are available here throughout the year. There is 250 feet of mooring float with sufficient depths for small craft. Fresh water can be had at the float during the summer months. A radio schedule is maintained during the summer months.

Sinitsin Island, low and wooded, is about 0.8 mile eastward of the entrance to Kalinin Bay, and is the farthest projection on the southerly side of Salisbury Sound. It should not be approached closer than 0.2 mile on its northern side and 0.5 mile on its western side. A rock with 1 fathom over it, marked by kelp, is 375 yards westward of the island. A rock, with ¾ fathom over it and marked by kelp, is 400 yards off the northwestern point of the island. A submerged rock, marked by kelp, is 250 yards off the northern point of the island. Deep water extends close up to the eastern side of the island. Small craft sometimes pass between the island and Kruzof Island, but strangers should use this passage with extreme care.

Sinitsin Cove, on the south side of Salisbury Sound 1 mile southeastward of Sinitsin Island, has deep water, an irregular, rocky bottom, and its shores are fringed with ledges. In bad weather the swell rolls heavily into this cove.

Scraggy Islands and the features to the southeastward in Neva Strait are described in Chapter 12.

Goloi Islands, about 6 miles eastward of Klokachef Point and 0.5 mile off the northern shore, are two in number and bare; the northern one is divided at high water; the southern one is about 60 feet high and has the appearance of a flattened cone. There are a number of other islands along and close to the north shore, but these and **Krugloi Islands,** 0.5 mile eastward, are the most prominent. These islands are surrounded by kelp rather close-to, and there is deep water close to the edge of the kelp on their south sides.

Round Island, 1 mile eastward of Goloi Islands, is wooded, 90 feet high and is close to the north shore of Salisbury Sound at the entrance to Peril Strait.

Chart 8252.—Peril Strait is important as affording a frequently used inside passage from Salisbury Sound, and the waters southward, to Chatham Strait. Its total length is about 41 miles. From Salisbury Sound it extends in a general northeasterly direction for 12 miles through Kakul Narrows, Sergius Narrows, and Northern Rapids to Povorotni Island; this part of the strait is narrow, has frequent changes in direction, and strong tidal currents, and strangers, other than small craft, are advised to take a pilot. From Povorotni Island the strait has a general northeasterly direction for about 4.5 miles to Otstoia Island, where it turns southeastward for 16 miles to Lindenberg Head, and then eastward for 7.5 miles to Chatham Strait. Some of the more serious dangers are marked by buoys or lights. A pilot may sometimes be obtained at Sitka or Juneau.

Courses and distances through Peril Strait are given in Chapter 3.

Fog from Salisbury Sound occasionally makes into Peril Strait as far as Sergius Narrows, and at times fills the strait northward of the narrows.

Currents.—The flood current from Salisbury Sound sets northward through Sergius Narrows and Adams Channel and meets the flood from Chatham Strait in the broad part of Peril Strait between Povorotni Island and Otstoia Island; the ebb current from the

meeting point sets in the opposite direction. The currents have a velocity of about 2½ knots in Kakul Narrows, 2½ knots abreast the entrance to Fish Bay, 5½ knots in Sergius Narrows, 2½ knots from Liesnoi Island to Yellow Point, 3 knots in Adams Channel, 2½ knots between Opasni Islands and Povorotni Island, and 1½ to 2½ knots from Povorotni Island to Chatham Strait. In Hoonah Sound north of Emmons Island the velocity at strength in both directions is about ½ knot.

Chart 8248.—**Point Kakul,** the eastern point at the entrance to Peril Strait from Salisbury Sound, is bold and wooded. **Kakul Rock,** with 2 fathoms over it and marked by kelp, is 275 yards westward from the point. A buoy marks the west side of the rock.

Kakul Narrows form the entrance to Peril Strait from Salisbury Sound. The narrows are deep, the dangers are marked by aids, and they are easily navigated. The narrows have been wire dragged and found clear as shown. The tidal currents in Kakul Narrows are described above.

Salmonberry Cove is a small bight on the western side of Kakul Narrows where small craft can find indifferent, and partially protected, anchorage.

Brad Rock is 175 yards from the northwest side of Kakul Narrows, and about 0.2 mile westward of the outer Channel Rock, in line with it and the bare rock off **Range Point.** It is of small extent, has 1¼ fathoms over it and leaf kelp at slack water, and is marked on its eastern side by a buoy. There are heavy tide swirls through this narrow part of the strait. The buoy tows under when currents are strong.

Channel Rocks extend 250 yards northward from the south point at the north end of Kakul Narrows. The largest rock is about 3 feet high and close-to; north of it are two rocks which cover only at the highest tides. Kakul Narrows Light is displayed from a white house on a skeleton tower on a concrete pier; it is 27 feet above the water. A rock bare at low water is close-to northward of the light. There is thick kelp, close-to, north and east of these rocks.

Bradshaw Cove, on the northwestern side of Peril Strait, close-to northward of Kakul Narrows, is an open bight too deep for anchorage. **Louise Cove,** on the southern side of the strait opposite Bradshaw Cove, is of no importance.

Fish Bay has its entrance on the eastern shore southward of Sergius Narrows, and extends eastward about 5 miles, with an average width of 1 mile. Sand or gravel beaches show along the shores at low water, and at its head is a flat nearly 0.5 mile in extent. **Haley Rock** is in the entrance 450 yards from the southern shore, and from the rock the western half of Rapids Island is open on **Fish Point,** bearing northward. It has ½ fathom over it and is surrounded by kelp. A rock, with 1½ fathoms over it and surrounded by kelp, is 250 yards westward of Haley Rock. **Haley Anchorage,** 300 yards from the south shore and about 0.3 mile westward of Haley Point, has depths of 18 to 20 fathoms, sandy bottom, and affords fair shelter in southerly weather. **Haley Point** is a sand flat terminating in a high-water island.

Schulze Cove, on the north side of Fish Bay, is about 0.8 mile wide and 1 mile long in a northerly direction, and is the best and most convenient anchorage southward of Sergius Narrows for vessels awaiting slack water in the narrows. **Piper Island,** low and wooded, is in the entrance, the navigable channel, about 0.2 mile wide, lying between it and the western shore; the channel on the east side of the island should not be attempted. The cove is free from dangers if the shore be given a berth of over 100 yards. The anchorage is in the middle of the cove in 14 to 16 fathoms, soft bottom, with good protection;

small vessels can anchor at the head of the cove in 7 to 9 fathoms. The only danger in the approach is Haley Rock. A rock, with 1 fathom over it and surrounded by kelp, is 0.2 mile southeastward of Piper Island and the same distance from the northern shore.

Suloia Bay has anchorage for small craft near its head in 12 to 15 fathoms, rocky bottom. The shores are foul near the anchorage, contracting it somewhat, and it is not recommended. Swirls make well into the bay. **Suloia Islet,** wooded, is in the bay 0.2 mile from the south side with rocks between. **Suloia Rock,** bare at low water, is 400 yards northward of Suloia Islet.

The channel at **Sergius Narrows** is only 100 yards wide at low water between the 3-fathom curves, and it is advisable for a stranger to carry a pilot when using it. There are no local pilots for Sergius Narrows, though one may possibly be obtained at Sitka or Juneau. Vessels should pass through Sergius Narrows only at or near slack water, especially with the large tides, and preferably at high water slack. At the strength of the current it is not safe for any vessels bound either way, especially long ones, between Francis Rocks and Liesnoi Shoal. With the smallest tides those with local knowledge pass through at all stages of the current.

In the *Pacific Coast Current Tables* will be found the predicted times of slack water and the times and velocities of strength of current for every day in the year. Mariners are advised to be on hand at least one-half hour before the predicted times of slack water in case abnormal conditions cause slack water to occur earlier than the stated times. If the current tables are not available, tide tables may be used. In Sergius Narrows the current turns from north to south about 1¾ hours before the time of high water at Sitka and from south to north about 1¾ hours before the time of low water at Sitka. These are average times and do not take into consideration variations in time due to tidal inequalities as do the current tables predictions. It is important that the navigator be on hand sufficiently early.

At the strength of the current the water is very much disturbed, heaving up over the ledge in the middle and boiling and swirling in the channel, especially at the end where the water is passing out. The channel is so narrow and the current so variable in direction that if a vessel gets a sheer she may be carried on the ledge or shore before she can be straightened out. With a strong north-flowing current a sharp deflection occurs at Shoal Point, which is dangerous, especially to long vessels bound southward, as it sheers the bow eastward in the direction of Wayanda Ledge, and there is little room to straighten out again on the proper channel line. With a strong south-flowing current a similar sharp deflection occurs westward of West Francis Rock, which is dangerous, especially to long vessels, bound either way, as it sheers the bow in toward the cove on the west side.

Vessels awaiting slack water at Sergius Narrows usually slow down before reaching it. If desiring to anchor, Schulze Cove is convenient when south of the narrows; when north of the narrows, Bear Bay is convenient for small vessels. Deep Bay is a much better anchorage but its entrance is narrow.

Rapids Island is a small wooded island near the middle of Sergius Narrows.

East Francis Rock, 350 yards westward of the southwest point of Rapids Island, is of small extent and has a least depth of 2¼ fathoms over it and no kelp.

West Francis Rock, with 1½ fathoms over it, is 400 yards westward of the west point of Rapids Island; it is 100 by 70 yards in extent and has depths of 5 and 6 fathoms close-to. It has leaf kelp, which shows only at slack water, and is marked by a lighted buoy, heavily moored, about 150 feet northward of it. Vessels pass northwestward of the

rock. In this vicinity the swirls and whirlpools are very strong while the current runs south.

Prolewy Rock is usually above water, but is slightly covered at highest tides; it is 175 yards northward of the middle of the north side of Rapids Island. **Wayanda Ledge,** within the 3-fathom curve, extends 200 yards northward of Prolewy Rock, its northwest edge lying 125 yards from the northwest shore of Sergius Narrows. The depth is ½ fathom over the ledge and it drops off quickly to the 3-fathom curve. The channel is between the ledge and the northern shore, and at its narrowest part is but 100 yards wide at low water between the 3-fathom curves. A buoy marks the northern end of Wayanda Ledge Shoal.

Sergius Narrows Light, shown from a white house on a skeleton tower on the north side of the narrows, is 17 feet above the water and visible 6 miles. The light is obscured between the bearings 080° and 242°.

Liesnoi Shoal is nearly in mid-channel 300 yards southward of Midway Rock. It is about 60 yards in extent and has a least depth of 1¼ fathoms. It is marked by a lighted bell buoy moored in 9 fathoms close to the edge of the kelp between the shoal and **Mountain Head,** and 400 yards from the latter.

Midway Rock is awash at highest tides.

Bear Bay, on the southeast shore, has anchorage for small vessels only, but is convenient if awaiting slack water in Sergius Narrows. Enter in mid-channel and anchor with **Arthur Island** in line with the southwest side of **Bear Bay Island,** bearing northward, in 14 to 16 fathoms, soft bottom. On the southern side, halfway up the bay, is a ledge which uncovers at low water, and vessels should not go above the range given to avoid swinging onto this ledge.

Deep Bay, on the northwestern side of the strait between Big and Little Islands, is a good anchorage 1 mile long and over 0.2 mile wide, and is the most convenient anchorage for large vessels northward of Sergius Narrows when awaiting slack water in the narrows. **Grasstop Rock,** about 5 feet high, is between Big and Little Islands, and is marked by a daybeacon; the best passage into the bay is between the rock and Big Island.

To enter, keep the south side of Big Island aboard at a distance of 100 yards in passing Grasstop Rock to clear a sunken kelp-marked ledge, which extends from the rock halfway to Big Island. Then follow a mid-channel course into the bay and anchor 0.2 to 0.8 mile beyond the wooded islet on the north side, westward of Big Island, in 10 to 12 fathoms, soft bottom.

A flat extends 0.6 mile from the head of the bay. A ledge, marked by kelp, with a rock which bares near its eastern end, extends 250 yards southeastward from the eastern end of **Little Island.** A bare rock about 10 feet high, is 100 yards southeast of **Big Island,** and kelp extends 100 yards eastward of the rock.

Middle Point Rock is 300 yards westward of **Middle Point** with a narrow channel between. The rock is covered at half tide and marked by Middle Point Light on a red box on a pier. The light is 11 feet above water and visible 6 miles. A ledge with 2¼ fathoms over it lies 350 yards from Arthur Island toward Middle Point.

Yellow Point is about 0.6 mile northward of Middle Point. A rock, bare at half tide and marked by a daybeacon, is 150 yards offshore, 0.3 mile eastward of Yellow Point.

Opasni Islands, consisting of the wooded **Big** and **Little Rose Islands,** are in mid-channel 3 miles southward from Pogibshi Point. **Adams Channel** is the passage eastward

of them; **Rose Channel** is the passage westward. An extensive flat, dry at low water, is in the bight on the south side of Adams Channel.

Rose Island (Adams Channel) Rock is off a bight on the east side of Big Rose Island, about 200 yards from the island. It is bare at low water and is marked on its eastern side by Rose Island Rock Light on a white slatted daymark on an I-beam mast. The light is 17 feet above the water and visible 6 miles.

Rose Channel Rock is 250 yards northwestward of Little Rose Island and 400 yards from the west shore. It is awash at highest tides and is a danger only when using Rose Channel. It is marked by a daybeacon.

Nixon Shoal is a flat, bare at low water, which projects 200 yards from the mouth of a stream on the east side about 0.8 mile northward of Opasni Islands.

Povorotni Island, low and wooded, is 500 yards northward of Pogibshi Point. Povorotni Island Light marks the northwest end of the island. The light, shown from a white wooden house, is 29 feet above the water and visible 6 miles. It is obscured from 293° to 031½°. The island shows against a wooded highland in coming from northward and is not readily seen until fairly close-to. A bare ledge is between the island and **Pogibshi Point;** the narrow passage between this ledge and the point is suitable only for small craft. Lying 200 yards southward of the island is the northwest end of a narrow ledge, 250 yards long in a southerly direction, with a least depth of 1 fathom. A spot with 2 fathoms over it is 125 yards northwestward of the island.

Poison Cove has its entrance on the west side westward of Povorotni Island, and affords anchorage for small craft only. Anchor in the middle, about 300 yards inside the south point at the entrance, taking care to avoid the flat nearly 0.4 mile wide at the head, in 18 fathoms, soft bottom.

From Pogibshi Point the shoreline trends in a northeasterly direction for about 5.5 miles to Nismeni Point, about 1 mile beyond Otstoia Island. **Deadman Reach** is the stretch of water off the flat between Otstoia Island and Pogibshi Point, about 2¼ miles from the latter. Anchorage may be made in several places along the shore.

Local magnetic attraction.—On the straight course from Povorotni Island to Otstoia Island a local attraction was observed ranging from ¼ to ½ point east, from 1.5 miles northward of Povorotni Island to 1 mile southward of Otstoia Island; closer inshore this local attraction will probably be larger. These local attractions increase the general easterly variation for these localities by the amounts stated.

Pogibshi Anchorage is on the northern side of Pogibshi Point off the entrance to a small lagoon in a small grassy flat, in 22 fathoms, sandy bottom, with the point bearing westward, distant 0.2 mile. A sand and gravel bar makes out 250 yards into the bight. **Favorite Anchorage** is about 1.2 miles southward of Otstoia Island and 0.2 mile from shore in about 17 fathoms. Anchorage may also be made in 16 to 20 fathoms with Broad Island in line with the east side of Otstoia Island, and with the northwestern side of Emmons Island showing between Krugloi and Elovoi Islands.

Emmons Island, large and 600 feet high, is about 5 miles northward of Povorotni Island. The channel between Emmons and Chichagof Islands should be used with caution and at low water.

Ushk Bay has its entrance on the west side about 2.8 miles southwestward of Emmons Island. It extends westward 4 miles, with an average width of 0.8 mile, narrowing to 0.3 mile at the point where it changes direction. It affords secure anchorage near its head in

18 to 20 fathoms, soft bottom, and a mid-channel course carries in safely. A flat extends nearly 0.5 mile from its head.

Hoggatt Reefs, about 2.7 miles northeastward of Povorotni Island and 1.2 miles from the eastern shore, cover an area of about 0.5 mile square. The largest and highest part of the reef is at the eastern end, and is a sand islet covered only at highest tides. Three ledges, covered at about half tide, are about 0.2 mile westward of this islet; and two rocks, covered at ordinary high water, are about 0.2 mile southward of it.

Dolph Rock, bare at low water, is about 0.8 mile off the west shore at the entrance at Ushk Bay and 1.2 miles westward of the islet of Hoggatt Reefs.

Ford Rock is about 0.9 mile northward of the islet of Hoggatt Reefs and 1.5 miles westward of Krugloi Islet, nearly in line between it and the northern point at the entrance to Ushk Bay; it is 150 yards long and bare only at lowest tides.

Otstoia Island, low and wooded, with dead trees standing at its northeast end, is 4.5 miles northeast of Povorotni Island. Otstoia Island Light, shown from a white wooden house at the southern end of the island, is 17 feet above the water and visible 9 miles. The light is obscured from 130° to 244°.

Elovoi Islet, small and wooded, and **Krugloi Islet**, small with a clump of trees in the middle, lie close together about 0.6 mile westward of Otstoia Island.

Chart 8252.—Hoonah Sound is the prolongation of Peril Strait northwestward of Emmons Island. **Vixen Islets**, a group of small islets, lie about 0.5 mile to the northwestward of Emmons Island. **Moser Island**, about 2.5 miles northwestward of Emmons Island and 5 miles long, divides Hoonah Sound into two arms, connected at high water at the northwest end of Moser Island.

North Arm is 10 miles long, and comparatively clear until 2 miles from its head, where there is a rock, bare at low water, in mid-channel southeastward of the eastern end of an island on the northern side, with no safe channel between. A flat extends 0.5 mile from the bight on the south side 0.8 mile southeastward of this island, and a flat extends 0.5 mile from the head. Anchorage can be made near the head of the northern arm above the island in 22 to 25 fathoms.

South Arm is comparatively clear, but the south side should not be approached too closely. On the south side, 1 mile within its entrance, is a small arm, **Fick Cove**, the head and western shore of which are shoal; a wooded islet is just east of the cove. Anchorage can be made in the entrance in 20 to 22 fathoms. Two miles farther westward the southern arm divides; the northern branch connects at high water with the North Arm, and a flat extends 0.8 mile from its head; in the middle, about 1.8 miles within its entrance, is a rock bare at low water. Anchorage can be made 300 to 500 yards above the rock in 13 to 16 fathoms. The southern branch, **Patterson Bay**, has shoals fringing its northwestern side, and a flat 0.8 mile wide at its head. Anchorage can be selected near its head in 24 fathoms.

Chart 8283.—A flat extends about 300 yards off the **Duffield Peninsula** shore contracting the channel between it and Otstoia Island to a clear width of about 150 yards. A lighted buoy marks the edge of the flat. The flat extends to the southwestward to Deadman Reach and eastward to Nismeni Point.

Cozian Reef, with ¾ to 1 fathom over it, extends 0.5 mile northeastward of the north end of Otstoia Island. Its eastern extremity is marked by a lighted buoy.

Broad Island, 200 feet high and wooded, is 1.2 miles northeastward of Otstoia Island and 0.5 mile off the north shore at the entrance to Hoonah Sound.

On the north shore of Peril Strait, 2.5 miles east of Broad Island, a large landslide extends up the mountain side for several hundred feet.

Nismeni Point is low and wooded and lies about 1.1 miles eastward of Otstoia Island. A sunken rock lies 200 yards from the shore and 0.5 mile westward of Nismeni Point; it is almost in line between the point and the north end of Otstoia Island. Two rocks, bare at low water, lie 600 and 800 yards, respectively, eastward of Nismeni Point, with a sunken rock between them and the point.

Nismeni Cove, on the eastern side of Nismeni Point, affords anchorage for small craft, with protection from southerly winds. To enter, keep the south shore aboard at a distance of about 200 yards to avoid the rocks off Nismeni Point, and anchor in the middle of the cove about 0.3 mile from the head, in 7 to 10 fathoms, fair holding ground.

Peschani Point is a low grassy point on the south side 2 miles northwestward of Rodman Bay. A flat extends about 0.3 mile into the strait for a distance of 0.5 mile east and west of the point. A stream empties southeastward of the point.

Rodman Bay, on the south side 6 miles southeastward of Nismeni Point, is 6 miles long in a southwesterly direction and has a good anchorage at its head. The soundings in the entrance are very irregular, and the shores at the entrance should be given a berth of 0.5 mile. A rock with 1 fathom over it is in the bay about 0.6 mile from the eastern point at the entrance and is marked by a buoy; vessels should pass westward and northward of the buoy.

Lauf Islands are on the east side near the head of Rodman Bay. The anchorage is 0.2 to 0.3 mile southwestward of Lauf Islands in 14 to 15 fathoms, soft bottom. Streams enter the southeast and southwest corners of the head of the bay, and flats extend 0.5 mile from their mouths. Southeast winds blow with considerable force through the pass at the head of the bay. A mid-channel course leads safely to the anchorage. **Appleton Cove,** on the east side 1 mile within the entrance, has numerous rocks and shoals, and affords anchorage for small craft only.

Point Benham and **Point Elizabeth,** rounded wooded points, are, respectively, to the eastward and westward of the entrance to Rodman Bay.

False Island, small and wooded, is close to the north shore of Peril Strait, northward of the entrance to Rodman Bay.

Saook Bay has its entrance on the south side of Peril Strait, 4 miles southeastward of Rodman Bay. It extends southwestward for 2 miles, and thence southward for 1 mile to **Paradise Flats,** which extend about 0.8 mile from its head. It affords a good and convenient anchorage with shelter from all winds. Water can be obtained from small streams.

To enter, take a mid-channel course until the second small islet on the east side is abeam, then keep the southeast shore aboard at a distance of 150 yards to avoid a sand and gravel flat which extends to mid-channel from a small stream coming from a ravine in the western shore. The anchorage is in mid-channel 0.5 mile southward of this ravine, in 19 to 20 fathoms, muddy bottom.

Saook Point and **Point Kennedy** are the northwest and southeast points of the entrance to Saook Bay. A depth of 7½ fathoms has been found about 0.4 mile off shore about 0.5 mile eastward of Point Kennedy; lesser depths may exist.

False Lindenberg Head, rocky cliffs, wooded on top, is on the northern side of the strait, 2.5 miles northeastward of the entrance to Saook Bay. Sunken rocks are reported

to be 2 miles northwestward of False Lindenberg Head and about 0.2 mile southward of the eastern point of the foul bight in the northern shore of the strait.

Todd is on the eastern side of the bight in the northern shore of Peril Strait, about midway between False Lindenberg Head and Lindenberg Head; it has a cannery and general store. The cannery wharf is 300 feet in length and has a face 70 feet long with a least depth alongside of about 25 feet. An oil wharf, about 40 yards southeastward of the cannery wharf, has a face 42 feet long with a depth of 26 feet and more alongside. Fresh water can be obtained at the cannery wharf and gasoline, Diesel oil, and lubricating oil at the oil wharf. There is no post office but mail and passenger planes stop here on regular schedule. The cannery operates a radio station during the canning season.

A rock, covered by 2¼ fathoms of water and marked on its eastern side by a buoy, is about 200 yards off the cannery wharf. A sandspit makes out from the eastern shore southeastward from the wharves and is usually marked by a private barrel buoy, placed on line with the face of the wharves. In approaching the wharves, keep the face of the wharves open and make a starboard landing. The tidal current is reported to set away from the wharf during the first 1½ hours of flood, and to set on the wharf during the remainder of the tide.

Lindenberg Head, a wooded knoll 250 feet high, is a projecting point on the northern shore 2.2 miles eastward of False Lindenberg Head.

Lindenberg Harbor is a small cove on the west side of Lindenberg Head and affords protection from northward and eastward. The anchorage is in the middle of the cove in 12 to 15 fathoms, with indifferent holding ground.

McClellan Rock covers at highest tides and is 350 yards southward of Lindenberg Head, with no safe passage between. It is marked by McClellan Rock Light, which, shown from a white wooden house on a cylindrical pier, is 22 feet above water and visible 9 miles.

Local magnetic attraction.—On a course passing 0.2 mile southward of McClellan Rock, a local attraction of about ¼ point east was observed from McClellan Rock halfway to Fairway Island, where it ceased. Sufficient observations were not taken to determine the position and amount of the maximum deflection in this locality, but the fact of the existence of a local attraction here should be kept in mind.

A sunken rock with 1 fathom over it is nearly 0.3 mile southeastward of the western point of a small open bight on the north shore about 1.8 miles eastward of Lindenberg Head.

Hanus Bay is a broad open bight in the south shore southward of Lindenberg Head. At its southeast corner Hanus Bay connects at high water with the north arm of Kelp Bay. At the western end of the bay are two coves, the southern one nearly bare at low water. The northern cove is about 0.5 mile long and has anchorage for small craft; ledges, bare at low water, are about 250 yards off the points of this cove. Hanus Bay is not recommended for large vessels on account of its irregular bottom and exposed situation. A temporary anchorage might be made in its entrance. Small craft frequently anchor in the cove at the southeastern side of the bay in 3 to 10 fathoms, mud bottom. The anchorage is approached through the entrance eastward of **Dead Tree Island.** It offers no shelter during southeast weather as strong winds draw through Portage Arm and are known to have blown small vessels out of the bay. The southern entrance to this cove is foul, one boulder inside the entrance baring at low water. This cove is used during the winter as a storage place for fish traps. A reef with about 3 fathoms over it has been reported about 600 yards northward of Dead Tree Island.

Eva Islands, close to the southern shore and about 1.6 miles eastward of **Point Hanus,** have broken ground on all sides. A sunken rock is 600 yards northeastward of the small rocky islet northwestward of Eva Islands. **Svensen Rock,** sunken and sparsely marked by kelp, is 0.5 mile westward of the same islet.

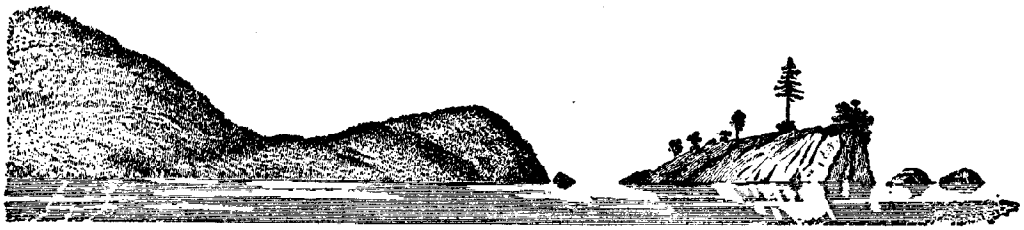
Fairway Island, 320 feet high and wooded, is 2 miles northwestward of Point Thatcher. A rock, with 1 fathom over it and marked by kelp, is 0.8 mile westward of Fairway Island. Ledges, mostly bare at half tide, extend 600 yards eastward of the island. Southward of Fairway Island the bottom is very irregular, and there are numerous rocks and reefs, some of which show only at extreme low water, while the sunken rocks are but poorly indicated by kelp. Fairway Island Light, 55 feet above the water and visible 6 miles, is shown from a small white house on the north point of the island. The light is obscured from 323° to 088°. A marker radiobeacon is at the light.

Midway Reef is about 5 feet high at its southern and highest part and is about 0.4 mile long in a northerly direction. Its north end bares 5 feet at low water and is about 0.8 mile eastward of Fairway Island.

Traders Islands, low and wooded, are 0.5 mile southward of Fairway Island. **Thatcher Channel** is the narrow channel southward of Traders Islands.

Point Thatcher, the southern point at the eastern entrance to Peril Strait, is low and wooded, and terminates in a ledge 250 yards long, with three bare heads. A rock, covered at half tide and surrounded by kelp, is 100 yards northeastward of the outer bare head.

A shoal with less than 4 fathoms on it has been reported 1,750 yards 041° from the extremity of Point Thatcher.



Point Craven bearing N by E, distant 1.5 miles

(Original sketch made before 1883)

Point Thatcher bearing S by E, distant 3.5 miles

(Original sketch made before 1883)

Point Craven, the south point at the entrance to Sitkoh Bay, is 1.4 miles northward from Fairway Island. It is marked by two rocks, close-to, connected at low water. Point Craven Light, shown from a white wooden house on the outer rock, is 35 feet above the water and visible 6 miles. The light is obscured from 077½° to 157½°.

Point Hayes, the northern point at the entrance from Chatham Strait, is moderately high, but is low at the extremity. Two wooded islets, about 60 feet high, and a bare rock are close to the point.

Morris Reef is a dangerous group of ledges and sunken rocks surrounding Point Hayes to a distance of nearly 1 mile on its east and southeast sides, and extending southwestward of the point halfway across the entrance of Sitkoh Bay. The southeast extension of the reef is broken ground with kelp and depths of 4 to 7 fathoms, possibly less, which extends 0.5 mile farther, and is marked at its southeast end by a lighted bell buoy 1.3 miles southeastward of the islet off Point Hayes and 1.9 miles eastward of Point Craven Light. On line between the buoy and Peninsular Point, 1.5 miles northward of Point Hayes, is an extensive reef, marked by kelp, and partly bare at low water, which lies 0.6 mile eastward of Point Hayes.

Sitkoh Bay has its entrance between Point Craven and Point Hayes, where it is nearly 1 mile wide, and extends northwestward for about 6.5 miles, the last 4.5 miles being about 0.4 mile wide. The bay is deep throughout in mid-channel, but there are several flats at the mouths of streams, and an extensive one, 1 mile wide, at its head. Morris Reef extends nearly halfway across its entrance.

Chatham, on the southwest side of Sitkoh Bay, 2 miles inside the entrance to the narrow part of the bay, has a cannery and a post office. The cannery wharf has a face of 200 feet with depths of 30 feet and more alongside. Off its eastern end is a rock which is sometimes marked by a barrel buoy. The oil wharf, westward of the cannery wharf, has about 20 feet at its end. The cannery operates a radio station, a machine shop, and general store during the season. Fresh water can be obtained at the cannery wharf and gasoline, Diesel oil, and lubricating oil at the oil wharf. A scheduled air mail and passenger service is maintained. Vessels usually make a port landing at the wharf. The cannery marine railway can haul a vessel of 50 tons, draft 7 feet.

Anchorage can be made 0.2 to 0.4 mile from the head of the bight on the northern shore 2 miles from Point Hayes, in 15 to 20 fathoms, rocky bottom, sheltered except from southeast winds. Secure anchorage can be had near the flat at the head of the bay about 1.4 miles above the cannery in 17 to 22 fathoms, soft bottom.

Entering Sitkoh Bay, keep the Point Craven shore aboard distant about 0.3 mile to clear Morris Reef, and then keep in mid-channel. At 0.5 to 0.8 mile above the cannery a flat makes out 400 yards from an islet near the western shore; the eastern shore should be favored slightly when passing it.

CHAPTER 14

West Coast of Chichagof and Yakobi Islands

Chart 8002

THE WEST COAST of Chichagof Island and Yakobi Island has a general northwesterly direction for about 37 miles from the west end of Klokachef Island to Cape Cross, and then the coast trends northward for 10 miles to Yakobi Rock. The main shore is formed by **Chichagof Island,** which has numerous mountain peaks about 3,000 feet high. From Klokachef Island to Khaz Bay the 100-fathom curve is about 15 miles offshore. The 50-fathom curve is about 6 miles offshore, and inside of that distance the soundings are irregular and less than 50 fathoms, except a narrow pocket with depths of 50 to 87 fathoms, which extends 5.5 miles 219° from Khaz Bay entrance. From the entrance of Khaz Bay to Cape Edward the coast is formed by numerous islets, rocks, and breakers, which prevent a near approach to the shore.

An inside passage for small vessels extends along the greater part of this coast. From Salisbury Sound this route leads northward through Fortuna Strait and then outside to Khaz Bay. Small craft sometimes enter Slocum Arm through Piehle Passage which lies close westward of Khaz Head. From Khaz Bay the route leads through Ogden Passage and Surveyor Passage to Portlock Harbor, thence through Imperial Passage to the outside coast. Small craft can take the shorter route from Khaz Bay, passing through Ogden Passage and Kukkan Passage and Bay. Small craft with local knowledge can leave Portlock Harbor by Dry Pass. From Portlock Harbor to Lisianski Strait the route leads outside, thence through Lisianski Strait and Inlet to Cross Sound. Directions for the inside passage are given in Chapter 3.

This entire coast has been surveyed and is shown on a series of large-scale charts. Several of the main entrances and channels have been wire-dragged and all known dangers are charted.

Chart 8248.—Fortuna Strait separates Klokachef Island from Chichagof Island, and is about 0.5 mile wide, with a clear channel 600 yards wide. The southeastern entrance is 600 to 700 yards wide between ledges extending 400 yards westward from Chichagof Island and **Vincent Reef** extending about 0.4 mile southward from the east end of Klokachef Island. A shoal marked by kelp, with a least depth of 2¼ fathoms, is 450 yards off the eastern shore and 0.5 mile northward from the eastern end of Klokachef Island. A rock, with ½ fathom over it and kelp, is 350 yards from the north shore on the west

side at the entrance to Leo Anchorage and eastward of the south side of the island on the north side of the strait.

Fortuna Strait is used, especially by small craft, when bound to Khaz Bay from Salisbury Sound. Directions are given in Chapter 3.

Leo Anchorage, on the northeastern side of Fortuna Strait, is about 0.5 mile long and 0.5 mile wide at the entrance, narrowing to the head, where there is a stream and small flat. The anchorage affords a fair shelter from northerly winds, but it is not recommended in southerly weather. With southerly winds there is less swell near the west side. The anchorage is near the middle, in 15 to 20 fathoms, or for small craft near the head in 5 to 7 fathoms. The bottom is hard with sticky patches.

Olga Rock is described in Chapter 13.

Point Slocum is about 3.5 miles north-northwestward of Klokachef Island. A bare, flat rock, about 30 feet high, is 200 yards southward of the point; inside the rock a boat landing can be made in ordinary weather. A breaker is about 0.5 mile westward of Point Slocum. An isolated breaker is about 0.6 mile southward from this point.

Chart 8280.—Khaz Head, a bold, bluff headland 1,275 feet high, particularly noticeable from southwestward, is about 7 miles northward of Klokachef Island. It is the western end of **Khaz Peninsula,** a rugged peninsula between Slocum Arm of Khaz Bay and the sea.

Khaz Point, the southwestern point of Khaz Head, shows from the southeast as a conical hill. It is about 2.6 miles northwestward of Point Slocum. The shore between these points forms a shallow bight in which there is much foul ground as well as numerous breakers. A breaker is about 0.8 mile westward of Khaz Point. A rock, awash at high water, at the end of the reef extending southward from the point, is used as a landmark by local motor boats which keep close inshore. The surf shows on this rock at all times.

Piehle Passage is entered close-to, westward of Khaz Point, and leads among the rocks and islets westward of Khaz Head, to Slocum Arm. This passage is extensively used by small craft with local knowledge, but is difficult for strangers. The entrance at Khaz Point is closed by breakers in heavy weather. Good protected anchorage for small craft can be had in the bight on the northwestern side of Khaz Head on the southeastern side of Piehle Passage. Anchorage can be selected at the head of the bight in 8 to 10 fathoms, mud and gravel bottom.

From Khaz Head a chain of numerous islands, rocks, and reefs, some wooded and all generally low, extend 3.5 miles northward to Ramp and Deuce Islands, at the entrance of Khaz Bay.

Middle Breaker is on a rock bare at low water and is about 2 miles northwestward of Khaz Point and nearly 1 mile from the nearest islet to eastward.

Khaz Breakers are the outer dangers in approaching Khaz Bay from southward, and are on a reef about 0.3 mile long. They are about 1.4 miles westward of Middle Breaker and 2.8 miles southeastward from Outer Rocks. Khaz Breakers are marked by a lighted buoy off the western side.

Outer Rocks are the southernmost bare rocks on the west side of the entrance to Khaz Bay. They are two in number, about 200 yards apart; the northern and larger one is about 30 feet high, the smaller one about 20 feet high. A rock, awash at low water, and on which almost always is a heavy breaker, is 0.2 mile southward of the southern rock.

Outer Rocks are distinctly darker than the rocks to northward, are mound-like in appearance, and can be easily identified by strangers.

Black Islet, 107 feet high, is the highest one of a group of small islands about 2.5 miles northwestward of Outer Rocks. It is the only wooded island of the group and forms an easily distinguishable landmark. Two bare rocks, 6 feet high, are about 0.8 mile westward of Black Islet, and a group of bare rocks extend 0.8 mile southward of the islet. Breakers extend 2 miles westward of the islet.

Inside the lines joining Outer Rocks, Black Islet, White Sisters, and Cape Edward are numerous bare rocks and reefs, but the four mentioned are the most prominent and easily recognized.

White Sisters are two outlying large white rocks about 2.5 miles northwestward of Black Islet.

Khaz Bay, about 11 miles northwestward of Klokachef Island, is 2.2 miles wide at its entrance between Ramp Island and Outer Rocks, and extends northward 2 miles to Quit Point. Here it divides into an extensive system of inland passages extending eastward, northward, and westward, and which connect with the sea northwestward of Cape Edward through Kukkan Bay and Portlock Harbor.

The entrance is wide and has deep water but is difficult to recognize on account of the many islets and bare rocks. In the entrance are a number of breakers which show except at high water with an exceptionally smooth sea, and assist in daylight and clear weather in shaping the course. Once in the entrance vessels should have no difficulty in going into Slocum Arm or through Ogden Passage to Kimshan Cove. Klag Bay is difficult except for small vessels at slack water.

Black Rock, lying about 1.1 miles northeastward of Outer Rocks, covers at high tide and is generally marked by a heavy breaker.

Ramp Island is small, about 100 feet high, and scantily wooded. It is the westernmost of the islands on the eastern side of Khaz Bay.

Deuce Island is the northwest wooded island on the eastern side of Khaz Bay, and lies about 0.8 mile northward of Ramp Island. At its northwestern end is a round bald knob about 100 feet high.

Ninefoot Shoal, about 0.5 mile northward of Deuce Island, is marked by a buoy.

Quit Point is the south end of the southernmost of the low wooded islands on the north side in the entrance to Khaz Bay, and lies about 1.2 miles northwestward of Deuce Island. The end of the point is bare, and at the timber line is about 90 feet high. This island is somewhat higher than others near it, and from most points shows as two knobs, the southern one the larger and higher, with a saddle between. A bare, rocky islet lies about 0.4 mile southwestward of Quit Point, and there is foul ground between this islet and Gray Rock.

Gray Rock is 3 feet high and lies 0.4 mile southward of Quit Point. The bottom between Gray Rock and Quit Point is foul and generally marked by breakers.

Rough Channel, lying westward of Quit Point and Gray Rock, is an entrance to Ogden Passage from Khaz Bay. It is about 0.5 mile wide westward of Gray Rock, but at its north end there are rocks above and under water which contract it to about 200 yards. There is generally a heavy swell in the channel, and it should be avoided except possibly at low water with a smooth sea. Smooth Channel is the better entrance to Ogden Passage.

Ogden Passage is described later in this chapter.

Guide Rock, bare and about 15 feet high, is about 0.4 mile eastward of Quit Point, and is the easternmost of the bare rocks extending 0.2 mile eastward from the island northward of the point. It is an important mark for entering any of the arms.

Smooth Channel, the best entrance to Ogden Passage, is protected from the ocean swell by a chain of wooded islands and ledges. From north of Guide Rock it extends for 1.5 miles in a northwesterly direction, and is 200 yards wide in its narrowest part, with depths of 7 to 15 fathoms. Smooth Channel also forms the approach to Klag Bay and connecting bodies of water. South of **Vorota Island** is an excellent anchorage for vessels up to 250 feet in length in 20 to 25 fathoms. With heavy southwesterly swells some of the turbulence enters the anchorage but not enough to make it unsafe.

Doolth Mountain, 2,120 feet high and wooded, is 6 miles northward of the entrance to Khaz Bay. It stands out from the higher mountains farther inland and is the most prominent one near the coast.

Slocum Arm extends 12 miles southeastward from Khaz Bay and is 0.8 mile wide. Its southwest side is formed by the mountainous peninsula terminating westward at Khaz Head, and by the chain of wooded islands extending 3.5 miles northwestward from that head to Deuce Island. The arm is free from dangers, with the exception of a rock, bare at half tide, 300 yards from the northeastern shore and 1 mile east-northeastward of the northern bare rock northward of Deuce Island. Piehle Passage has been described earlier in this chapter.

Ford Arm, eastward of Deuce Island, extends 2.5 miles northeastward from Slocum Arm, with a width of about 0.2 mile, but contracted to less in places by islands and rocks. At its head is an expansion about 0.8 mile in diameter, from which arms extend eastward and westward. The eastern arm is about 1 mile long with some islets and a flat at its head; there is anchorage for vessels below the islets in desired depths up to 15 fathoms. The western arm is 2 miles long and has anchorage for small craft at its head in 6 to 15 fathoms. Small craft can also anchor in **Elf Cove,** the cove north of the north point at the entrance to the western arm, in 5 to 8 fathoms; a ledge bare at half tide is close to the north side of the cove.

The entrance to Ford Arm is marked on the northwest side by two grassy flats with a native shack, and on the southeast side by a group of small wooded islands, which should not be approached closely. Two miles inside the entrance on the western shore is a prominent point.

Falcon Arm, 1.2 miles southeastward of Ford Arm, extends northward 2 miles with a width of 0.2 to 0.3 mile and narrows to 350 yards at its head. A rock, with 1½ fathoms over it, is 200 yards from the eastern side at the entrance, and a rock, bare 3 feet at mean lower low water, is 250 yards northward of this rock and 100 yards off a projecting point on the eastern side. At 0.4 mile inside the bay in the middle is a rock with 1 foot over it. Favor the western shore for 0.5 mile from the entrance to avoid these rocks and then keep in mid-channel. The depths in the wide part of the arm are 22 to 25 fathoms. A good anchorage is in an expansion above a point on the western side 1.5 miles from the entrance in 13 to 15 fathoms.

Waterfall Cove, about 1.8 miles eastward of Falcon Arm, is identified by a large waterfall about 1 mile above its head. Two bights are at the head; the eastern one is dry at low water; the western one has 7 to 8 fathoms and affords anchorage for small craft.

Island Cove, about 4.5 miles eastward of Falcon Arm, has some islands in it near the shore. The anchorage is in the eastern end of the cove in about 16 fathoms. Favor the eastern point of the cove when entering and avoid a flat which extends 300 yards from the north shore of the anchorage.

On the south shore of Slocum Arm, opposite Island Cove, is a small point with a wooded knoll 80 feet high. Anchorage for small craft is in the cove westward of this point in 8 to 10 fathoms.

Flat Cove, on the north side 6 miles eastward of Falcon Arm, has depths of 25 to 30 fathoms to the flat which extends 700 yards from its head.

Good anchorage is 0.5 to 0.6 mile from the head of Slocum Arm in 16 to 18 fathoms. A flat extends nearly 0.3 mile from its head.

Klag Bay has its entrance on the southern side of Klag Island. The entrance leads through a narrow, crooked channel with foul shores and strong currents, and is difficult except for small vessels at slack water. Strangers should enter at low-water slack, when the dangers will either show above water or be indicated by kelp. The main entrance is on the northern side of Smooth Channel through The Gate, and thence through Elbow Passage, which leads around the southern and eastern sides of Klag Island into the bay. The western end of Elbow Passage connects with Ogden Passage and affords another entrance to Klag Bay from Ogden Passage.

The Gate has its entrance 1 mile northward of Guide Rock. It is 600 yards long in a northerly direction and has depths of 4½ to 10 fathoms. The tidal currents have great velocity and the passage should be used at or near slack water only. A temporary anchorage can be found 250 to 300 yards southward of the sparsely wooded islet forming the east point at the south entrance to The Gate in 15 to 20 fathoms.

Vorota Island forms the western shore of The Gate. A daybeacon marks the western side of the narrowest part of The Gate. A rock, with 1 fathom of water on it, is on the eastern side of the channel opposite the daybeacon and about 20 yards from the shore of the small island. The channel here is about 50 yards wide.

A daybeacon at the west side of the north end of The Gate marks the extremity of the shoal off Vorota Island. This daybeacon and a white pyramidal daybeacon on Klag Island form a range past the sunken rock in The Gate.

Klag Island, 0.8 mile long, is in the southern end of Klag Bay. The pass westward of the island is nearly blocked at its north end and is suitable only for small boats or launches.

Elbow Passage, on the south and east sides of Klag Island, has an average width of 300 yards, but the channel is contracted in places to 75 yards by kelp-marked shoals.

The western part of Elbow Passage is 1 mile long from The Gate to Ogden Passage and is contracted in places to 75 yards, with a least mid-channel depth of 2¾ fathoms. On the north side at the entrance from Ogden Passage a sunken kelp-marked reef makes out 100 yards to a rock which shows 1 foot above high water and which is covered at high spring tides. The entrance is close southward of this rock and northward of this rock and northward of Elbow Passage Light, shown from a white house, marking the south side of the western entrance to the passage. The light is 14 feet above the water and visible 6 miles.

Caution.—The last of the ebb sets out westward with great velocity through this entrance, forming heavy swirls, and passage should be attempted only at slack water, preferably low-water slack.

A buoy is at the edge of the shoal off the southeast end of Klag Island, marking the western side of the channel. A buoy marks the eastern side of the channel abreast the middle of Klag Island; a buoy also marks the shoal off the northeast end of the same island.

Northward of Klag Island, Klag Bay is about 2 miles long, and is comparatively clear, though a number of islands are in it and foul ground is along the eastern shore inside the islands. The depths are moderate, under 20 fathoms, affording anchorage in any part of it.

Chichagof is an abandoned mining camp with post office and a float for small craft, situated on the west side of Klag Bay at its northern end. The United States Forest Service has constructed a pack trail from Chichagof to Hoonah Sound, a distance of about 17 miles. The anchorage is good in the basin off the wharf at Chichagof in 4 to 5 fathoms.

Lake Anna has its entrance through a narrow channel from the east side of the northern end of Elbow Passage. In the lake, 400 yards eastward of the narrow entrance, is a large reef bare at half tide and marked by kelp, which is avoided by keeping the shore southward of it aboard at a distance of 150 yards, or the shore westward of it 250 yards. There is anchorage at the south end of the lake in 6 to 15 fathoms. At 1 mile northward of the entrance a ledge with bare heads extends to mid-channel from the east side; the channel is westward of it. At the north end of the lake is an anchorage in 5 to 12 fathoms. Lake Anna should only be entered by those with local knowledge because of its narrow entrance and extreme currents except at slack water.

Sister Lake is joined to the northeast end of Lake Anna by a narrow, foul passage 0.5 mile long, navigable only for boats at slack water. The south end of this lake is only 200 yards from Ford Arm and at the same distance from **Double Cove,** a small bay at the north end of Khaz Bay, with low land between. Sister Lake has not been surveyed and should be navigated with caution. The lake is reported to be deep, but with good anchorage in the coves. The power plant of the Chichagof Mine is here.

Tidal Currents.—In The Gate, Elbow Passage, and entrance to Lake Anna the tidal currents have great velocity at times, with heavy swirls, and these passages are navigable only at slack water, especially with the large tides. Slack water in The Gate and Elbow Passage occurs approximately ½ hour after slack water at Wrangell Narrows. At the time of slack water there is a period varying inversely with the range of tide from 10 minutes to ½ hour when the current has little or no velocity.

Ice forms in Klag Bay each winter early in January and is a hazard to navigation through February and most of March.

Khaz Bay is connected with Portlock Harbor by Ogden and Surveyor Passages, this route being navigable for small vessels. Another route, partially protected, leads from Ogden Passage through Kukkan Passage and Bay to South Passage, which is the southern entrance to Portlock Harbor. This route is recommended for small craft only. Rough Channel and Smooth Channel have been described earlier in this chapter.

Ogden Passage is entered from Khaz Bay through Rough Channel or Smooth Channel, the latter being the best. From Klag Bay it can be entered through the western part of Elbow Passage. The depths in Ogden Passage are generally good and the dangers are

charted, but several narrow passages and sharp turns make its navigation difficult for large vessels. The bottom is generally rocky and the only good anchorage is in Kimshan Cove.

From Smooth Channel, Ogden Passage extends northwestward and then northward for 2 miles, with a width of 0.8 to 1 mile, to Frog Rock. It then trends northward for 1.8 miles, narrowing in places to 250 yards. It then expands eastward into a basin about 0.8 mile in diameter, from which the passage continues northward for 1 mile, with widths of 250 to 400 yards, to Fitz, Dippy, and Port Islands.

Frog Rock is a steep, grassy rock about 35 feet high, and is the outermost of a small group of islets on the east side of the passage. A deserted native village is 0.5 mile southeastward of it.

Snipe Rock, about 0.6 mile southwestward of Frog Rock, is a flat, grassy rock about 10 feet high, part of a long, sunken ledge. It is marked by a daybeacon and lies in the entrance to Kukkan Passage which leads through Kukkan Bay to the sea, northward of Cape Edward. A rock, bare at half tide, is 0.2 mile southeastward of Snipe Rock.

Fitz, Dippy, and **Port Islands** are wooded islets which lie at the junction of Ogden Passage with Surveyor Passage. A daybeacon marks the northwestern side of a reef with ½ fathom over it, which lies in the channel leading to Kimshan Cove between Fitz and Dippy Islands. Boats passing between the daybeacon and Fitz Island should give the beacon a berth of at least 75 yards to avoid the reef. A sunken rock is in the middle of the channel westward of Port Island making it unsafe.

Kimshan Cove, eastward of Fitz Island, is 0.2 by 0.5 mile in extent, with depths of 8 to 10 fathoms. Anchorage can be selected anywhere in the cove; the bottom is mud. The abandoned buildings and wharf of the Hirst Chichagof Mine are on the southeastern side of the cove. Along the face of the wharf is a depth of 9 feet with 3 fathoms of water 10 feet off the wharf. There is only a watchman at the wharf and the wharf is in poor condition.

Chart 8258.—Surveyor Passage is the passage extending from Portlock Harbor to Ogden Passage west of Kimshan Cove. Many sunken rocks are in the passage. **Lydonia Island** is a wooded island, 175 feet high, in the northern end of Surveyor Passage. The channel westward and southward of the island is foul, and large vessels always use the eastern channel.

Minnie Reef is in the main channel northward of Lydonia Island. The reef bares at half tide and is marked at the northeast edge by Minnie Reef Light, a white slatted daymark on a mast. The light is 21 feet above the water. The area between the reef and Lydonia Island is very foul.

A daybeacon marks a reef, bare at three-quarters tide, on the eastern side of the passage 0.5 mile southward of Lydonia Island. A sunken rock is 50 yards off the northern shore in the narrow part of the passage about 0.5 miles southeastward of the daybeacon.

The **tidal currents** in Surveyor Passage are small. The flood enters the passage from both ends and meets in the vicinity of the entrance to Black Bay.

Black Bay, extending for 1 mile to eastward from Surveyor Passage, has two islands obstructing its entrance. The best passage into the bay is to the northward of these islands, although small boats can pass between them. The shoreline is steep and rocky except at the head where there is a large sand and gravel flat. Strong winds draw through the bay

from the head and it is not recommended for shelter. Directions through Ogden Passage and Surveyor Passage are given in Chapter 3.

Chart 8280.—Kukkan Bay is between Edward Islands and Herbert Graves Island. It is poorly protected and is used only as a passage into Ogden Passage through Kukkan Passage. The principal entrance is northward of Edward Islands, but vessels can also enter southward of these islands. Kukkan Bay is connected with Ogden Passage by **Kukkan Passage** and is used by cannery tenders of about 9-foot draft at all stages of the tide, however, the spot shown as 2 fathoms, on the north end of the shoal area off Pole Point, breaks in heavy weather and may have less than 2 fathoms on it. It should be avoided by all craft. **Pole Point,** on the southern side of the bay, is a bare, bluff point with high, wooded land behind it. **Ittar Rock** is a bare rock 12 feet high in the middle of the entrance to Kukkan Passage.

Tawak Passage extends southward from the western end of Kukkan Passage, and affords a protected, although intricate, passage for small boats along the coast. The northern end of the passage is foul and should not be used without local knowledge. The islands to westward of Tawak Passage are called the **Myriad Islands. Gig Pass** is a deep, narrow passage leading from the southern end of Tawak Passage to Ogden Passage.

Edward Islands are two groups of prominent, wooded islands about 0.8 mile southward of the cape. Foul ground extends for over 0.5 mile westward of these islands. A brown, bare rock, 16 feet high, is 1 mile south-southwestward from Edward Islands and 1 mile northwestward of the White Sisters.

Cape Edward, on the western point of **Elkugu Island,** is about 3 miles northward of White Sisters. A rock, bare at high tide, is about 0.4 mile westward of the cape and there are sunken rocks 200 yards northwestward and 50 yards eastward of this rock. **Elkugu Bay,** on the eastern side of Cape Edward, is exposed to southward and is of no importance.

Chart 8258.—Portlock Harbor is formed on its seaward side by Hogan and Hill Islands. **Hogan Island** is nearly flat-topped and timbered with scrubby growth. The shoreline is very steep and rocky, with practically no sand beach except for small coves, which are unfit for beaching any size boat. **Hill Island** is well timbered except in the northwestern portion, which is almost a flat plateau sparsely wooded with scrub spruce. The highest point of the island has an elevation of 637 feet and is located near the center. **Herbert Graves Island,** on the south side of the harbor, is sparsely wooded except for a high, wooded hill on the eastern part, which is a prominent landmark. The western half of the island is low and rolling with numerous small lakes and swampy areas. **Mount Lydonia,** 3,215 feet high, is on Chichagof Island eastward of the harbor, and is a prominent landmark, being the highest mountain in the vicinity.

Portlock Harbor is used chiefly by boats going through the inside waters to Ogden Passage. It has three entrances from the sea — South Passage, Imperial Passage, and Dry Pass. Imperial Passage is used by most vessels, although South Passage is equally good. Dry Pass is foul and is used only by small local boats.

South Passage is between Cape Edward and **Point Hogan,** which is the southern point on Hogan Island. Reefs extend for 0.5 mile southward from Point Hogan, a rock 10 feet high is near the outer end, with a sunken rock 125 yards farther south. Three rocks also lie in the southern part of the passage 150 yards off Cape Edward. Between these dangers the passage is clear.

To enter South Passage steer for Cape Edward on course 106° until 0.5 mile from the cape, then steer 053° through South Passage. When the passage widens, 1.2 miles above the entrance, turn northward, keeping about midway between Hogan and Herbert Graves Islands, into Portlock Harbor.

Imperial Passage, between Hogan and Hill Islands, is the main entrance into Portlock Harbor. The group of islands off the northwestern side of Hogan Island form a good landmark, the outer ones being grass-covered and the inner ones having a few trees. Two reefs, awash at low water, are 500 yards westward of the outer islands. The northern side of Imperial Passage is marked by Hill Island Light on the southern end of Hill Island. The light, shown from a white skeleton framework on a wooden house, is 60 feet above the water and visible 9 miles. It is obscured from 111° to 256°.

Peer Islet, a bare rock 20 feet high, is in the passage about 0.3 mile eastward of the light, and there is a shoal extending southward of this rock with a depth of 1¾ fathoms 150 yards southward of the rock. Several shoal areas are off the entrance to the passage where a heavy sea will break.

Anchorage can be found in Portlock Harbor 300 yards northward of **Sholin Island,** in 12 to 18 fathoms, rocky bottom. Anchorage can also be had at the junction of Goulding Harbor and Dry Pass in 15 to 18 fathoms. Most of the bays making off from Portlock Harbor are too deep for good anchorage. Good anchorage can be had in Kimshan Cove in 7 to 10 fathoms, soft bottom.

Didrickson Bay has its entrance on the eastern side of Portlock Harbor, 0.8 mile northward of **Lock Island.** Reefs extend southward from the western side of the entrance, a sunken rock lying 200 yards south of the point. Another sunken rock is 250 yards southwestward of the eastern point of the entrance. Between these sunken rocks the entrance is deep and clear. A 6-foot waterfall at the head of the bay can be seen from the entrance. Good anchorage can be had near the head of the bay in 4 to 15 fathoms, mud bottom.

Pinta Bay extends northward for 2 miles from Portlock Harbor. Two small, wooded islands on the western side of the entrance are joined by a reef which bares at low water. Eastward of these islands the entrance is clear.

Goulding Harbor, at the northwestern end of Portlock Harbor, has two branches. **Baker Cove,** the northwest branch, is about 0.6 mile long and 0.1 mile wide. The northeastern branch terminates in a shallow cove 0.5 mile long, bordered with sand and gravel flats. With local knowledge it is possible to take launches of 4 feet or less draft to the head of the cove where a large stream empties into the bay. A small gold mine is about 1 mile inland, at an elevation of about 1,000 feet. Most boats coming to the mine anchor immediately after rounding the first point of the cove and near the western shore. Soundings taken at the entrance to the northeastern branch show a depth of 6 feet at low water on a reef of considerable size.

Dry Pass, the northern passage from Portlock Harbor to the Pacific Ocean, is northward of Hill Island. For 0.3 mile from the western end, the pass is less than 0.1 mile wide and is foul. A narrow channel with depths ranging from 3 to 10 feet passes between rocks at the entrance and to the southward of a rock in mid-channel, 0.1 mile from the western end and to the southward of a small rocky islet near the northern shore, 0.1 mile from the east end of this section. The pass then expands into a basin 0.5 to 0.8 mile in diameter, with a group of islets at the southwest end. Two rocks awash at mean lower low water are in the middle of this basin.

Anchorage in Dry Pass is reported in the cove on the northern shore back of a large island in 6 fathoms, sticky bottom, and also in the cove on the southeastern shore in 4 to 7 fathoms.

From the northeast side of the basin the pass continues in a northeasterly direction for about 0.6 mile and then turns southeastward to Portlock Harbor. A small island with Indian graves on the western end and a small rock close to its southern point is at the turn of the pass near the northern shore. A rock, bare 4 feet at low water, is 0.5 mile southeastward from the west point of the island. Directions from Surveyor Passage through Imperial Passage are given in Chapter 3.

The coast from Imperial Passage to Lisianski Strait is very irregular and characterized mainly by bold cliffs, rocky beaches, and many small islands, inlets, and bays. The immediate shoreline and larger islands are well wooded, but in the rolling country back from the beach are stretches of open marsh with lakes or tidal lagoons. Two or three miles inland the mountains rise to elevations of 2,000 to 3,000 feet and are generally bare above 1,200 feet. **North Mountain,** 1,885 feet high, about 1.8 miles to the northward of Mirror Harbor, is timbered to an elevation of about 1,600 feet and appears dark against the peaks beyond. As seen from the southward it shows cone-shape, with a shoulder 220 feet lower extending to eastward. **Mount Douglas,** 2,035 feet high, a rounded double peak, lies about 1.5 miles eastward from Mirror Harbor.

There are many outlying rocks and breakers along this coast. A 5½-fathom spot lies 1.5 miles 274° from Hill Island Light and is marked by breakers in heavy weather.

Outlying dangers.—A 2½-fathom shoal lies 2.9 miles 285½° from Hill Island Light. A rock awash at low water lies 0.3 mile 180° from Cape Dearborn. A 3-fathom shoal lies 0.5 mile 310° from Cape Dearborn. A 3½-fathom shoal lies 1.2 miles 310° from the cape. A 2½-fathom shoal lies 1 mile 330° from the cape, and there are many sunken rocks and shoals extending northward from this shoal. Several rocks lie southward of Skinner Island, the outermost lying 0.6 mile 220° from the southern point of the island, with another rock, baring 5 feet at low water, lying 300 yards 000° from this. Several sunken rocks lie southward from Porcupine Islands, the outermost three lying 0.6 mile 167°, 0.6 mile 195°, and 0.6 mile 233° from the southern point of the largest island.

Cape Dearborn, the western extremity of Hill Island, is a bold bluff about 80 feet high and has several small rocky islets close-to.

Little Bay is 1.5 miles northeastward from Cape Dearborn. It extends 0.5 mile in a northeasterly direction and has a width of about 0.1 mile. The entrance to the bay is wide and clear, having a depth of about 12 fathoms decreasing to 4 fathoms near the head of the bay. The head of the bay is foul. **Point Weigle** is 1.5 miles north-northeastward from Cape Dearborn.

Cormorant Island, Shag Rock, Grace Island, Middle Island, and **Snag Island** form a group about 1.7 miles northward from Cape Dearborn. A reef is 375 yards southeastward from Cormorant Island. **Fern Rock, Gull Rock,** and a rock awash midway between the two, are 270 yards northward from Grace Island. A reef extends 100 yards northward from the north point of Grace Island. **Davison Bay,** the bight to the eastward and northeastward of this group of islands, has depths of 4 to 12 fathoms.

Fleming Island, about 0.5 mile long and 0.3 mile wide, is 2 miles northward from Cape Dearborn.

Mirror Harbor, 360 yards in diameter, is northward of Fleming Island. It has depths of 3 to 4 fathoms in the middle. The channel to it is between Fleming Island and the

group to the westward. It is intricate, narrows to about 10 yards, and in places has depths of 1 fathom. Local knowledge is required for its safe passage.

Directions.—The following information may be of assistance. Enter midway between **Point Schultz,** the southern point of Fleming Island, and **Fairway Rock,** which is 275 yards southwestward from Point Schultz. Head for the northern end of **Kinky Island.** When abeam the small cove 0.2 mile from Point Schultz, make a sharp turn northeast around the reef which extends northwestward from the southern point of the cove, taking care to leave on the port hand the rocks which extend about 100 yards southeastward from the small island northward of Kinky Island. Head about 038° with the southern point of Kinky Island astern and the west tangent of the small islet near Fleming Island ahead.

Pass midway between the islet and the rocks 40 yards off its shores. From the northern point of the islet to the point ahead on the eastern shore the channel is very narrow. The rock on the eastern side of the channel should be buoyed before entering this section. **West Arm,** northward of **Pluma Island,** is foul.

Skinner Island, the most westerly of the group, is about 600 yards long and 125 yards wide. A rocky islet is 300 yards to the westward. Breakers and foul ground extend 0.8 mile south-southwestward.

Caution Pass lies close eastward of Skinner Island and between it and the islands to the eastward. It is used by small local launches going to Bertha Bay.

Bertha Bay, an open bight about 1 mile wide, extends in a northerly direction from Skinner Island. The bay is rocky at the head and is very foul and affords little protection from the ocean swell. Even small boats must keep over 600 yards from the shore to avoid rocks and reefs. **White Sulphur Springs** and a few buildings are on the north side of the bight. The beach is rocky, and landings at the hot springs can only be made in smooth weather. A house with a red roof is on the northern side of the bay 0.5 mile eastward of the hot springs.

Porcupine Rock is a prominent bare rock about 12 feet high, about 1.5 miles westward of **Beric Island,** the westernmost of the Porcupine Islands, and about 1.5 miles southward of Point Urey.

Porcupine Islands, so named from the shape of the outer one, are three wooded islands, lying 2 miles eastward of Porcupine Rock and about 1 mile off shore. Extensive bare ledges prolonged by breakers extend fully 0.5 mile southward from the islands. **Winifred Island,** the largest island of the group, is used as a fox farm. Two rocky islets are about 0.5 mile northward of Porcupine Islands, and a sunken rock, showing a breaker at low water in moderate sea, is nearly 0.3 mile northwestward of the rocky islets.

Islas Bay extends northward from Porcupine Islands. It is about 1 mile wide and 1.5 miles long. On its northwestern side are numerous inlets, most of which have shoal water and rocks at the entrances. Ilin Bay and Porcupine Bay branch off from the northern end.

Porcupine Bay is about 0.3 mile in diameter and has a general depth of 8 to 12 fathoms. A wooded island 90 feet high is in the western part of the entrance. The entrance southeastward of this island is clear. The western entrance is shoaler and narrower. A reef, awash at high water, is 100 yards northward of the island. A waterfall at the northeast end of the bay shows from the entrance. The harbor affords protected anchorage. A sunken rock 100 yards off the northern shore must be avoided in anchoring.

Ilin Bay has its entrance 0.5 mile westward of the entrance to Porcupine Bay. It is about 1 mile long, narrow, rocky, and suitable for small craft only. An anchorage in 8

fathoms, mud bottom, is in the upper half of the bay, but this anchorage is exposed to the southward. A more protected anchorage is behind the islands, on the eastern side of the bay in 3 to 4 fathoms, mud bottom. The southern entrance and the western entrance between the islands leading to this anchorage are foul, but the northern entrance at the head of the bay is clear.

Chart 8260.—Lisianski Strait, between Yakobi and Chichagof Islands, about 11 miles long and from 0.2 to 0.8 mile wide, follows a general northerly direction and connects Lisianski Inlet with the Pacific Ocean. The waters throughout the strait are generally deep, but the southern entrance is foul, and the navigable channel there lies between rocks about 0.2 mile apart, with spots of 2½, 4½, and 5 fathoms. From the southern end northward, the strait is clear until about 1.2 miles to the southward of the junction with Lisianski Inlet, where there are two small islets, the northern grass-covered with a lone tree on it, the southern rocky and wooded, with several rocks close-to. Kelp extends from the islets to the Chichagof Island shore. A rock, bare at half tide, lies 75 yards off the eastern point of the entrance. Abreast the rock kelp extends off the western shore for about 100 yards.

From the southern entrance the land presents a succession of low, wooded hills, gradually rising to sharp rocky peaks 2,000 to 3,000 feet in elevation.

S. W. Entrance to Lisianski Strait distant 4 miles
(From a Sketch by W. H. Dell, Asst., U.S.C.&G.S., 1880)

Currents.—Outside the rocks and reefs at the southern entrance the current floods to the northward and ebbs to the southward. Near the entrance among the rocks, on the ebb, a set to the southeastward has been experienced. Tide rips are encountered here, with an ebb current against the wind. Swirls are formed in the vicinity of Esther Island, and the current has been reported to exceed 3 knots at times. From Esther Island to about 0.5 mile to the southward of the islands near the northern entrance the current is slight; 0.5 mile to the southward of the islets swirls and eddies are formed. Along the islets a current of ½ to 2 knots is found flooding to the north and ebbing to the south. To the northward of the islets the current is small. In the vicinity of Miner Island currents vary from ½ to 2 knots. Between Miner Island and Chichagof Islands eddies and swirls occur. The currents from Cross Sound and Lisianski Strait appear to meet in the vicinity of Miner Island. An ebb current of ½ knot from Stag Bay has been experienced.

Directions for Lisianski Strait and Inlet are given in Chapter 3. The southern entrance channel to Lisianski Strait is about 125 yards wide, with a reef on the eastern side with 2½ fathoms on it and rocks on the western side. Favor the western side, especially if the current is ebbing, as then there is a southeasterly set.

Point Theodore, on the western side of the southern entrance, is low and wooded, with a background of high mountains. Two wooded islands are within the entrance close to the point. Rocks and reefs, bare at various stages of the tide, extend for 0.2 mile in a

southerly direction from the southern point of the southern island. A rock, awash at high water, is about 0.3 mile southward of the point.

Star Rock, about 0.9 mile southward of Point Theodore, is awash at high water; a bell buoy is moored about 200 yards southwest of the rock. A 4½-fathom spot is about 500 yards eastward of Star Rock.

Point Urey, the eastern point of the southern entrance to Lisianski Strait, is low, flat, and timbered; it has a small sharp knob, 290 feet high, near the southern end. Rocks and foul ground extend off the point, the most prominent being Porcupine Rock. Sunken rocks and rocks awash at high tide are about midway between Porcupine Rock and Point Urey. **Threenob Rock,** a conspicuous triple-headed rock, the highest part having an elevation of 20 feet, is 0.4 mile southwestward from the point. A rock about 100 yards in diameter is about 0.8 mile southwestward of the point; there are other rocks in the vicinity. Breakers were observed about 0.5 mile southeastward of Point Urey.

Urey Rocks, about 0.8 mile westward from Point Urey and about 1.5 miles from Point Theodore, are two bare rocks; the westerly one is about 110 feet high, the eastern rock, longer and wider, rises to a height of about 80 feet. Several small rocks lie to the southward and eastward of Urey Rocks; three large rocks, with small rocks close-to, lie to the northward and northwestward. Kelp extends to the shore of Chichagof and Esther Islands.

Esther Island is just within the entrance. It is about 0.3 mile long, 150 yards wide, and is heavily timbered. Near the middle of the island on the eastern side is a bight which almost cuts the island in two and where during storm tides the seas nearly wash across. The eastern shore of Esther Island is on the western side of what is known locally as the **Inside Passage.** Rocks awash extend for about 0.5 mile northward of the north end of Esther Island. **Lisianski Strait Entrance Light,** on the northern extremity of Esther Island, is shown from a white wooden house, at a height of 45 feet above the water. The light is most brilliant on the bearing 044°, diminishing around the remainder of the horizon except in the sector 218° to 023° 30′, where the light is obscured.

Lumber Cove, the small-boat anchorage northwestward of Point Urey, is about 0.6 mile long in a northeasterly direction and about 0.5 mile wide at the entrance, narrowing to 0.1 mile near the head. Midway in the entrance is a small steep island which rises to a height of about 100 feet and is covered by trees about 50 feet high. In entering pass close to the island, leaving it on the starboard hand. When clear of the island, pass in mid-channel and anchor near the head of the cove in 5 or 6 fathoms, sticky bottom. A rock which bares 4 feet at low water is close to the north entrance point of the bay and there are rocks in the southeastern part.

Canoe Cove, about 1.5 miles from Point Urey to the eastward of Esther Island, furnishes anchorage for small boats in 4 to 5 fathoms, sticky bottom. The anchorage is small, about 250 yards wide. It has two entrances, known locally as the **North Pass** and the **West Pass;** both are narrow. At low water North Pass bares for a short distance while West Pass has about 1 foot of water at its shoalest part. At the seaward end of West Pass is a heavy growth of kelp. A good supply of fresh water will be found on the east side of the cove.

Lumber Cove and Canoe Cove are connected at high water by a narrow passage called **Canoe Pass.**

Lost Cove, about 1 mile above the light on Esther Island, affords anchorage for small vessels in 11 to 17 fathoms, mud bottom. The anchorage is about 300 yards wide.

Midway between the entrance points is a rock which bares 5 feet at mean lower low water. It is marked by kelp during the summer and fall. Fresh water may be had at the head of the arm near the end of the cove.

Stag Bay, on the east side of Lisianski Strait, 6 miles from the south end, is 3 miles long from the entrance to the tide flats at the head of the bay and 0.2 to 0.3 mile wide. The shores are steep and precipitous, the land rising rapidly to elevations of 2,000 to 3,000 feet on each side. The slopes are timbered to an elevation of about 600 feet, and to an elevation of about 1,000 feet with a scrub growth, above which the entire country is generally barren. About 2.2 miles from the entrance and 0.8 mile from the shore on the south side is **Cub Mountain**, a prominent peak 3,110 feet high, which from the entrance shows steep on the northern side near the summit, with a shoulder on the southern side. Near the entrance on the north side, about 160 yards offshore, is a small rock. At the head of the bay is an extensive tide flat, the greater part of which bares at the lowest tides and the approach to which is very steep. Depths within the bay range from 27 fathoms at the entrance to 40 to 70 fathoms inside.

On the north shore 2 miles from the entrance are the ruins of a small wharf on the edge of a flat. Near the ruins is a fair-sized stream. At the head of the bay near the south side is a stream with a small waterfall which affords facilities for filling small boats. Along each shore are mountain streams at the mouths of which banks have been formed which extend offshore for 100 to 150 yards. In entering follow mid-channel courses. There is an anchorage at the head of the bay off the flats in 40 fathoms, with very restricted swinging room, but this is not recommended.

Two small islets, the northern grass-covered with a lone tree on it, the southern rocky and wooded, are near mid-channel about 3.5 miles above Stag Bay entrance and about 1 mile southward of the junction with Lisianski Inlet. Several rocks lie close to these islets and kelp extends from them to the Chichagof Island shore. The main channel lies on the western side of the islets. A reef with ½ fathom over it extends about 220 yards off the western shore of the strait, about 0.2 mile southward of the southern islet.

Rock Point, at the south side of the junction of Lisianski Strait and Lisianski Inlet, is marked by Rock Point Light, which is shown from a white slatted daymark on an I-beam on a rock awash. The light is 15 feet above the water and visible 6 miles.

Miner Island, at the junction of Lisianski Strait and Lisianski Inlet, separated from Yakobi Island at high tide by a channel about 100 yards wide, is about 500 yards long in an easterly direction and 400 yards wide. It is heavily wooded and has a ground elevation of about 50 feet on the northern side. The shore is surrounded by kelp. In the bight in the Yakobi Island shore about 0.5 mile to the westward of Miner Island is a flat with kelp along the edge.

Junction Island, a small wooded island, lies in Lisianski Inlet about 0.5 mile off the Chichagof Island shore and 0.9 mile to the southeastward of Miner Island.

A rocky ledge extends about 200 yards to the northward from Junction Island; kelp extends about 50 yards beyond this. From Junction Island 0.2 mile 350° is a rock with ¼ fathom on it at mean lower low water; 0.5 mile 113° from the southern point of Miner Island, and 0.5 mile 337° from Junction Island, is a rock with ¼ fathom on it at mean lower low water. These rocks are marked by kelp.

Lisianski Inlet is described in Chapter 15.

Yakobi Island, about 16 miles long in a northerly direction and about 6 miles wide, is densely wooded in its lower portions, but contains many high, bare, mountain peaks. The southern and northern parts of the island are low; the interior and eastern parts reach elevations of over 2,000 feet. The western coast of the island is broken up by many islands and off-lying rocks into numerous bays and bights, forming frequent shelter for small craft.

Between Point Theodore and Squid Bay are numerous small islands, mostly wooded, the outermost and most prominent being **Greentop Island.** This island is about 70 feet high, and the top is grass-covered. Greentop Island Light, 79 feet above the water and visible 9 miles, is shown from a small white house on the southern end of Greentop Island. The light is obscured from 143° to 318°. Close-to northeastward of Greentop Island is a narrow arm extending for 1.5 miles in a northeasterly direction. Along its north shore about 0.3 mile from the head a fish-buying scow anchors each year from May 1 to September 15. All fishermen supplies, including provisions, gasoline, Diesel oil, and kerosene, are available. About 200 feet of mooring float is available for small craft. Fresh water can be had at the float. Radio Communication is maintained with Pelican.

Enter north of Greentop Island, passing north of the two large islands and the small elbow-shaped island. Favor the north shore of the arm, being careful to avoid the one charted off-lying rock on that shore.

Secure anchorage may be had either north or south of the float in 4 to 7 fathoms, mud bottom. A large anchorage is on the eastern side of the arm, about midway of its length. This anchorage has a depth of 8 to 9 fathoms, mud bottom, but there are rocks which bare in the entrance, and caution is required in entering. The other passages among the islands are foul and should not be attempted except by very small craft with local knowledge.

Squid Bay, about 2.5 miles northwestward of Point Theodore, extends for about 1 mile inshore in a northeasterly direction. The anchorage here is in 5 to 17 fathoms, soft bottom, but it is exposed to southward. The entrance is clear and is bounded to eastward by the high, wooded shoreline, and to the westward by a large area of foul ground which extends to Point Satchrun. In entering, favor the eastern shore.

Point Satchrun, on the eastern side of the entrance to Takanis Bay, is bold and wooded. The point can be identified by a prominent cross of white quartz in the dark basalt which forms the point. This cross is about 40 feet above the water line and close below the tree line. Extending southward of Point Satchrun to the entrance to Squid Bay is a large area of foul ground marked by kelp and breakers. All vessels should keep well away from this area.

Takanis Bay, with entrance close to westward of Point Satchrun, extends about 2 miles in a northerly direction and is about 0.5 mile wide; several narrow arms make off from the bay in various directions. The bay is exposed to the southward, but small craft can usually find protected anchorage in its branches. The long narrow arm at the head of the bay is clear but has too limited swinging room for anchorage. The western half of Takanis Bay is foul and should be avoided.

The usual anchorage for small craft is in the northwestern branch, which contains a small, wooded island near its head. There is ample swinging room southward of this island in 6½ fathoms, mud and rock bottom. Very small craft anchor to northward of this island, which affords more protection but limited swinging room, the best approach being to eastward of the island.

Small craft with good local knowledge sometimes anchor in the lagoon lying to eastward of the upper end of Takanis Bay. The entrance is in the eastern shore of the bay, about 1.2 miles northward of Point Satchrun, and is through a long, narrow arm about 25 yards wide, between bold cliffs. The tidal currents through this arm are very swift, and this passage should not be attempted except at high-water slack and with good local knowledge.

Directions.—Approaching from westward, bring Point Satchrun to bear **065°** and head for it on this course, which will clear all the shoals extending southeastward from Cape Cross.

Approaching from southward, keep Point Satchrun bearing to eastward of 000°, which will clear the shoals extending for 1 mile southward of the point.

From a point 0.2 mile westward of Point Satchrun, steer **015°**, passing 350 yards off the point and midway between a high bare rock in the center of the bay and a large, flat rock on the eastern side. When the large, flat rock is on the starboard beam, steer **028°** for 0.5 mile to an anchorage in 8 fathoms, mud and rock bottom. There is a rock, bare at low water and on which there is usually a breaker, in the center of the bay, near its head. This rock will show about ½ point on the starboard bow when on the last course given above.

Cape Cross is about 5.2 miles northwestward of Point Theodore. The point is comparatively low and wooded and is identified by a high, rocky islet lying 0.2 mile off the cape, on which is a prominent clump of trees. Two large, bare islets lie northward of this islet and are connected therewith at low tide. Foul ground extends for 400 yards westward and for 300 yards southward of the islet.

Cape Cross Rocks distant 2 miles
W. H. Dall, Asst., U.S.C.&G.S., 1880

Cape Cross Rocks distant 3 miles
(From a Sketch by W. H. Dall, Asst., U.S.C.&G.S., 1880)

Between Takanis Bay and Cape Cross are numerous small islands, some of which are wooded. With local knowledge small boats can pass among these islands, but there is much foul ground and there are no protected anchorages. **White Crag Island,** the outermost island, lying midway between Cape Cross and Point Satchrun, is bare and has a conspicuous white top which forms a prominent landmark. A rock awash and which always shows a breaker, lies 0.8 mile southward of Cape Cross and is the most outlying danger in this direction. A 5½-fathom shoal which breaks in heavy weather lies 400 yards southward of this rock.

Between Cape Cross and Surge Bay the coast is rocky and broken with numerous large rocks lying close to shore. The 20-fathom curve follows the coast at a distance of

about 0.5 mile, outside of which there are no dangers. Off Surge Bay, however, the 20-fathom curve extends for more than 2 miles offshore, and there are several 9- and 10-fathom spots from 1 to 1.5 miles offshore; but there are no dangers more than 0.5 mile off the general coastline. Two miles northward of Cape Cross is a large bight about 1 mile wide. Considerable kelp is found here and there is no protected anchorage even for small boats in the main part of the bight. In the southern part east of the wooded island is an inner bight, locally called **Deer Harbor.** It is entered only on the upper half of the tide.

A bell buoy is moored in 5 fathoms 580 yards north of the northwesternmost extremity of **Takanis Peninsula.** A rock with less than 2 fathoms over it has been reported approximately 75 yards northeast of the buoy. To enter Deer Harbor pass south of the bell buoy and of the large wooded island.

Two fish-buying scows are anchored in Deer Harbor from May 1 to September 15. They each have all fishermen supplies, including provisions, Diesel oil, and gasoline available. There are mooring floats for small craft and fresh water is obtainable at the floats. Radio communication is maintained with Pelican. Sheltered anchorage may be had in either the north or south arm of the harbor in 4 to 7 fathoms, mud bottom.

Surge Bay, about 4 miles above Cape Cross, is an open bight with numerous rocks and is suitable only for small vessels with local knowledge. The small bights on the eastern side of the bay are open westward the only protected anchorage for larger vessels being at the extreme northern end of the bay, the passage to which leads among numerous small islands and rocks. In about the center of the bay is a high, rocky islet, with two grass-covered knolls on it, which is the best mark for the bay. A group of low, bare rocks extends 500 yards southward of the islet; a rock, awash at high water, lies 500 yards farther southward; and a submerged rock which breaks in a moderate swell, lies 300 yards farther southward. The best entrance to the bay is southward and eastward of the islet; the entrance westward of it is through kelp, and in westerly weather breakers extend clear across the entrance. The southeastern point of the bay is formed by two rocky islets close together, about 150 yards offshore, the outermost and smaller being bare and the larger islet wooded.

Surge Bay Entrance Light, 74 feet above the water and visible 9 miles, is shown from a small white house on a small islet marking the southern entrance to Surge Bay. East of the light and in the protected arm of the bay, southeast of two small wooded islands, a fish-buying scow is moored from May 1 to September 15. All fishermen supplies, including provisions, gasoline, and Diesel oil, are available. There is a mooring float for small craft and fresh water is piped to the float. Radio communication is maintained with Pelican.

To reach the scow approach it from the north. Enter the bay north of the island group where the light is situated on course **072°**, pass north of the group of four charted rocks and when clear change course to **157°**. Pass close to the small round islet, keeping it on the starboard hand and avoiding the rocks on the port side. When abeam of a small wooded islet on the port hand change course right to avoid a dangerous rock ahead. This will take you into a clear part of the bight where you can steer for the floats. Only boats with local knowledge should attempt the entrance to the floats from the light.

Directions.—Head for the smallest island mentioned above on course **063°** to a position 300 yards southward of the submerged rock, or to within about 650 yards of the islet. Then steer **043°**, passing 200 yards to westward of the islets and 200 yards

eastward of the bare rocks. When the bare rocks are abeam, steer **032°** to an anchorage in about 12 fathoms.

If going to the anchorage at the head of the bay, hold the last course given above for 1,300 yards past the island in the center of the bay and then steer **345°**, passing midway between a rock, awash at half tide, to starboard and a ridge of bare rock to port. Hold this course for 450 yards past the bare rocks and then steer **036°**, heading for a small, wooded islet between two small, bare islets. Pass midway between a rock, bare at three-quarter tide, marked by kelp, and the bare islet to port and haul to port, leaving the wooded islet to starboard about 70 yards. A rock, bare at half tide, marked by kelp, lies in mid-channel northwestward of the wooded islet. Pass to westward of this rock, midway between it and the rocky point which lies 70 yards to westward, beyond which mid-channel courses will lead through clear water to the head of the bay. Anchor northeastward of the small, wooded island at the head of the bay in 3 to 4 fathoms, mud bottom. On approaching the anchorage, favor the island, passing to eastward of it.

From Surge Bay to Cape Bingham the coast is very broken with many off-lying rocks and islets. Most of the coves among these islets are foul and there are no protected anchorages for large vessels. There are no dangers extending more than 0.5 mile off the outermost islets.

Yakobi Rock, about 0.5 mile westward of Cape Bingham, the farthest offshore of the numerous rocky islets in the vicinity, is about 75 by 100 yards in extent and about 15 feet high.

Hoktaheen Cove, a small, open, and exposed cove about 1.2 miles southward of Cape Bingham, is suitable only for small craft, and local knowledge is required for its entry. A small timbered knob with an elevation of about 175 feet is about 0.3 mile southward of the southern shore of the cove, and 1.5 miles southward of the cove are two somewhat sharp knobs, the southwestern peak having an elevation of 1,042 feet.

Bingham Cove, on the south side of Cape Bingham, is open to westward. Its southern arm is well protected, however, and a fish-buying scow is moored there from May 1 to September 15. All fishermen supplies, including provisions, gasoline, and Diesel oil, are available. There is a mooring float for small craft and fresh water can be obtained. Radio communications are maintained with Pelican.

Enter the cove on course **163°**, passing close to the large wooded island on the starboard hand and being careful to avoid the charted rocks on the port side. The inner cove is fairly free of dangers and there are no known dangers which are not charted. Small vessels anchor in either of the two southerly arms of the cove. For information necessary to reach anchorage in the easterly of the two arms inquire at the buying scow.

Cape Bingham is described with Cross Sound in Chapter 15.

CHAPTER 15

Cross Sound and Icy Strait
Chart 8202

CROSS SOUND and Icy Strait are the northernmost of the channels connecting the inland passages of southeast Alaska, separating the mainland between Cape Spencer and Point Couverden from Yakobi and Chichagof Islands between Cape Bingham and Point Augusta. The waterway is about 62 miles in length from abeam Cape Spencer to the western entrance at Point Augusta, its junction with Chatham Strait. It averages from 4 to 7 miles in width, but in places is reduced by islands.

Ports.—The only towns of importance in this section are Hoonah, which is located in Port Frederick and Pelican on Lisianski Inlet. Canneries are located in Port Althorp, Dundas Bay, and two in Excursion Inlet. There is sometimes a floating cannery in operation at Hoonah. **Supplies** in limited quantities can be had at Hoonah, Pelican, and the canneries operate general stores during the season. Gasoline and oil can be obtained from two oil companies at Hoonah and, during the summer months, from a small station at Elfin Cove, the small bight on the eastern side of the northern entrance to Port Althorp. There is a machine shop at Hoonah. Post offices are located at Hoonah, Pelican, and Gustavus (Icy Passage), and local mail boats occasionally stop at Dundas Bay and Port Althorp canneries.

Radio stations are operated during the season by the canneries in Port Althorp and Dundas Bay. A radiobeacon is located at Cape Spencer Light.

Glacial ice in varying quantities is prevalent in Icy Strait and Cross Sound throughout the year. The ice comes from Glacier Bay, and most of it is usually found at Glacier Bay entrance and from there to Inian Islands. It is often quite thick in Cross Sound and ice has been seen 10 or 15 miles seaward of Cape Spencer and as far eastward as Point Augusta. The size of the pieces is sufficient to make them dangerous to navigation. Ice at times piles up heavily along the shore from Point Adolphus to Eagle Point.

The **tidal current** on the flood sets through Cross Sound and Icy Strait from the ocean and meets the flood in Chatham Strait southward of Point Augusta; the ebb sets in the opposite direction. The velocity varies with the range of tide and width of passage. The ebb velocity is considerably stronger than the flood.

In the wider portions of Cross Sound the estimated maximum velocity of the ebb current is about 2½ knots; the flood is weaker.

Between Inian Islands and Point Wimbledon the velocity at strength is 3 to 8 knots on the ebb and 1 to 5 knots on the flood, and, when strongest, heavy swirls and rips occur at the northwest end of the northwest Inian Island which, with the large tides,

extend clear across. The *Pacific Coast Current Tables* include daily predictions of the times of slack water and times and velocities of strength of current in North Inian Pass.

South of the Inian Islands, in the narrowest part of the passage between them and Point Lavinia, the ebb velocity may exceed 8½ knots at times, and heavy dangerous rips and swirls occur, especially with an ebb current and westerly or southwesterly winds.

In North Passage and South Passage, Icy Strait, the strength of ebb is about 3½ to 5 knots. There are swirls and tide rips at times off the entrance to Glacier Bay. At Point Augusta the tidal currents usually have little velocity.

Strong tide rips occur at the entrance to Swanson Harbor with even a slight southerly breeze.

On the south side of Icy Strait between Point Sophia and Point Augusta very little current is ordinarily encountered. On several occasions, when weather indications were that there was a southeast storm along the outer coast in the vicinity of the entrance to Chatham Strait, a current of 2 or 3 knots was noted, flowing in a westerly direction along the shore in this locality. Its direction appeared unaffected by the stage of the tide.

Courses and distances through Cross Sound and Icy Strait are given in Chapter 3.

Chart 8304.—Cross Sound, about 11 miles long in a northeasterly direction and about 9 miles wide from Cape Spencer to Cape Bingham, is that part of the passage to the westward of the Inian Islands. Icy Strait is that part to the eastward.

The northern shores of the sound are mostly high, formed by the slopes of the Fairweather range. The southern side, formed by the Chichagof group, is comparatively low. The main channels have been wire-dragged and all dangers are charted.

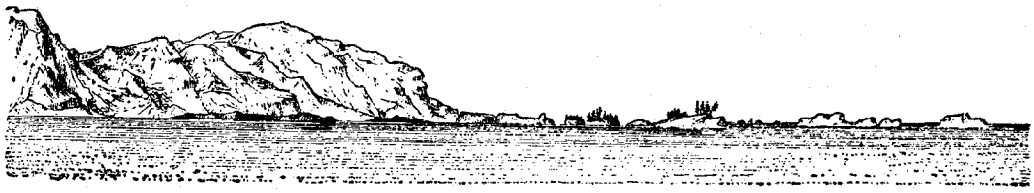
Chart 8260.—Cape Bingham, the northwest extremity of Yakobi Island and the southeastern point at the entrance to Cross Sound, is a low, irregular, rounding, wooded point with a gradual rise for about 1 mile to the interior. Numerous open glades occur in the vicinity. Low timbered islets and points extend offshore for a distance of about 0.4 mile.

From Cape Bingham to Soapstone Point the shoreline is of a very irregular and broken character and presents an almost continuous line of perpendicular cliffs with numerous indentations and inlets, at the heads of which are gradually shelving sand beaches. Numerous columnlike pinnacle rocks and small rocky islets mark the entire shoreline.

Soapstone Point, on the western side of the entrance to Lisianski Inlet, is the extremity of a neck of land 200 to 300 feet in elevation, and is of bold appearance with a shoreline of steep cliffs 25 to 50 feet high. To the westward is a small cove open and exposed and with depths of 6 to 9 fathoms at the entrance. To the eastward is Soapstone Cove, a narrow inlet about 1 mile long, at the head of which is a valley through which a stream flows. Depths shoal rapidly from 19 to 20 fathoms at the entrance to less than 1 fathom 0.3 mile within the inlet. From the shoreline in the vicinity of the point the land rises rapidly to elevations of 1,500 to 2,000 feet and is generally timbered to elevations of about 1,500 feet. The bottom is very irregular for a distance of 1 mile in a northwesterly direction from the point. A 3¼-fathom spot is 0.4 mile northwestward from the point. Rocks and kelp extend about 250 yards off the point.

Chart 8410.—Cape Spencer, the northwestern entrance point to Cross Sound, is a conspicuous headland. Extending from the cape for about 1 mile in a southerly direction

is a large shoal area in which there are rocky islets, some of the inner ones wooded, and rocks, the outer ones usually showing as breakers. From the shoreline the cape rises rapidly to timbered ridges with an elevation of about 1,800 feet.



Cape Spencer bearing E by S, distant 6 miles

(Original sketch made before 1883)

A group of islets surrounded by rocks and foul ground extend for 1.2 miles southward of the cape. A rock bare at low water is about 725 yards 089° from Cape Spencer Light.

A mooring buoy is maintained by the Coast Guard in the cove among the islets lying about 0.5 mile northwestward of the light. The cove is entered from westward from the approach to Dicks Arm, passing close to westward and northward of the buoy which lies on the north side of a 2½-fathom spot.

Cape Spencer Light is on the outermost large, rocky islet southward from Cape Spencer. The light, shown from a white, square tower on a rectangular, concrete building, is 105 feet above the water and visible 16 miles. The fog signal is a two-tone air diaphone. The fog signal and radiobeacon are synchronized for distance finding.

Dicks Arm, a narrow inlet less than 200 yards wide in places, extends in a northerly direction for about 2 miles. From the head of the arm is a gradually rising valley, passing over a saddle to Taylor Bay. A narrow channel, depths 5 to 12 fathoms, passes through the off-lying rocks and islets to the inlet, where depths of 4 to 7 fathoms are found, until within 0.3 mile of the head, where it is shoal. The entrance channel has been wire dragged and the dangers charted. A mooring buoy is maintained at the anchorage at the head of the arm by the Coast Guard. A buoy marks the northwest side of a 2½-fathom spot on the eastern side of the entrance channel.

To enter, steer **044°** heading a little to eastward of the buoy. When **Zip Rock,** bare rock 20 feet high is abeam to westward, change course to pass about 50 yards westward of the buoy. From the buoy a course of **031°** leads approximately in mid-channel into the arm, but care must be used to avoid the rocks on both sides.

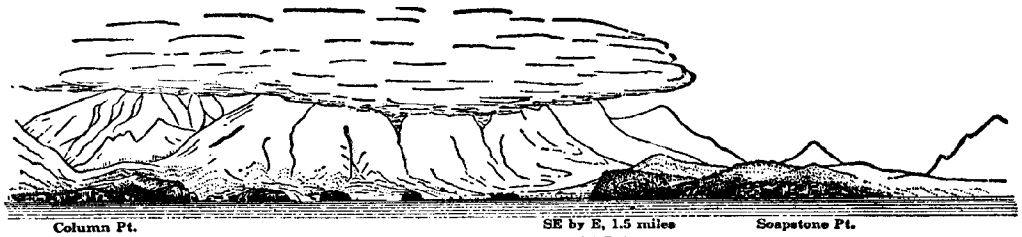
Chart 8304.—Taylor Bay, on the northwestern side of Cross Sound, has its entrance about 6 miles northeastward of Cape Spencer. The bay is about 4.5 miles long, 2.5 miles wide, and is open to the southeast. **Brady Glacier,** at the head of the bay, has a face about 2 miles long, about 400 feet high, and presents a broken, ragged appearance, with dark streaks, deposits of earth and rock. Off the face of the glacier there is an extensive flat which drops off sharply to 3 fathoms, deepening rapidly to 10 and 12 fathoms. The flat at the face of the glacier is moving rapidly down the bay. Vessels proceeding up the bay should use caution and keep sounding. The main body of the bay shoals rapidly from 30 fathoms near the entrance to about 15 fathoms off the head. The bottom is gray mud.

A shoal, with 3 fathoms on it and marked by kelp, lies 0.8 mile from the west shore of the bay and 2.1 miles westward of the bare rocks off the southeast end of Taylor Island. The west side of the bay is shoal for 0.5 mile offshore.

Taylor Island, high and hummocky, forms the east side of the bay for 2.8 miles from the entrance with a bare rock 0.3 mile off the south end of the island and small rocky islets closer inshore. From Taylor Island a chain of reefs extends northwestward. There is no navigable channel between the reefs and the shore. To the northwestward of Taylor Island is a small bight having depths of 3 and 4 fathoms.

Fern Harbor, the inlet on the eastern side of Taylor Island, extends about 1 mile in a northwesterly direction and is about 0.3 mile wide. Depths of 25 fathoms were found at the entrance and depths of 9 to 11 fathoms, sticky bottom, within the cove. A boulder reef closes the head of the bay except a narrow high-water channel near the Taylor Island shore. The harbor affords anchorage for small craft.

Chart 8260.—Lisianski Inlet, about 0.8 mile wide at the entrance, narrowing to about 0.2 mile at the head, follows a general southeasterly direction for 21 miles. There is temporary anchorage for vessels up to 150 feet in length off the eastern side of Miner Island in 20 fathoms, rocky bottom, poor holding ground. The vessel swings to the current and the effects of wind drawing through the channel are felt. Good anchorage and shelter may be had at the head of Lisianski Inlet in 15 fathoms, soft, sticky bottom. Small boats anchor alongshore where the depths are not too great, particularly in Mite Bay, off Miner Island, and off the flats alongshore.



North Entrance to Lisianski Inlet
(From a Sketch by W. H. Dall, Asst., U.S.C.&G.S., 1880)
(Telescopic view)

Currents in Lisianski Inlet are reported slight and set fair with the channel.

Directions are given in Chapter 3. In entering favor the southwestern shore until within the entrance. Follow mid-channel courses.

If bound for Lisianski Strait, round Miner Island at a distance of about 300 yards; this passes close to an 8-fathom spot surrounded by deep water.

If bound for the head of the bay, pass northeastward of Miner and Junction Islands, follow mid-channel courses for about 5 miles beyond Junction Island, then favor the southwestern shore until past the flats off the northern shore and the rock almost in mid-channel 0.6 mile beyond. Follow mid-channel courses until near the head of the bay, then favor the southwestern shore through the narrows and proceed in mid-channel to anchorage.

Column Point, the northeastern headland of Lisianski Inlet, receives its name from the columnlike masses of rock that extend from its shores. The shoreline is rough and broken and is marked by steep cliffs 20 to 100 feet high. The land eastward rises rapidly to heights of over 2,000 feet and is timbered to elevations of about 1,500 feet. Small rocky

islets and rocks awash, marked by kelp, extend about 450 yards offshore, just within the entrance to Lisianski Inlet.

Lisianski Inlet Light, 65 feet above the water and visible 9 miles, on a small white house, marks the western side of the entrance to Lisianski Inlet. The light is obscured from 331° to 127°.

The western shore to Lisianski Straight, for a distance of 7.5 miles from the entrance, is bold but broken by a number of small bights. **Mite Cove,** 2.5 miles from the entrance, forms the best anchorage for small craft. It is about 500 yards long and 250 yards wide, with **Mite Islet,** about 60 feet high, off the northwestern point of the entrance. Kelp and rocks extend for about 50 yards off shore of the island. Depths of 13 to 20 fathoms were obtained in the channel to the eastward of the island, while in that to the southward depths of 5 and 6 fathoms were found. Protected anchorage may be had in 11 to 12 fathoms, soft bottom, in the center of the cove. There are several fresh-water streams, and at the head of the cove and on each side are sand and gravel beaches. **Mite Head** is marked by a light which is shown from a small white house. The light, 55 feet above the water, is obscured from 312° to 146°.

On the western shore 0.5 mile southeastward of Mite Cove is a bight with 17 fathoms about 100 yards off the beach and 47 to 66 fathoms at the entrance.

A rock, covered by 1 foot of water at mean lower low water, is 350 yards off the western shore about 5.8 miles from the entrance to Lisianski Inlet and about 1.8 miles from Miner Island. There is deep water between it and the western shore.

Nose Head, on the east shore 6 miles in from Lisianski Inlet Light, is marked by a light shown from a small white house. The light, 50 feet above the water, is obscured from 136° to 320°.

Miner Island, off the western point of the northern entrance to Lisianski Straight is described under Lisianski Straight in Chapter 14.

Junction Island, about 0.9 mile southeastward of Miner Island and the off-lying reefs and rocks, are described under Lisianski Straight in Chapter 14.

The northern shore of Lisianski Inlet from within the entrance to opposite Miner Island is clear. The beach is rocky, and the land rises rapidly to mountain ridges over 2,000 feet high, timbered to an elevation of about 1,500 feet. To the head of the inlet the shoreline is generally rocky, with several islands and points with flats extending short distances offshore. The slopes of the ridges are moderate and heavily wooded. On the southern side the slopes are steep. The peaks are bare.

Pelican (**Pelican City**), on the eastern shore about 5 miles southeastward of Miner Island, is a settlement of considerable size. It is a customs port of entry. The town is an integrated fishing port and has a post office, cannery, cold storage plant, general store, small sawmill, restaurant, hotel, school, and bank. The wharf face is 140 feet in length with a least depth of 23 feet alongside. Fresh water is available. A mooring float for small craft and a landing float for planes are maintained. Oil storage tanks are located here and all petroleum products are available. Pelican has daily air passenger and mail service with Sitka and Juneau.

The cannery is located in a small bight formed by a rounded point and a large flat some 700 yards to the southeastward. The flat extends about 450 yards offshore with two rocky islets and rocks awash close to its edge, and gives protection to the wharf from southeast winds.

About 0.6 mile southeastward of the flat, 5.6 miles from Miner Island and slightly to the eastward of mid-channel, is a rock about 5 feet above high water with deep water on all sides. About 2.5 miles southeastward of this rock, close to the north shore, is a group of small islets, the most prominent of which has an elevation of about 40 feet and is covered by spruce 50 feet and more in height; sand spits extend along the shore from these islets. Southeastward of the islets is an inlet about 0.3 mile long filled by a flat.

On the southwestern shore, about 2.5 miles from the head of Lisianski Inlet, is a flat which extends offshore for about 350 yards, while on the northern shore is a grassy point off which a flat extends for about 100 yards.

About 1.5 miles from the head, Lisianski Inlet is narrowed to a width of 0.1 mile by **Soloma Point,** a grassy point projecting from the northern shore. Beyond this the inlet widens to about 0.3 mile. At the head of the inlet is a flat which bares for about 0.5 mile at low water. Two streams empty here, the northern about 60 yards wide and of considerable volume; the current is swift but the water is shoal. Beyond the flat is a grass-covered area, the western end of a large valley.

Chart 8304.—Port Althorp, between Point Lucan and Point Lavinia, with Three Hill Island and George Islands at the entrance, is about 7 miles long in a southeastward direction, about 1.5 miles wide, but narrows to an inlet about 0.2 mile wide near the head.

Three passes lead to Port Althorp. All have been wire dragged. That between George Islands and Point Lavinia has been dragged to a depth of 49 feet. In the pass between Gaff Rock and Three Hill Island 4½ fathoms was found 192° from Gaff Rock, and a 5½-fathom spot 0.15 mile northwestward from the northern extremity of Three Hill Island. The pass between Three Hill Island and Point Lucan was dragged to 31 feet. The channel between Three Hill Island and the rocks to the eastward was dragged to a depth of 29 feet. A deep drag was used between Althorp Rock and the northeastern shore of the bay and in the bay to abeam the cannery; from this a narrow area was dragged northward and eastward of the islet to within 0.6 mile of the head of the bay.

Entrance to Port Althorp
(Telescopic view)

Point Lucan, 3 miles northeastward from Column Point, is a prominent wooded headland. From Column Point to Point Lucan the shoreline consists almost of unbroken precipitous cliffs 50 to 100 feet high, with the exception of a narrow strip of sand beach 0.5 mile south-southwestward of Point Lucan. Heavy masses of kelp extend offshore for 0.2 to 0.5 mile. A small rocky islet lies 0.4 mile offshore 1.2 miles northward of Column Point. From the shore the land rises rapidly to elevations of 2,000 to 3,000 feet; the slopes are heavily timbered.

Three Hill Island, northwestward of Point Lucan, is about 1.5 miles long in a northwesterly direction and less than 0.5 mile in width. It has three prominent wooded hills separated by low saddles; the southeastern summit is about 400 feet high and somewhat

flat; the central summit is about 1,000 feet high; the northwestern summit, 600 feet high, appears conical. The southwest shore is fringed with rocks and rocky islets. Off the southeastern extremity of the island are two small rocky islets close together, about 25 feet high, between which and the rocky islet off Point Lucan is a deep water channel 0.2 mile wide.

Three Hill Island Light is shown on a white slatted tripod on an islet off the southeast end of Three Hill Island. The light, 80 feet above the water and visible 9 miles, is obscured from 115½° to 261½°.

George Islands, a group of four islands, lie about 8 miles to the northeastward of Cape Bingham and at the entrance to Port Althorp. The larger islands are sparsely wooded. The two northern islands are small with off-lying rocks extending about 0.1 mile in a northerly direction. The most northerly island is marked by George Islands Light on a white wooden house. The light, 48 feet above the water and visible 6 miles, is obscured from 019° to 043°.

The westernmost and largest of the George Islands extends in a northeasterly direction for almost 1 mile and is irregular in shape with a deep indentation, Granite Cove, in its southern side. From a low depression in the center of the island, at the head of Granite Cove, the land rises to the southward to an elevation of about 300 feet, steep and with rocky cliffs on the southern side; to the northward of the depression the land rises less steeply to an elevation of somewhat over 200 feet. The western and southern shores are fringed with rocks and kelp.

The easternmost island, separated from the western island by a narrow channel with depths of 3 fathoms, rises to an elevation of over 100 feet; the shores are fringed with kelp and rocks, and kelp lies off the southern end, close-to. On the southern side of the island is a white grave stone cemented to the bare rock outcrop. It is 4 feet high and the top is 30 feet above the water.

Gaff Rock, 20 feet high, is about 0.4 mile westward of the southern end of the western George Island. There is no safe passage between the rock and the island. Kelp surrounds the rock, and there is a kelp patch to the eastward. A 4½-fathom spot is 0.5 mile southward of Gaff Rock.

Granite Cove is about 400 yards in extent and is open to the southward. The sides of the cove are irregular cliffs while the head is a shingle beach. From the rock off the point on the western shore of the cove where the shoreline turns westward a shoal point extends for about 150 yards.

Currents.—Current observations in the entrance eastward of George Islands indicate that the current usually flows northward with a varying velocity which reaches a strength of about 2 knots 2¼ hours before flood strength in North Inian Pass; see *Current Tables, Pacific Coast.*

Point Lavinia, about 10 miles northeastward from Cape Spencer, is the northern headland at the entrance to Port Althorp. The point appears to form a little bluff at its extremity with rather low land behind it rising in a southeast direction to 1,500 feet. It is wooded. Depths of 2 to 5 fathoms extend 200 yards off the point.

A light, 60 feet above the water and visible 9 miles, is shown from a small white house on Point Lavinia. The light is obscured from 278° to 073°.

Elfin Cove is a narrow inlet in the northeast shore of Port Althorp, abeam the eastern George Island. Two islets lie off the entrance point and a rock, marked by kelp, on which is a least depth of 1¾ fathoms, lies about 520 yards, 337° from Elfin Cove Light.

The northeast islet lies in the middle of the entrance to the Cove. Elfin Cove Light, marking the southern entrance point and shown from a small white house, is 48 feet above the water and visible 6 miles. The light is obscured from 292° to 096°.

The Federal project provides for a channel 10 feet deep and 60 feet wide through the outer entrance and a channel 8 feet deep and 40 feet wide through the inner entrance. In June 1951 no work had been done on this project.

The main entrance channel has a minimum depth of 10 feet. This channel is somewhat constricted by rocky ledges on each side of the channel beyond the light. The rock ledge to the southward is marked by a red triangular daymark on a pipe and the rocky reef to the northward is marked by a black square daymark on an iron pipe.

About 200 yards beyond the aids, the channel leads through a very narrow cut in which there is a least depth of 3 feet, to a small inner basin with depths of 2½ to 3½ fathoms. This anchorage is protected and used extensively by small fishing boats. A second basin, with slightly deeper water, lies farther toward the head of the cove. The channel connecting the two basins has a least depth of 9 feet. There is a fresh water stream at the head of the inlet.

The village on the northeast shore of Elfin Cove has two trading posts and two oil stations. Each trading post has a small float and there are a number of small landings along the shore. The settlement has scheduled air mail and passenger service and daily radio schedule is maintained with Alaska Communications System.

Althorp Rock, about 15 feet high and marked by a light, lies in the middle of Port Althorp, about 1.7 miles eastward of Three Hill Island. Althorp Rock Light, shown from a white wooden house, is 18 feet above the water and visible 6 miles. Several rocks, which cover, lie close-to. A group of rocks, several of which show at high water, lie about 0.3 mile southwestward of Althorp Rock; a 4-fathom spot lies about 0.3 mile westward of this group. Kelp usually marks all of these. Deep-water is found between the patches, but the use of these channels is not recommended.

On the eastern shore of Port Althorp, eastward of Point Lucan, is a cove with a small island near the northern shore and a small islet with rocks close-to near the eastern shore. Depths of 18 fathoms near the head to 29 fathoms in the middle were obtained. From the northern part of the cove an inlet extends eastward for about 0.3 mile to a bight about 0.3 mile in diameter; flats extend for a considerably distance off the northern shore. Depths of 1 fathom were found in the bight and in the channel.

There are some cannery buildings on the southwest shore of Port Althorp, about 1.5 miles from Point Lucan. The wharf has a face 170 feet long with depths alongside ranging from 50 feet at the western corner to 28 feet at the eastern corner. Vessels make either a port or starboard landing as desired. Anchorage may be had in 15 to 20 fathoms, mud bottom. Small craft anchor closer in near the head in 5 fathoms, soft bottom. In entering, the channel eastward of the islet is preferred. At the head of the bay is a flat about 0.5 mile wide with a stream emptying into the southeast corner.

The **Inian Islands,** consisting of five principal islands, five smaller islets, and a few rocks, lie between Point Wimbledon and Point Lavinia and separate Cross Sound from Icy Strait. They are about 4 miles in extent, close together, mountainous, and wooded. The northwestern island rises about 1,500 feet to a conical peak with a shoulder on the southeastern side. **North Inian Pass Light** is on the northern point of the northwest island.

The light, shown from a white wooden house, is 64 feet high and visible 9 miles. It is obscured from 260° to 051°.

South Inian Pass, connecting Cross Sound and Icy Strait southward of the Inian Islands, is nearly 3 miles in length and varies in width from about 1 mile at the eastern end to less than 0.4 mile at the western end of Point Lavinia. Depths of 2¼ fathoms extend 200 yards northwestward from Point Lavinia. Two shoal spots lie off the point on the southern side of the pass at the eastern entrance; the northern one, marked by a lighted bell buoy, is covered by 1¼ fathoms of water and is distant from the point about 1 mile 071°; the southern spot is covered by 2 fathoms of water and is distant from the point about 0.8 mile 095°.

South Rock, at the entrance to the bight in the south side of the pass, and **Dad Rock,** at the entrance to the irregular indentation in the northern side of the pass 300 yards southward from the islet, are bare at low water and are marked by kelp.

There are no dangers in South Inian Pass proper and no anchorages.

The **current** is stronger than in North Inian Pass, exceeding 8½ knots on the ebb at times. The flood is considerably weaker. Severe tide rips and swirls occur, especially at the western entrance, with an ebb current and westerly or southwesterly wind.

A mid-channel strip, 0.3 to 0.5 mile wide, has been examined with the wire drag. Coming from the eastward and rounding into Port Althorp, Point Lavinia should be given a berth of not less than 225 yards to avoid the 2-fathom spot northwestward of the point. Ice is occasionally encountered.

Earl Cove is the indentation about 400 yards wide in the eastern side of Inian Islands. It is clear, and a small vessel may anchor here temporarily in 10 to 15 fathoms, but it is exposed eastward, and generally has considerable ice.

North Inian Pass, between the northern coasts of the Inian Islands and Point Wimbledon, varies from 1.5 to 2.5 miles in width. From the northeast entrance point of Inian Cove, about 0.6 mile northeastward, is a ½-fathom spot; it is about 400 yards offshore; a sunken rock is midway between this shoal spot and the shore. The channel has been dragged to a depth of 81 feet to within 0.3 mile of the point on the northern side. The southern limit follows the trend of the channel about the same distance off the southern shore and the shoal mentioned above.

Point Wimbledon, about 3 miles eastward from the southern extremity of Taylor Island, is a bold headland rising to 1,820 feet about 0.8 mile off the beach, then with less slope to higher peaks to the northwest. It is thickly wooded and presents a continuous shoreline of gray cliffs about 50 feet high. In the bight between Taylor Island and Point Wimbledon is a rather prominent headland off which a shoal extends for about 0.6 mile. Ice from Glacier Bay is frequently encountered.

Inian Cove, on the north side of Inian Islands, is a secure anchorage with a clear width of 600 yards. Its entrance is about 1.6 miles eastward of the northwest point of the westernmost Inian Island. The cove is 1 mile long, 375 yards wide in its narrowest part, and 0.3 mile wide at its head. The north point at its entrance is a small grassy islet with steep rocky sides. Kelp grows in deep water on both sides in the entrance. Ice drifts into the cove, usually along the south side, but is not considered dangerous to vessels at anchor. The float landing of a fox farm is near the head of the cove. The mail boat from Juneau calls here.

Approaching from eastward pass northward of foul ground extending 0.2 mile off Inian Islands, 0.5 mile eastward of the entrance to the cove. From westward the approach

is clear. Enter in mid-channel and steer eastward so as to keep the north shore aboard, distant 100 yards, in the narrowest part of the cove. Anchor in the wide part of the cove in 7 to 9 fathoms, soft bottom.

Chart 8202.—Icy Strait extends from Inian Islands in an easterly direction for about 16 miles to Point Adolphus, where it takes a southeasterly direction for about 27 miles to its junction with Chatham Strait. It averages 6.5 miles in width, but in places is reduced by islands. The main channels have been wire dragged.

Glacial ice from Glacier Bay is prevalent in the strait in varying quantities throughout the year. The sizes of the pieces is sufficient to make them dangerous to navigation.

Chart 8304.—Point Dundas, the eastern point of the entrance to Dundas Bay, on the north shore of Icy Strait to the northward of the Inian Islands, is bold, steep, and well wooded and rises to an elevation of 2,330 feet within 0.5 mile of the beach. There is deep water close to the point, the 50-fathom curve being less than 0.2 mile offshore.

Dundas Bay has its entrance on the northwest side of Icy Strait, northward of Inian Islands. The main bay is about 2 miles wide and 4 miles long in a northwesterly direction. The northern end is filled by flats to a distance of 1.3 miles from its head, between which is a channel of very deep water leading northward toward the mouth of the stream at its head. Westward of the flats is a channel along the southwest shore of the bay leading into the narrow crooked inlet which extends 5 miles in a westerly direction, and then turning abruptly southward, reaches to within 1 mile of Taylor Bay, with low land between.

The ruins of a cannery and wharf are on the western side of Dundas Bay, about 3 miles within the entrance. A wooded islet lies about 150 yards offshore, about 0.2 mile below the ruined wharf.

An anchorage is about 0.3 mile offshore in 8 to 12 fathoms, sticky bottom, and the only danger is the flat opposite, which lies about 0.6 mile eastward of the islet. The anchorage is exposed southeastward, and heavy ice drifting with the current is sometimes troublesome. At the anchorage the tidal currents have an estimated maximum velocity of 2½ knots.

Idaho Inlet has its entrance on the southern shore eastward of Inian Islands, where it is 3.5 miles wide. Two shoal spots, the more northerly of which is covered by 1¼ fathoms of water and marked by a lighted bell buoy, and the southern, covered by 2 fathoms of water, lie about 1 mile eastward of the northwest point of the entrance to the inlet. **Shaw Islands,** two in number and wooded, lie on the western side nearly 2 miles within the entrance. The islands are connected by a ledge, but a good channel is on each side of them. Above Shaw Islands the inlet is about 1.2 miles wide, narrowing to 0.5 mile, and extends 8 miles in a southeasterly direction to two wooded islets near the southern side, beyond which are flats bare at low water. A mid-channel course leads safely to the head of the inlet, where there is anchorage in the middle, about 0.4 to 0.5 mile westward of the two wooded islets, in 18 fathoms, muddy bottom. Small craft find anchorage closer to the head of the bay in 5 to 10 fathoms. A trail marker at the head of the bay marks the end of a trail which extends inland for about 6 miles to the head of Tenakee Inlet. The trail is maintained by the Forest Service.

From the eastern point at the entrance to Idaho Inlet a shoal extends nearly 400 yards westward. On the eastern shore of the inlet just south of this point is **Gull Cove,** in the entrance of which anchorage can be made in 15 fathoms. A small vessel at low water

can select an anchorage closer in, in about 9 fathoms, with better shelter from northerly winds. The small settlement here has a post office. The mail boat from Juneau makes weekly calls.

About 2½ miles south of Gull Cove on the eastern shore of the inlet is a recent settlement of about 20 families of fishermen.

Lemesurier Island, marked by a light on a white wooden house on the northern point, lies in the middle of Icy Strait, 4 miles eastward of the Inian Islands. The light is 42 feet above the water and visible 9 miles. It is obscured frum 292° to 086°. The island is about 4.5 miles long, 2.5 miles wide, is heavily timbered, and has several summits, the highest of which has an elevation of 2,225 feet. A small wooded island lies about 200 yards off the north shore. A shoal about 0.4 mile in length extends offshore 0.4 mile from the eastern side of the island about 0.4 mile from the northern point. A reef extends about 0.2 mile from the southeast point of the island; otherwise the shores are bold.

Willoughby Cove, on the southeast side of Lemesurier Island, is about 1.5 miles in width between extreme points and indents the coast for about 0.5 mile. Anchorage can be obtained in the eastern part of the cove about 0.2 mile off the beach in 8 to 10 fathoms, but a strong eddy sweeps in icebergs. Its use is not recommended.

North Passage and **South Passage,** northward and southward of Lemesurier Island, are clear. Both have been wire dragged to a depth of 81 feet in mid-channel. North Passage is more often used, furnishing a more direct passage from and to the sea. The southern shore of South Passage should be given a berth of at least 0.8 mile to avoid the reef and sunken rocks off Goose Island.

Local Magnetic Attraction.—The variation of the compass was observed to be about 7° west of normal at a point on the north shore of North Passage about 3 miles southwest of Point Carolus. The extent of the local attraction is small.

From the eastern point at the entrance to Idaho Inlet the shoreline is low and wooded and trends to the eastward for 4 miles to **Mud Bay.** This bay is about 2.5 miles wide at the entrance and about 1.8 miles in length. A large stream empties through the sand spits at the head of the bay, off which flats extend for 0.6 mile. On the western side of the bay are three low wooded islands separated from the mainland by a narrow channel which bares at low water. The largest of these is known as **Goose Island.** Foul ground, bare in places at low water, extends 0.5 mile offshore from the northwestern point of Goose Island. A depth of 5 fathoms exists 2 miles 077° from **Quartz Point,** the northeastern point of Goose Island.

Anchorage may be had in 6 to 9 fathoms of water 1 mile from the head of Mud Bay, but it is exposed from north to west, and at times considerable ice is encountered. In entering from the westward, the northern shore of Goose Island should be given a berth of at least 0.8 mile and Quartz Point a berth of 0.5 mile.

Point Adolphus, the northernmost point of Chichagof Island, is a bold prominent point covered with timber and rising within 0.5 mile of the beach to a rounded summit 1,670 feet in elevation. About 1 mile southward is another rounded peak 1,930 feet in elevation. The shoreline between Mud Bay and Point Adolphus is fairly regular. Point Adolphus is marked by a light, 30 feet above the water, shown from a red wooden house. The light is obscured between the bearings 322° and 102°.

Pinta Cove, the bight on the east side of Point Adolphus, has been used as a temporary anchorage, but it is not recommended.

Flynn Cove is on the south side of Icy Strait, about 7 miles southeastward from Point Adolphus and about 1.7 miles southeastward of **Eagle Point.** It furnishes anchorage, about 600 yards in extent, in its southeastern part in 6 to 8 fathoms. A shoal extends 300 yards northwestward from the northern extremity of **Burger Point,** the high, wooded peninsula forming the northeast side of the cove. **Harry Island,** small and wooded, is in the entrance 600 yards northwestward of this point. A half-tide reef is 600 yards westward of Harry Island. A sunken rock is reported to be about 50 yards southeastward of Harry Island.

The best entrance into Flynn Cove is between Harry Island and Burger Point, favoring if anything, Harry Island. At low water the entrance from westward, passing in mid-channel westward of the half-tide reef, may also be used.

Glacier Bay is described later in this chapter.

Pleasant Island, about 4.5 miles eastward of Point Adolphus, is 6.5 miles long, 3.5 miles wide, and is comparatively low. Near the middle of the southern shore is a prominent wooded knob 880 feet high. A bare rock is 250 yards off **Noon Point,** the eastern extremity of Pleasant Island, and a rock, bare at low water, lies nearly 0.3 mile southeastward of the bare rock. Off the northern point of the island, about 300 yards offshore is a rock bare at all times and marked by **Icy Passage Light,** 22 feet above the water and visible 6 miles, on a white square slatted daymark on I-beam, close to which are rocks bare at various stages of the tide; for a distance of 1.2 miles eastward and 0.8 mile westward, shoals and broken ground extend about 0.3 to 0.5 mile off Pleasant Island. A 1¾-fathom spot is 1.2 miles 109° from the light.

Icy Passage is the channel between Pleasant Island and the northern shore. Mud flats extend off the northern shore to within 0.5 mile of the northern shore of Pleasant Island. A channel, 0.3 to 0.5 mile wide, has been examined with the wire drag to a depth of 30 feet. The shallow cove on the north shore of Pleasant Island, southeast of the light, offers fair shelter in 2 to 10 fathoms, mud bottom. Several mooring piles have been driven in the cove.

Gustavus Light is 2.9 miles 274° from Icy Passage Light, is 20 feet above the water, shown from a five-pile dolphin in 5 feet of water. **Gustavus** is a post office on the shore near the light.

Pleasant Island Reef is an extensive reef 1 mile southward of Pleasant Island. A lighted bell buoy marks the southern edge of the reef. Between the reef and the shore is a 3¼-fathom spot; between this spot and the reef is a narrow channel which has been wire dragged.

Porpoise Islands, a group of four islands, lie off the eastern end of Icy Passage, about 2 miles eastward of Noon Point, Pleasant Island. The southernmost and largest island is nearly 1 mile long, 370 feet high, wooded, and has a prominent yellow cliff 300 feet high on the southern side. The northwestern end of the island is a long low point, terminating in a clump, beyond which a sand spit extends almost to the next island. An aviation light is shown from the summit of the largest island. The light is obscured from northward to 314½°.

Foul ground extends off the islands in places almost 0.2 mile. A rock, covered at half tide, is 400 yards off the south point of the southernmost island. Anchorage may be had in about 15 fathoms, muddy bottom, about 0.2 mile northward of the rock, with the tangents of the largest island bearing 031° and 125°.

Excursion Inlet is a deep narrow inlet in the northern shore of Icy Strait, with its entrance northward of Porpoise Islands. It has a northerly direction, a length of about 9 miles, and is deep and clear. Two and a half miles inside the entrance is an extensive area of low land on the northeastern side of the inlet. At 4.5 miles inside the entrance the inlet divides into two arms. A rock with ½ fathom over it is 250 yards off the eastern side of the point separating the two arms, and bears 080° from the point; the range of the cannery near the head of the east arm open from the west shore of the arm leads eastward of the rock.

A cannery is on the eastern shore of Excursion Inlet, about 2 miles below the dividing point. The cannery wharf has a face 130 feet long. Vessels usually stem the current, making either a port or starboard landing. The flood current is reported to set about parallel with the face of the wharf; the ebb sets off the wharf, particularly during the first part of the ebb. At low tide, large vessels will ground at the bilge keel next to the wharf in soft mud, but will have 25 to 30 feet of water at the keel line, the shoalest water being at the southern corner of the wharf. A 2-tone crane is on the wharf. There is a least depth of about 20 feet at the face of the oil wharf, which has a 40-foot face, and lies 165 feet southward of the cannery wharf. The cannery operates a general store during the season. Fresh water can be obtained on the wharf. Gasoline, Diesel oil, and fuel oil are stored for cannery use.

Vessels will find indifferent anchorage near the head of the east arm, 0.6 to 0.8 miles above the abandoned cannery and 0.2 mile from the eastern shore, in about 30 fathoms. Small craft can select anchorage in the coves at the head of the west arm in not less than about 10 fathoms.

Chart 8306.—Glacier Bay has its entrance on the northern side of Icy Strait between Point Gustavus and Point Carolus. It is about 35 miles long to the head of Muir Inlet and 56 miles long to the head of Tarr Inlet, its northwest arm, and varies in width from 2 miles at Beardslee Islands to 9 miles at its widest part above Willoughby Island. From Point Gustavus to Willoughby Island, the eastern shore, including Beardsley Islands, is low and quite shelivng, and the western shore is low for a short distance back; above Willoughby Island both shores of the bay are steep and high. The shores are foul and should be avoided. All the shoals of less than about 6-fathom depth are covered with kelp part of the year, but, as the strong currents make the kelp tow under most of the time, the kelp cannot be depended upon to indicate the dangers. All of Glacier Bay is contained in the 3,590-square mile **Glacier Bay National Monument.** At present transportation facilities are limited, and there are no public accommodations in the monument. The monument contains over 20 tremendous glaciers and many others almost equally impressive. They illustrate all stages, from actively moving ice masses to those that are nearly stagnant and slowly dying.

Ice.—Numerous discharging glaciers enter the bay, and glacial ice is always present, sometimes in enormous quantities. Large icebergs have been observed floating out of Muir Inlet. The quantity of ice discharged from Glacier Bay varies for different years. Those familiar with the locality report that earthquakes or earth tremors in the vicinity are concurrent with the periods of greatest discharge. When the ice falls from the faces of the glaciers, it may create waves 30 feet high. Therefore, small boats should not approach closer than half a mile to active glaciers. Icebergs also should not be approached closely because, if disturbed by swells from a small boat in passing, they may roll over.

Some **local magnetic attraction** has been observed in the bay, particularly in Reid Inlet leading to Johns Hopkins Glacier.

Caution.—The navigation of Glacier Bay is not considered safe without local knowledge. The shoals are usually marked by grounded ice. Glacier Bay has not been completely surveyed above the line Francis Island to Tlingit Point, the western entrance point of Muir Inlet, and the depths shown on the chart are from preliminary examinations.

Point Carolus, the western point of the entrance to Glacier Bay, is a low gravel and boulder point, back of which it is low and timbered; high land lies westward and northward.

An extensive reef and several rocks are off the point. A 3¼-fathom shoal is outside the reef and about 0.8 mile off the point. Vessels in rounding Point Carolus should give it a berth of over 1 mile in order to stay outside the dangers. A small cove, into which a stream empties, is about 1 mile southwestward from the point. Low-water flats fill the cove and extend about 0.2 mile offshore to the point.

Point Gustavus, the eastern entrance point of Glacier Bay, is low and wooded and does not exceed 200 feet in elevation. The beach is of gravel and boulders. It is advisable for all vessels to stay well outside Ancon Rock when rounding Point Gustavus. Old piling of fish traps lies in the area eastward of Point Gustavus. A 5¾-fathom spot is 1 mile northward of the point and the bottom in this locality is broken and uneven.

Ancon Rock, with ½ fathom over it and showing some kelp at slack water, is 0.5 mile southwestward of Point Gustavus. Broken ground, with depths of 3¾ to 5¾ fathoms and a possibility of less, extends 1.2 miles southward of Point Gustavus; it should be avoided by vessels. A rock awash at mean lower low water is about 0.4 mile westward from Point Gustavus.

Bartlett Cove, 4 miles northward of Point Gustavus, formed by the mainland on the southeast and Beardslee Islands on the northwest, is large and affords good anchorage. It is open southwest but the holding ground is good. Occasionally ice gets into the bay and is at times troublesome to vessels at anchor. The best anchorage in the cove is about 0.2 mile off the southeast side in 7 to 10 fathoms, muddy bottom, care being taken not to approach too close to the head of the cove. In southerly weather small boats can anchor close inshore on the southeasterly side of the cove. The small bight back of the wooded island is sometimes used by small boats for anchorage. It can be entered at half tide by small boats drawing 3½ feet. The National Park Service has the entrance channel marked by driven poles which should be kept close on the starboard side when entering. The service has also constructed a shelter cabin on the island and has a small float on the shore of the island inside the bight which has a 50-foot face with 8-foot depths alongside. The bight is good shelter in all weather and has anchoring depths from 3 to 5 fathoms, mud bottom. The water on the northwest side of the cove is deeper; for large vessels anchorage is recommended in the center of the cove in 8 to 16 fathoms. Good water can be obtained at the mouth of the stream, locally called **Alder Creek**, inside the bight.

To anchor in Bartlett Cove, follow the eastern shore of Glacier Bay at a distance of 1 to 1.5 miles for 4 miles from Point Gustavus to the entrance of the cove, course about 020°, and enter in mid-channel. No dangers exist that are not connected with the shore except at the head of the cove and off the east and west entrance points. The reef making off the east entrance point is particularly dangerous and extends offshore for about 350 yards. Foul ground extends for about the same distance off the west point of the entrance and is marked at times by kelp.

Beardslee Islands, low, hilly, and sandy, begin 4 miles above Point Gustavus and extend along the eastern shore to within about 3 miles of Willoughby Island; they should be given a good berth. Their southwest and west sides are quite shelving, and there are detached shoals northward of them a considerable distance, one of which bares several feet. Beyond these islands the eastern side of the bay has shoals and sand dunes formed by the glacial debris from the head of the bay; many of these shoals show only at low water and some of them are never uncovered.

The best entrance to the water areas among the Beardslee Islands is through **Beardslee Entrance.** The shoals at the entrance, although they have comparatively deep water over them, cause numerous swirls and tide rips. Among the islands are a number of anchorages but local knowledge is necessary for their approach.

A large reef is about 0.5 mile northward of the northern side of **Strawberry Island.**

A group of reefs in latitude 58° 36′ N., longitude 135° 59′ W., coarse gravel and scattered boulders, can be considered the northern extremity of the Beardslee Islands. The tidal currents in the passage between **Rush Point** and the Beardslee Islands at times reach an estimated velocity of 5 knots.

Berg Bay is on the southwest side of Glacier Bay, 10 miles above the entrance. Two channels enter Berg Bay. The passage northward of Netland Island is not recommended as rocks constrict the Glacier Bay end and low water the Berg Bay end of the channel. The controlling depth is 5 feet. The main entrance is between **Lars** and **Netland Islands.** A shoal, on which there is a ½-fathom spot, obstructs the channel at the Glacier Bay end. In entering Berg Bay, a vessel should pass midway between the 4-foot spot and the low water line on the north side of the channel, on course 237°. The controlling depth is 22 feet. Care should be taken not to steer south of this course until past the shoal area making out from the southern shore. Do not pass south of the $1^5/_6$-fathom spot. It is advisable to make passage at or near high water. Kelp grows in about 6 fathoms, but the strong currents make the kelp tow under most of the time except during slack water.

A narrow, tortuous, channel leads into the southeastern arm of Berg Bay but its use is not recommended as the bottom is rocky with many boulders. The currents are strong except for a short time immediately preceding and following high water. Below half tide there is a divided gradient between Berg Bay and the water in this arm.

Heavy ice grounds at the entrance to Berg Bay and may at times render it impracticable to enter or leave. With continued easterly winds Berg Bay is filled by the smaller bergs. Ordinarily the bay is comparatively free from ice, and it is considered to be less troublesome to vessels at anchor than in Bartlett Cove.

Approaching from southeastward, the island on the southeast side at the entrance shows detached from the shore and is readily identified.

There is a good anchorage in about 18 fathoms about 1 mile inside the entrance. Small craft can anchor farther inshore for protection from southerly winds. Good anchorage, with protection from northerly winds, can be had in the northerly arm. There is good anchorage for small craft in the westerly arm.

Willoughby Island is a mountain of bare rock, 1,597 feet high and 3.5 miles long. Three small islets lie close to its north end. The small indentation at the northeast extremity of Willoughby Island is partially protected from the ice by the two small islands and affords some protection for small boats in all but southeasterly weather.

Whidbey Passage, a well-defined and deep channel, separates Willoughby Island from the mainland to the westward.

The main channel of Glacier Bay passes about 1 mile eastward of the Willoughby Island shore.

Francis Island is a densely wooded islet, 1.2 miles northwestward of Willoughby Island, with a deep channel between.

Drake Island, similar to Willoughby Island and about 990 feet high, is densely wooded. The shores are rocky and steep, with short stretches of gravel beach.

Marble Islets, high and bare and weathered to a slate color, are 1.2 miles apart; the southern one lies 3 miles northward of Willoughby Island. Just off the south end of South Marble Island are some rocks awash, and relatively shoal water extends in a narrow ridge some 750 yards southeastward. A shoal with a least depth of 1¼ fathoms lies midway between **North** and **South Marble Islands** and makes passage dangerous between them. The shoal is marked by kelp. Shallow water extends northwestward from the north end of North Marble Island. Near the northern extremity of the shoal, 470 yards from the island, is a rock bare 6 feet at mean lower low water.

The two islands lying about 1.5 miles eastward of the Marble Islets are low, thickly wooded, and have an extensive area of shoal water surrounding them and a large reef to the southward. The channel between these islands and the Marble Islets is navigable but great caution is necessary.

Beartrack Cove, which indents the eastern shore of Glacier Bay about 13 miles northward of Point Gustavus, is very deep throughout and the bottom slopes steeply from the shore. A stream of considerable size empties into the upper end of the cove. To anchor in 20 fathoms or less a vessel must lie about 175 yards off the low water line. Strong westerly winds bring swells into the cove. To enter from westward pass 1 mile southward of the two islands eastward of Marble Islets on a course **090°** and continue on this course until the islands are about 1 mile abaft the beam. Then head into the cove. Bears attracted by spawning salmon have worn broad winding trails along the stream banks.

A deep channel passes northward between the islands just previously mentioned and the mainland, and then between North Marble Island and Sturgess Island. It affords good passage from Beartrack Cove to Sandy Cove and Muir Inlet.

Sturgess Islands, bare and higher than the Marble Islets, lie 3 miles northward of North Marble Islet. The largest island has a longitudinal ridge rising to a height of over 200 feet with an even slope to the water's edge. A chain of islets extends southeastward from Sturgess Islands. A 5-fathom shoal is about 0.5 mile southwestward of Sturgess Islands.

The strait between the Sturgess Islands and the large island to the eastward is about 0.6 mile wide. There are shoal areas in the western half but deep water is found if the eastern shore is favored.

Sandy Cove, eastward of Sturgess Islands, affords anchorage in 5 to 10 fathoms, good holding ground and good protection from winds from any quarter. It is rarely that ice drifts into the cove. Two channels lead into North Sandy Cove; the north channel is better as it is wide and deep. The south channel has a controlling depth of 4½ fathoms and is used to some extent by local fishing vessels and seal hunters.

A 10-fathom channel leads into **Spokane Cove.** In entering care must be used to pass southward of the rock off the northern shore and to avoid the boulders which fringe

the shore of the mainland. This cove is used by fishing boats with local knowledge but is open to winds from the northwest. Anchorage can be had in 5 to 8 fathoms, mud and sand botton.

There are two rocks in latitude 58°41′.45 N., longitude 136°00′.1 W. The southern rock bares 12 feet and the northern rock bares 2½ feet at mean lower low water.

Muir Inlet extends northward for a distance of over 7 miles from the northern side of Glacier Bay. At its entrance the shores are steep and timbered but at the upper end of the inlet the shore is an area of terminal moraine with numerous shifting glacial streams. A number of glaciers empty into the inlet.

Muir Glacier, at the head of Muir Inlet, discharges bergs continuously as does Cushing Glacier, and the presence of ice makes navigation precarious. Good depth is found in mid-channel.

Tlingit Point, on the western side of the entrance, is rock outcrop. **Sebree Island,** close to the western shore, is 295 feet high, heavily wooded, and is connected to the mainland at low water by gravel and mud flats. Small vessels can anchor in **Sebree Cove** between Tlingit Point and the southern part of Sebree Island; the holding ground is good. The cove is exposed to southerly winds but ice seldom drifts in.

Caroline Shoal extends about 1.4 miles from the western side of Muir Inlet just above Sebree Island. The end of the shoal is a gravel and sand spit about 400 yards in extent in a southeasterly direction. This part of the shoal is about 150 yards in width and bares 17 feet at mean lower low water. Ice is generally present on Caroline Shoal and in the bight between the shoal and Sebree Island.

Garforth Island is on the east side of Muir Inlet, about 2.8 miles northeastward of Sebree Island. Garforth Island is 85 feet in elevation and densely wooded except at the north end. The channel between the island and the eastern shore of the inlet has a controlling depth of 6 fathoms. There is considerable kelp in the shoal part of the channel.

Adams Inlet, an indentation in the eastern shore of Muir Inlet, is deep at the entrance. It is reported dangerous to enter because of a large submerged rock near the center of its narrowest part. **Adams Glacier,** which was at its head, has completely melted and ice no longer flows out of the inlet.

Hunter Cove on the west side former by the recession of **Plateau Glacier** is a good temporary anchorage. When using this bight care must be taken to avoid two rocks which bare 2 feet at mean lower low water, just eastward of the bold point at the north entrance.

Wachusett Inlet is on the west side of Muir Inlet, about 6 miles northward of Adams Inlet, at the base of **Cushing Glacier.** A shoal with a depth of 3¾ fathoms is near the middle of the entrance; icebergs frequently ground on this shoal. A reef, baring 9 feet, is about in the middle of the inlet and about 500 yards from the southern shore. Vessels should favor the northern shore. Waves and surges, dangerous to small boats close to shore, are set up by the discharges of large masses of ice from Cushing Glacier.

Sealers Island, a small rocky island with steep sides, is close to the eastern shore of Muir Inlet and about 6 miles northward of Adams Inlet. Small fishing vessels can anchor in the small cove eastward of the island. The cove is narrow and shoal but generally free from ice during the summer.

The northwest arm of Glacier Bay has a northwesterly direction, with a width of 2 to 5 miles. **Lone Islet** has a rocky, precipitous shoreline and lies in mid-channel about 3.4 miles northwestward of Drake Island. **Geikie Rock,** elevation 6 feet, is off **Geikie Inlet,** about 1.2 miles eastward of the western point at the entrance and 1.8 miles south-

ward of Lone Islet. A rock bare at lowest tides, is close southeast of it, and the grounded ice in the vicinity indicates a shoal of some extent. A large rock, baring 11 feet at mean lower low water, has been located 900 yards 042° from Geikie Rock.

Reconnaissance soundings have been made in Geikie Inlet and it is recommended that vessels navigating the inlet steer a mid-channel course. **Hugh Miller Inlet** is shoal.

A line of soundings through Glacier Bay, favoring somewhat the north side, gave depths of 80 to 120 fathoms to **Composite Island,** which lies on the north side 13 miles northwestward of Lone Islet. At this point the arm divides into three inlets.

Reid Inlet has a southwesterly direction for 12 miles to **Johns Hopkins Glacier,** at the head of its south arm, and a length of about 19 miles to **Grand Pacific Glacier** at the head of **Tarr Inlet,** its north arm. No sounding has been done. The north side of the inlet is reported to be shoal to **Russell Island,** the large island 5 miles above its entrance.

Rendu Inlet has a north-northwesterly direction for 8 miles, with a width less than 0.8 mile and depths of 75 to 100 fathoms.

Queen Inlet has a northerly direction for about 7 miles, a width of 1.2 miles, and depths of 40 to 75 fathoms. Depths of 15 to 20 fathoms are found eastward of **Triangle Island,** 3.5 miles above Composite Island. There are depths of 35 to 45 fathoms westward of Composite Island; no sounding has been done eastward of the island.

Ice.—Beginning in January Glacier Bay is at times frozen in its upper reaches and in the bays and inlets where much fresh water is discharged. The greatest amount of float ice is found in the spring, and it lessens as the season advances. In June the ice in front of the glaciers, as seen from mountains farther down, appears to be solid at the head of the bay. More ice comes down the bay on the large tides than the small, and winds also exert a marked influence on the ice movements. A southwest wind drives the ice into Bartlett Cove, and a north wind, which blew steadily for a week in September 1907, blocked the channel westward of Drake Island, which to that time had been open all the season.

Usually the great mass of ice from Muir Glacier is congested in Muir Inlet and out into the bay to South Marble Islet, leaving the southwest shore from Willoughby Island to Hugh Miller Inlet comparatively free from ice.

The ice from Lamplugh, Reid, Scidmore, Johns Hopkins, and Grand Pacific Glaciers is usually congested in Reid Inlet, and thence drifts along the south shore to Hugh Miller Inlet. Here it sets across toward the north shore, but is generally so scattered that vessels usually have little trouble in passing through the ice belt to the comparatively free north shore above.

The **tidal currents** from Point Gustavus to Willoughby Island at times attain a velocity of 6 knots or more. Heavy tide rips and swirls occur abreast Beardslee Islands, especially off the channel southeastward of the northwest island of the group. From this channel the ebb current sets across the bay and meeting the direct current coming down on either side of Willoughby Island produces heavy swirls and rips during large tides, especially dangerous when the ice is thick. The ice in the swirls moves in all directions with varying speed, and it is nearly impossible to get through without striking if the ice is thick. The water is shallow enough to ground the largest bergs, forming temporary dangerous obstructions in places. The floating ice rushes past these grounded bergs with great velocity. Above Willoughby Island the currents have little velocity. Predicted times and velocities of the current may be obtained from the *Current Tables, Pacific Coast.*

Chart 8304.—Port Frederick, between Crist Point and Point Sophia, eastward of Point Adolphus, is an inlet 3 miles wide at the entrance, 12 miles long in a southwesterly direction; it then turns westward for about 6.5 miles. Port Frederick has no known dangers other than those charted. It offers several very good anchorages with good holding bottom and shelter. There is a large mooring buoy anchored in the northern arm of Neka Bay in 13 fathoms.

Small craft approaching from westward use Gedney Channel which has been wire dragged. This channel is not recommended for large vessels on account of the unmarked dangers. Large vessels use mid-channel courses between Point Sophia and Inner Point Sophia to eastward, and Pinta Rock and Halibut Rock to westward.

If bound for Hoonah, give Inner Point Sophia and the shore to eastward a berth of 200 yards or more. The approach is clear.

Crist Point, the western point at the entrance, is marked by two islands about 0.6 mile off its north side. **Hoonah Island,** the northwestern and larger one, is 270 feet high and well wooded; a reef with 2 fathoms over it extends about 0.3 mile northward off the northwest end of Hoonah Island. **Scraggy Island,** 40 feet high and sparsely wooded, is about 0.8 mile southeast of Hoonah Island; a rock, bare at half tide, is midway between Hoonah Island and Scraggy Island. **Pinta Rock** is a sunken rock 300 yards in extent, with 2 fathoms over it and marked by kelp for about two-thirds of its length. It is about 0.8 mile southeastward of Scraggy Island and about on the line of the west sides of Scraggy and Hoonah Islands.

Gedney Channel lies to the southwestward of Hoonah and Scraggy Islands. A strip about 0.3 mile wide has been wire-dragged through the channel; the eastern limit approaches to within 0.1 mile of Hoonah Island and 0.1 mile of Scraggy Island. Shoal spots of 1¾ to 4¾ fathoms are found in the channel.

Halibut Island is 0.5 mile from the west side, 1 mile inside the entrance to the port. It is wooded, and foul ground extends 0.3 mile eastward from it. **Halibut Rock,** bare at half tide, is about 0.6 mile southward of Halibut Island. There is kelp for a distance of about 100 yards west and southwest of the rock, but none on its east side. A sunken rock is midway between Halibut Island and the western shore.

Point Sophia shows from eastward a wooded hill 560 feet high, somewhat bluff at the water; southward of the hill is a **V**-shaped saddle, from which it rises to high land. From Point Sophia to Inner Point Sophia the shore is free from dangers.

Inner Point Sophia, on the east side of Port Frederick, 2 miles westward of Point Sophia, is similar in appearance to Point Sophia, but lower, and is marked by Inner Point Sophia Light on a white wooden house, skeleton tower. The light is 29 feet above the water, visible 9 miles, and obscured from 245° to 357°. The water is shoal for a distance of about 100 yards around the point. A cannery and wharf are a short distance inside of Inner Point Sophia. The wharf is reported to have a face 54 feet in length with deep water alongside. A small marine railway is at the cannery. A native village is located on the point.

Hoonah Point, 0.8 mile southward of Inner Point Sophia, is a rocky bluff wooded on top. About 0.8 mile southward of Hoohan Point is **Pitt Island,** the northern one of several islands near the eastern shore. The island is wooded and 125 feet high.

Hoonah Harbor is eastward of Hoonah Point and between Pitt Island and the northern shore. The anchorage is between, or a little inside, the western end of Pitt Island and the western end of the village, in 12 to 14 fathoms, soft bottom. The anchor-

age is not well protected from southwest, but the holding ground is good. Broad gravel beaches extend from the north side of Pitt Island and off the village. A bar, with about 1 fathom over it, connects the east end of Pitt Island with the main shore eastward.

Hoonah is a post office and native village on the northern shore of Hoonah Harbor. There are two general stores where provisions and fishermen's supplies can be obtained. Gasoline and oils can be obtained from two oil companies which have wharves on the water front. The Standard Oil Company wharf, the northern wharf, has a least depth of 18 feet alongside its outer face. A float landing is on each side of the wharf. The Union Oil Company wharf, the southern wharf, has a depth of 18 feet off the northern corner, 14 feet off the center, and 9 feet off the southern corner. A float landing is on each side of the wharf. A small grid is at each of the oil company wharves. A floating cannery is occasionally in operation at Hoonah. A machine shop where minor repairs can be made is here. There is daily air and passenger service with Juneau and radio communication with Alaska Communications System.

To the eastward of Hoonah is a small inlet about 1.5 miles long and 0.5 mile wide, divided by a low wooded point. Mud flats, bare at low water, and marsh grass fill the inlet.

False Point is the low, wooded point southward of Pitt Island. There is a rocky ledge 200 yards westward of the point.

Long Island, 6 miles southwestward of Pitt Island, is about 200 feet high, and wooded. It is connected with the eastern shore of the bay by flats on which there are islets and rocks.

A small wooded island, with a reef extending about 0.2 mile off its western end, is between Pitt Island and Long Island, 0.2 mile northward of the latter. A shoal extends about 0.1 mile off the northern point of the island. Between the islands and the eastern shore of the bay are channels and inlets into the flats with depths of 2 to 12 fathoms.

Game Point, about 3 miles southward of Inner Point Sophia, is low and wooded. A narrow neck of land extends about 0.2 mile in a northeast direction from Game Point, from the end of which flats stretch to Long Island. **Game Creek,** a large-sized salmon creek, empties into the flats. To the southward of Game Point, about 0.8 mile, is a low, wooded islet. Flats extend from Game Point for about 1.2 miles southwestward.

A bight about 1 mile wide and 0.5 mile to the head lies in the western shore southwestward of Game Point. It is filled by flats which extend over 0.1 mile eastward of the line joining the points of the bight. **Humpback Creek** empties into the northern end of the bight.

From Game Point the shore trends in a southwesterly direction for about 2.2 miles to a low wooded point which projects about 0.3 mile in a northerly direction. In the inlet to the eastward of the point are depths of 12 fathoms at the entrance, shoaling to 2 fathoms near the head.

Burnt Point, 3.3 miles southwestward from Game Point, is wooded and rises rapidly to an elevation of 1,175 feet and to higher ground to the southeastward.

Grassy Rock, a small grass-covered rock 20 feet high, is about 0.2 mile off Burnt Point. A reef extends about 100 yards from the rock. In the bight eastward of Grassy Rock are depths of 40 fathoms at the entrance to 13 fathoms near the head. Flats extend off the eastern side of the bight for 350 yards.

Sea Gull Creek, about 1.8 miles southward from Burnt Point, has flats extending offshore 0.5 mile from its mouth.

Chimney Rock, about 0.5 mile off the southern point of the entrance to Neka Bay, is a small wooded islet. A reef extends from the Chichagof Island shore almost to Chimney Rock, leaving a channel about 100 yards wide with depths less than 2 fathoms. There is a small islet on this reef. A reef extends over 0.1 mile northward from Chimney Rock. A 6-fathom spot is 0.8 mile 350° from Chimney Rock. A 5-fathom spot is about 0.9 mile 022° from the same rock.

Midway Island, small and wooded, about 100 feet high, is about 3.3 miles southward of Burnt Point.

Midway Rocks, 0.5 mile westward from Midway Island, are two rocks about 0.1 mile apart, bare at one-quarter tide. A reef extends from the western shore, inside the rocks, for a distance of about 300 yards.

A bight about 0.8 mile wide indents the northern shore about 3 miles westward of **The Narrows.** Flats extend over 0.2 mile off the northern and western shores of the head of the bight. Anchorage may be had in 5 to 17 fathoms.

The head of Port Frederick is divided into two inlets by a low, wooded, peninsula, with rocks awash off its northeast end and extending to **Bell Island,** a low, wooded island. Depths of 26 fathoms are found at the entrance to the northern inlet, shoaling to 11 fathoms near the head. Flats extend 250 yards off the northwestern shore of this inlet.

The southern inlet is long and narrow with several bends and has depths of 6 to 11 fathoms in the widest part, except near the shores. To enter the southern inlet, favor the Bell Island shore to avoid a shoal making off the southern shore eastward of Bell Island. The channel is about 175 yards wide and has depths of 8 fathoms. To the southward of Bell Island the channel narrows to about 70 yards and has 7-fathom depths; a flat extends off the southeastern shore for about 150 yards. The channel then widens to 0.4 mile, forming a basin with depths of 6 to 11 fathoms, mud bottom, with a flat in the western corner with depths of 3½ fathoms. A reef extends about 100 yards from the prominent point on the north shore of the basin; a rock, awash at high water, is 0.2 mile southward from this point. The channel to the two arms at the head of this inlet leads between the point and the rock and has depths of 6 to 8 fathoms. Tide flats fill the northwestern arm, which extends to a canoe portage 70 yards wide to Tenakee Inlet. Depths of ½ fathom are found at its entrance. The southeastern arm has depths of 3 to 5 fathoms, sticky bottom.

Salt Lake Bay has a width of about 0.5 mile at the entrance and extends about 1 mile in a southerly direction, with depths of 47 fathoms at the entrance to 11 fathoms off the flats, which extend about 0.2 mile from the southeast corner. The bay extends to the southwestward through an opening less than 150 yards wide and 0.2 mile long, with depths of 1 fathom to a basin about 0.3 mile wide and 0.8 mile long, with depths of 12 fathoms in the center.

Neka Bay is about 2 miles wide at the entrance and extends in a westerly direction. It is divided into three arms by two low, wooded peninsulas. **Neka Island** is 0.2 mile eastward from the extremity of the northern peninsula. A 3-fathom channel 70 yards wide is between the island and the edge of the shoal 170 yards off the point. From the eastern extermity of Neka Island, about 0.2 mile eastward, is a 3½-fathom spot. A sunken rock with 1 foot over it, not marked by kelp, is in mid-channel southward of Neka Island.

From Neka Island, where the width is almost 1 mile, the north arm follows a west-northwesterly direction for about 1.3 miles, narrowing to 0.3 mile. Depths range from 17 fathoms abeam Neka Island to 6 fathoms at the narrow part. The arm then follows a westerly direction for 1 mile, with depths of 1½ to 2½ fathoms. It continues in the same general direction for about 1.6 miles, terminating in a large basin 2.3 miles long and 0.8 mile wide, which is dry at low water, but the greater part is navigable at high water for craft of 2- or 3-foot draft. On the southern side of the channel, 0.3 mile from the entrance to the narrow part, is a small wooded island with a bight to the southward. Depths of less than 1 fathom were found in the channels leading to the bight with a rock in the western channel.

North Bight, the middle arm, with the entrance to the southward of Neka Island, is about 2.2 miles long in a westerly direction and 0.2 to 0.6 mile wide, with depths of 6 to 12 fathoms, sticky bottom. At the head it narrows to a small, irregularly shaped bight, shoal with the exception of a very narrow channel with depths of 3 to 6 fathoms. A reef extends for about 200 yards in a northwesterly direction from the extremity of the peninsula on the southern side of the arm.

The entrance to **South Bight** is constricted to a width of about 100 yards by a long narrow point which projects from the southern shore. Depths of 2 fathoms were found at the entrance. Depths of 3 fathoms were found in the eastern part of the arm, while depths of 3 to 7 fathoms were obtained at the western end, with shoals extending from the southern shore and the head.

Chart 8302.—The Sisters, lying near the middle of Icy Strait, about 5 miles east-northeastward from Point Sophia, about 1 mile long in a northwesterly direction, consist of two islands connected by a sand beach at low water. The northern island is a little over 0.5 mile long and 0.1 mile wide, about 150 feet high, and heavily wooded. The southern island is about 0.4 mile long and very narrow, with a clump of trees at each end, giving the group the appearance of three islands. A shelving ledge extends 0.2 mile from the north end of the group and a sunken ledge extends 250 yards from the southeast end. There is a 1¼-fathom spot 0.4 mile southeastward from the southeast end of the southern island.

The Sisters Light, shown from a white wooden house on the north end of the northern island, is 25 feet above the water and visible 9 miles; it is obscured from 312° to 081°. The aeronautical radiobeacon at The Sisters may be of some aid to mariners as a radiobeacon. It transmits on 251 kilocycles, 24 groups of SSR (... ... .—.) per minute. Sisters Island Aviation Light is on the south end of the larger of the Sisters Islands. This light is obscured from 162½° to 192½° and at various sectors by small islands from 333° to 030°.

Sisters Reef is 1.1 miles westward of the north end of The Sisters. The reef is bare at low water in two heads and has no kelp. At times the tidal current hsa a velocity of 2 or 3 knots over the reef.

Spasski Island, marked by a light on a white wooden house on its northern side, is 2 miles southward of The Sisters and 1.8 miles from the southern shore of Icy Strait. The light is 30 feet above the water, visible 9 miles, and obscured from 315° to 088°. The island is small and divided at high water; the larger part is 30 feet high and has several trees on it. A reef, showing well in places at low water, extends 0.4 mile southward from it. A detached rock, bare at low water, is about 0.6 mile southeastward of the island.

Shoal spots exist on the following distances and bearings from the north island: 0.7 mile 301°, 5 fathoms; 0.5 mile 277°, 1¾ fathoms; 0.8 mile 134°, 5 fathoms.

Spasski Bay is on the south shore to the southward of Spasski Island. **Neck Point,** the western point at the entrance, is a high, rocky, wooded peninsula, connected with the main shore by a low narrow neck. A 3¼-fathom spot is 0.6 mile eastward from Neck Point. It is reported that the cannery tender *Excursion* struck a sunken rock 2,000 feet northward from Neck Point (P. D. on Chart 8302.) A rock, awash at low water, is 0.2 mile eastward of Neck Point. In the eastern end of the bay are extensive sand flats, and behind the low point is a grassy flat covered at high water. **Pulizzi Island,** a small triangular-shaped, wooded island, with rocks 0.1 mile off the northeast end lies near the eastern end of the bay. The shores of the bight at the western end of the bay are wide sand and gravel beaches, with a flat covered at high water near the eastern point of the bight.

Entering from the eastward, pass 0.2 to 0.3 mile northward of Pulizzi Island and steer westward for the middle of the entrance. The anchorage, exposed to the northeast, is in 9 to 10 fathoms in the middle of the western end of the bay, with Neck Point bearing northeast. From the westward, pass northward of the reef, bare at low water, extending nearly 0.5 mile from the shore, 0.8 mile northwestward of Neck Point, and then round Neck Point at a distance of at least 0.5 mile to clear the rock off Neck Point, previously described.

From 1 to 1.5 miles eastward of Point Sophia, 3½- and 5-fathom spots have been found almost 0.5 mile offshore. In this section the shore should be given a berth of 0.8 mile and also in the vicinity of the reef northwestward of Neck Point.

Chart 8202.—Whitestone Harbor, on the south side of Icy Strait, about 7 miles eastward of Pulizzi Island, is an inlet about 1 mile long in a westerly direction. The shores at the entrance are foul. By favoring the northern shore, a boulder which bares at low water lying to southward of the center of the cove will be avoided. Anchorage for small craft will be found in the northern arm, near its head, in 5 fathoms, sand and gravel bottom, or in the south arm in 3 to 5 fathoms, mud bottom.

Chatham Strait is described in Chapter 11. Lynn Canal is described in Chapter 10.

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CHAPTER 16

Cross Sound to Yakutat Bay
Chart 8402

FROM CAPE SPENCER the coast trends in a general northwesterly direction to Ocean Cape, a distance of about 128 miles. The Fairweather Range lies on the mainland from about 20 miles northwestward of Cape Spencer to Alsek River. These mountains are snow-covered, have elevations from 10,000 to over 15,000 feet, and present a spectacle of great grandeur. From Alsek River to Yakutat Bay the mountains range from 4,000 to nearly 6,000 feet high. There are numerous glaciers with terminal moraines along the coast. The most conspicuous are: La Perouse Glacier, which comes down to the sea a few miles westward of Icy Point, its sea face being partly vertical, and at its highest point 200 or 300 feet high; those westward of Cape Fairweather; Yakutat Glacier, lying 25 miles eastward of Yakutat Bay; and the great ice field of Malaspina Glacier, westward of Yakutat Bay. There are no known outlying dangers along the coast.

Courses and distances from Cape Spencer to Yakutat are given in Chapter 3.

Chart 8410.—Cape Spencer, Cape Spencer Light, Zip Rock, Dicks Arm, and the rocks and reefs in this vicinity are described in Chapter 15.

Graves Rocks are about 5 miles northwestward of Cape Spencer and about 1 mile offshore. The north end of the group is an islet, wooded on top and about 125 feet high. From the islet a series or group of large bare rocks extend southward more than 1 mile. Rocks and kelp patches extend from the group to the mainland eastward and fringe the shore to Cape Spencer.

Polka Rock is a bare rock 20 feet high, 700 yards off **Polka Peninsula,** a bold, rocky point 2.8 miles westward of Cape Spencer Light. This rock marks the outer limit of the foul ground, marked by kelp, which extends about 0.5 mile off the general shoreline in this vicinity. Small craft going to Graves Harbor from southeastward pass between Polka Rock and Graves Rocks.

Libby Island is about 1 mile northward of Graves Rocks and nearly 0.5 mile from shore. It is a good-sized wooded island, 175 feet high, with some bare rocks between it and the point northward and a considerable area of bare rocks on its south side. Other rocks that cover and are usually marked by breakers extend out about 0.3 mile southward of the island.

Horn Mountain, 2,160 feet high, is a sharp, bare peak on the western side of the entrance to Graves Harbor and is a prominent landmark.

Graves Harbor, with entrance between Graves Rocks and Libby Island, extends for 2.5 miles eastward with an average width of 1 mile. There are three coves making off from the main part of the harbor.

Murk Bay, on the western side, with its entrance 1 mile northeastward of Libby Island, is clear but too deep and open for a good anchorage.

Murphy Cove, on the eastern side opposite Murk Bay, is divided into two parts, joined by a channel about 100 yards wide. The inner southeastern part of the cove is shoal, but the outer part affords snug anchorage for small vessels in 10 to 12 fathoms. The entrance to the cove is clear.

The eastern cove of Graves Harbor, extending southward from the head of the harbor, is a good, landlocked anchorage which is easily entered. A fish-buying scow is anchored on the west shore of the southern arm from May 1 to September 15. All fishermen supplies, including groceries. Diesel and fuel oil, and gasoline are obtainable. Fresh water may be obtained at the mooring float for small craft.

A rock awash at half tide, marked by kelp, is 300 yards off the southwestern point of the entrance and is the principal danger to be avoided. Vessels should also avoid the small bight making off to the northward at the extreme head of the bay, as the water shoals very rapidly here. The depths at the anchorage in the eastern cove range from 10 to 12 fathoms with uniform muddy bottom. Small craft can anchor near the head of the cove in 4 to 8 fathoms. Fresh water can be obtained by boats from the small streams that empty here.

Graves Harbor is all clear except for the rocks making off from Graves Rocks and Libby Island, leaving a clear channel 0.8 mile wide between. The average depth is over 70 fathoms until near the head of the harbor. Enter in mid-channel between Graves Rocks and Libby Island and steer **047°**, which leads in mid-channel through the bay. When the small island off the eastern point of Murk Bay is on the port beam, change course to **062°**, heading for the eastern side of the small bight at the head of the bay. When the southern point of the entrance to the eastern cove is abeam, haul around slowly to eastward and then favor the eastern shore southward into the cove, avoiding the rock marked by kelp, off the southwest point. Steer mid-channel, when past this rock, to an anchorage.

Torch Bay, with entrance northwestward of Libby Island, extends for over 3 miles in a northerly direction and varies in width from 1 mile at the entrance to 0.3 mile at the head. Two rocks, bare at three-quarter tide and on which there are always breakers, lie in the middle of the entrance, with deep water close to them on all sides. Vessels can pass on either side of these rocks in entering. Inside the bay the water is clear except for rocks lying close inshore. This bay is deep and has no good anchorage for large vessels. Small vessels can find protected anchorage in the small cove on the eastern side of the bay opposite the branch which extends northwestward.

Shoals with depths of 3 to 5 fathoms extend over 0.5 mile southwestward from **Venisa Point,** the eastern point of the entrance to the bay, and a submerged rock is 0.3 mile southwestward of this point. Two submerged rocks, on which there are usually breakers, lie 1 mile 180° from Sugarloaf Island.

Enter in mid-channel on a **027°** course, passing 350 yards southeastward of the rocks in the entrance. When up to the bend, steer mid-channel courses, which will lead in the best water.

Sugarloaf Island is about 4 miles northwestward of Libby Island and 10 miles from Cape Spencer. It was named from its shape as seen from southward, from which direction it shows as barely detached from the islet-like point to eastward. It is over 700 feet high and well wooded. As seen from westward it has a uniform north slope; its south slope has a step and is separated by a deep V-shaped ravine from its small south end. Some bare rocks and some that cover lie close to the island from south around to west. Submerged rocks and shoals, usually marked by breakers, lie from 1 to 1.2 miles south of Sugarloaf Island. Sugarloaf Island Shoal bell buoy is on the south edge of the shoal in 66 feet of water. It is maintained on station from May 20 to September 30 each year. With moderate easterly gales temporary anchorage can be made in the middle of the rocky cove northeastward of the island in 10 to 18 fathoms, rocky bottom. The cove is 0.3 mile wide and open northwestward.

Astrolabe Point is 1.8 miles northwestward of Sugarloaf Island. It is rugged and its western face is bare cliffs to the top of the mountain. Its south face is moderately wooded halfway up. **Astrolabe Rocks,** off the south face of the point, are a large number of bare rocks and some that cover, extending out 0.5 mile.

Dixon Harbor has its entrance between Sugarloaf Island and Astrolabe Point. Inside Astrolabe Point the harbor is 2 miles long in a general northerly direction, with a width of 0.8 mile, and above its head is a glacier visible from the entrance. At its head is an extensive flat 0.2 to 0.3 mile wide, which extends westward to the entrance of the northwest arm. **Thistle Cove,** the northwest arm, is 1.2 miles long in a northerly direction and 0.2 to 0.3 mile wide. The north point at its entrance is a grass-covered rock about 20 feet high, from which a shoal extends southward across the cove, leaving a channel close to the southwest shore 200 yards wide, with depths of 2¼ fathoms. The channel is reported as shoaling. The sea and swell from outside are well broken before reaching the entrance to this cove, and vessels have no difficulty in entering. The head of the cove is clear, with a depth of 7 fathoms, muddy bottom, and is a secure anchorage. On its western shore about 0.8 mile from the head a fish-buying scow anchors each year from May 1 to September 15. All supplies for fishermen, including food, Diesel oil, and gasoline are for sale at the scow. There is a mooring float for small craft at which fresh water is obtainable. Small vessels find secure anchorage in the head of the cove. Temporary anchorage can be made 300 to 400 yards eastward of the south point at the entrance to the cove in 5 to 7 fathoms, soft bottom.

To enter Dixon Harbor, pass about 0.5 mile westward of Sugarloaf Island on a **031°** course, and when inside the entrance, follow the west shore at a distance of about 0.2 mile to the entrance of Thistle Cove. Pass 150 to 200 yards northward of the south point of the cove on a **323°** course and then follow the west shore at a distance of 150 yards on an **008°** course until 0.4 mile above the grass-covered rock off the north point at the entrance. Continue the course until in mid-channel, which is then clear to the head.

Palma Bay, sometimes called **Icy Bay,** is a large open body of water lying between Astrolabe Point and Icy Point. The water in the bay is uniformly deep and clear, anchorage for large vessels being found close inshore in 15 to 20 fathoms. On the eastern side of the bay is **Boussole Head,** a prominent, wooded point 650 feet high, which extends for nearly 1 mile into the bay in a southwesterly direction. The end of this point terminates in a natural arch which rises about 60 feet above the water line and is quite prominent to the southward.

Astrolabe Bay is on the southeastern side of Boussole Head, and **Boussole Bay** on the northwestern side. These bays are open to southward but afford protection for small vessels in northerly or easterly weather.

Anchorage can be found near the head of each bay in 6 to 8 fathoms, sand bottom, the best anchorage being in Boussole Bay, close to the base of the point. Another anchorage, which affords some protection for small craft in westerly weather, lies off the mouth of a large stream **Kaknau Creek,** which empties into the bight on the northeastern side of Icy Point. Many rocks lie close off the western shore of this bight, but all dangers are visible at low tide. Anchorage is close inshore in 6 to 10 fathoms, sand bottom.

The only danger in Palma Bay is **Alder Rock,** bare 4 feet at mean low water, which lies about 0.4 mile southward from the end of Boussole Head.

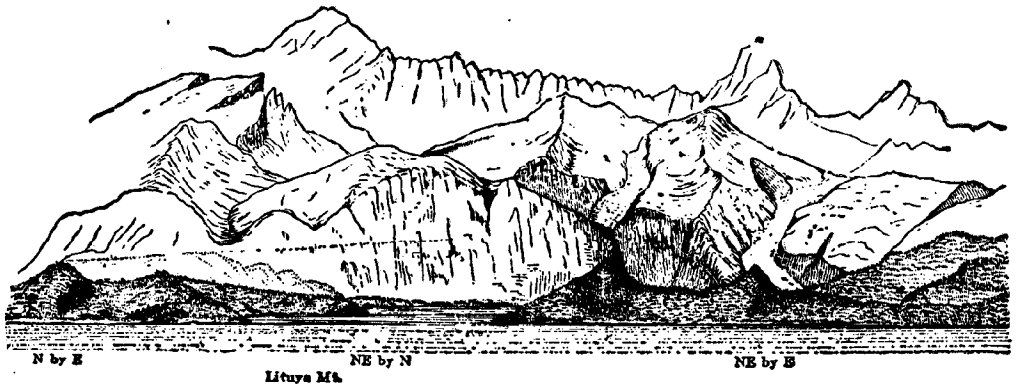
Icy Point, about 18 miles 308° from Cape Spencer, is low and wooded, and from southward La Perouse Glacier can be seen over it. There are many rocks inshore off the point, but deep water is close outside. There is a hot spring at a small shack on the tree line on the southeastern side of the point.

Chart 8402.—The shoreline is very rocky for 3 miles northwestward of Icy Point' beyond which is a smooth sand beach extending to La Perouse Glacier. The coast is low and wooded, with rolling hills, gradually increasing in height back toward the bare mountain peaks. **La Perouse Glacier** is the most prominent landmark along the coast, for the mountain peaks are often covered by clouds. The face of the glacier is nearly perpendicular, 200 to 300 feet high. A narrow strip of sand beach, strewn with boulders, extends along the face of the glacier.

From La Perouse Glacier to Lituya Bay, a distance of 14 miles, the coast is low and densely wooded, with hills lying about 2 miles back from the shoreline and rising in a succession of terraces to the snow-capped peaks of the **Fairweather Range.** The shoreline is generally sandy, with occasional boulders, to within 1.5 miles of Lituya Bay, the shore being covered the remainder of the distance with huge boulders. From Icy Point to Harbor Point the 20-fathom curve lies from 0.5 to 1.2 miles offshore, and there are no dangers except rocks close inshore. The bottom is uniformly sandy except for a few rocky spots close inshore.

Chart 8505.—**Lituya Bay** affords protected anchorage in all weather when once inside, but the entrance is dangerous, and on account of strong currents should never be attempted except at slack water. The bay extends for 6.5 miles in a northeasterly direction with a width of 1 to 2 miles. At the head of the bay are two arms with large glaciers at the head of each. **Gilbert Inlet** extends northwestward with Lituya Glacier at its head. **Crillon Inlet** extends southeastward and has **North Crillon Glacier** at its head. **Cascade Glacier** empties directly into the head of the bay, falling down to a steep mountain slope. Cascade Glacier shows far out to sea and forms a prominent landmark for the bay. The depths in the bay are generally deep, being over 100 fathoms in places. There is no fresh water near the mouth of the bay, but vessels can obtain fresh water from streams near the head of the bay.

Harbor Point, the eastern point of the entrance to Lituya Bay, is about 40 miles 308° from Cape Spencer and 88 miles 130° from Ocean Cape. This point and La Chaussee Spit extend about 1 mile out from the general trend of the shoreline, and can easily be identified by vessels along the coast close inshore. From offshore the point can be identi-



Entrance to Lituya Bay
(Telescopic view)

fied by two conical, wooded hills which lie behind it northeastward, called **The Paps,** the western one being the higher. These two rounded hills form excellent landmarks for the entrance to Lituya Bay. Large boulders, which are 20 to 35 feet high, are strewn along the beach. **Cormorant Rock,** 16 feet high, is the largest of three bare rocks lying off the southern extremity of Harbor Point.

La Chaussee Spit, which forms the western point of the entrance to Lituya Bay and the southwestern side of Anchorage Cove, is about 0.8 mile long and from 200 to 300 yards wide. The spit is low, from 2 to 12 feet high, and the point and outer coast are covered with large boulders. The spit is bare except for a few scattered scrubby trees near the point and for two clumps of trees near its base.

The entrance, between Harbor Point and La Chaussee Spit, is about 350 yards wide, but most of this is foul. In the channel there is a width of about 80 yards between 3-fathom curves, the average depth being 5 to 7 fathoms; inside the 3-fathom curve the water shoals abruptly and there are many rocks.

Passage Rock marks the end of a rocky ledge making off westward from Harbor Point. This rock has several feet of water over it at low water. The axis of the entrance channel passes about 75 yards westward of this rock. Rocks, which bare at various stages of the tide, extend for nearly 200 yards southeastward from the end of La Chaussee Spit.

Anchorage Cove affords a convenient and protected anchorage. The depths vary from 4 to 7 fathoms, hard, sandy bottom. On a flood tide with southerly weather this anchorage has considerable swell, and small vessels usually seek an anchorage farther up the bay. Two abandoned shacks are on the northwest shore of Anchorage Cove. Opposite Anchorage Cove, and just northeastward from Harbor Point, is a very shoal bight which should be avoided by all craft. Vessels should give the rocky point 0.4 mile northeastward of Harbor Point a berth of over 400 yards.

Cenotaph Island, lying nearly in the center of the bay, is densely wooded and has several hills, the highest being 320 feet high. The northern and western sides of the island are gently sloping, but the southern side terminates with an abrupt, high cliff, and there is a depth of 100 fathoms of water 100 yards off this cliff. A shoal makes off from the point from the northeastern side of the island, depths of 3 fathoms being found nearly 300 yards offshore. A large rock, bare at low water, is 225 yards off the narrow point on the western side of the island. Elsewhere deep water extends close to the island. The island

takes its name from a wooden monument or cenotaph which was erected on the island by La Perouse in 1786 in memory of officers and men who were lost in the entrance to the bay. No trace of this monument or its site was found in 1874.

The only danger in the bay not already mentioned is the large, bare spot lying 200 yards off the western shore, about 0.8 mile westward of Cenotaph Island. This spot is covered only by the highest tides, but shoal water extends for 200 yards farther offshore. Between this bare spot and the shore are numerous rocks covered at high tide.

Ice.—The bay has never been known to freeze over, but icebergs are always to be found in the upper end of the bay. With northeasterly breezes these icebergs often reach the entrance of the bay before melting. Ice is usually heaviest during the month of October. The many streams flowing from the glaciers at the head of the bay give the water a murky, discolored appearance.

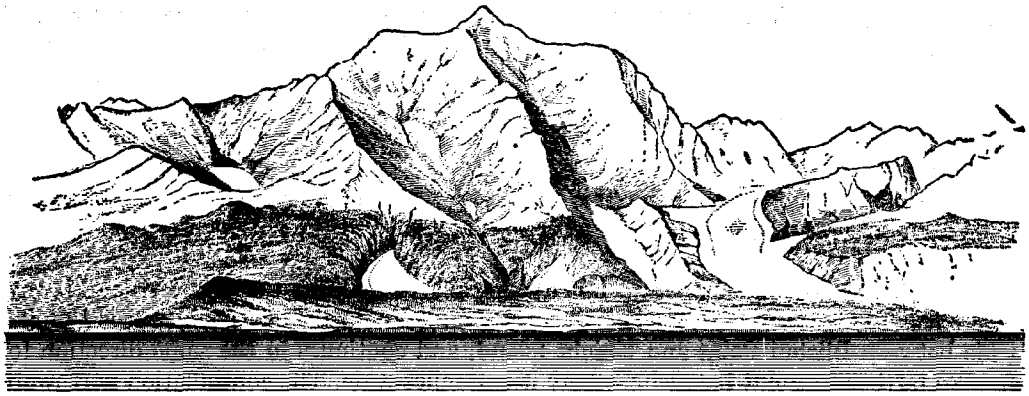
Tidal currents.—At the entrance the tidal currents have an estimated velocity of about 8 to 12 knots on spring tides. The ebb currents, running out against a southwest swell, cause bad topping seas or combers across the entire entrance, through which no small boat could live. Small-powered vessels inside the bay should keep away from the entrance on the ebb to avoid being swept through. The ebb current flows in a narrow stream for several miles out to sea, and can be seen at a distance of several miles, forming a prominent mark for the entrance. On the flood the entrance is smooth, and with a calm sea local fishing boats often enter, being quickly swept through the center of the channel by the powerful current. However, no stranger should attempt to enter except at slack water. Slack water lasts from 10 to 20 minutes. The high-water slack occurs about 45 minutes after high water at Sitka and the low-water slack about 1½ hours after low water at Sitka.

Directions.—Enter only at slack water after a careful inspection of the entrance. High-water slack is the best. The channel through the entrance is straight but only about 80 yards wide and favors the eastern side of the entrance. Steer **012°**, passing 150 yards westward of the smallest of three bare rocks on the eastern side of the entrance, of which Cormorant Rock is the largest. This course leads through the axis of the channel to deep water in the bay, but care should be taken that tide rips do not set the vessel out of the channel. If going to the head of the bay, deeper water will be found in the channel eastward of Cenotaph Island.

Chart 8402.—From Lituya Bay the coast trends in a general northwesterly direction to Ocean Cape, a distance of about 88 miles. The water areas off this coast have not been thoroughly surveyed, but there are no known dangers. High mountains with numerous glaciers extend along the coast. **Mount Fairweather,** 15,200 feet high, lies northward from Lituya Bay. Mount St. Elias, 18,008 feet high, lies behind **Malaspina Glacier,** westward of Yakutat Bay. During clear weather these mountains show prominently from all points off the coast.

The shore northward to Dry Bay is composed for the most part of gently curving sand beaches although boulder-strewn shore occurs in the vicinity of Cape Fairweather and at other places. The prevailing currents set to the northward, about parallel to the shore. However, it has been observed that winds have a great influence on both the direction and strength of the current.

Cape Fairweather, about 16 miles northwestward of Harbor Point, is an evenly rounded point, with an elevation behind it, sloping gently to the sea and abruptly to the



Mt. Fairweather bearing ENE, distant 24 miles

mountains. The summit of the cape is bare of vegetation and is covered with large heaps of glacial drift piled irregularly, some of it of a bright iron-rust red color. Considerable protection from southeasterly weather may be had northward of Cape Fairweather where anchorage can be selected in suitable depth. Both the wind and swell are appreciably broken by the cape. Inshore is a sand beach where landings can be made in a small boat in moderate southeasterly or southwesterly weather. Just northward is a high rocky slide, with a cataract several hundred feet high, which is prominent from offshore.

NW by N

Cape Fairweather from Lituya Heads

(From a Sketch by W. H. Dall, Asst., U.S.C.&G.S., 1874)

Dry Bay, the delta of **Alsek River,** is 12 miles long fronting the ocean, and extends back about 7 miles. It is mostly covered at high tide, but at low tide is filled with bars and small islands between which are ramifying channels all constantly changing. The only permanent feature in the delta appears to be a wooded island about 200 feet high near the middle of the bay, which in line with **Alsek Glacier** bearing about east, leads close to the western entrance. There are three entrances from sea, but neither the depth nor position can be depended on, and inside each is a lagoon several miles in extent.

In recent years the western entrance, lying 45 miles eastward of Ocean Cape, has been used to some extent by small craft, it having a width of about 400 yards and a depth of about 6 feet at low water. The natives state that the current usually sets out and that an anchorage may be made by small craft in from 8 to 9 feet inside the bar at the western entrance. The current has a velocity of about 2½ knots on the falling tide. No directions can be given. The best time to enter is on a rising tide near high water, and a smooth sea is essential. During heavy weather the sea breaks fully 2 miles offshore.

From Dry Bay to Yakutat Bay the mountains lie from 5 to 14 miles from the coast, and between is a low wooded plain, traversed by numerous streams, many of which are connected. At high water, by making long detours, a canoe can be taken through between Dry Bay and Yakutat, but there are several portages and the route is impracticable for

a boat of any size. The principal rivers, with their approximate distances, eastward of Ocean Cape, are: **Ustay,** 32.5; **Italio,** 23.5; **Dangerous,** 21; **Ahrnklin,** 15; and **Situk,** 12 miles. All of them have shifting bars at their entrances and a lagoon or tidal basin inside, and are suitable only for boats or launches at high water with a smooth sea and local knowledge. The fishing station on the Situk River has rail connection with the cannery at Yakutat.

The mountains which bound this plain carry numerous glaciers. **Yakutat Glacier,** lying 28 miles eastward of Ocean Cape, is 3 miles wide and the most noticeable.

Chart 8455.—Yakutat Bay has its entrance between Ocean Cape and Point Manby, where it is 16 miles wide. It has a northeasterly direction for 15 miles, where it is 10 miles wide between **Blizhni Point** and **Knight Island,** and continues in the same direction for 8 miles farther to **Point Latouche,** where it is 3 miles wide. The continuation northward is known as Disenchantment Bay. Yakutat Bay is important as affording the best anchorage between Cape Spencer and Prince William Sound. The bay is clear of islands and dangerous shoals, except along its eastern shore from Ocean Cape to Knight Island. The east shore, from the north end of Khantaak Island nearly to Point Latouche, should be approached with caution.

Caution.—During very heavy weather it has been observed that breakers or pronounced increase in the height of the swell occur across the entire entrance of Yakutat Bay from Point Manby to Ocean Cape. In such cases the entrance is considered dangerous.

The depths in the bay are irregular, ranging from 7 fathoms 2 miles westward of Khantaak Island to 167 fathoms near Point Latouche. Outside of a line between Ocean Cape and Point Manby, at a distance of 2 to 3 miles, is a submarine ridge with depths of 8½ to 16 fathoms. This ridge is very narrow on top, and the water deepens rapidly to over 30 fathoms on either side except near Point Manby. Near Ocean Cape the ridge curves northeastward and joins the shoaler water extending from the cape.

Ocean Cape, the eastern point at the entrance to Yakutat Bay, is low, well wooded, and marked by a light which is shown from a white wooden house on a skeleton structure. The light is 131 feet above the water, visible 11 miles, and obscured from 151° to 309°. Three bare, light-colored bluffs from 50 to 70 feet high, the western one forming the point of the cape, are an unmistakable landmark for it.

The 3-fathom curve is about 0.2 mile offshore southward of the cape, increasing to 0.5 mile on its west side. From Ocean Cape the shore trends northward for about 1.2 miles to Point Carrew, where it bends sharply eastward into Monti Bay. The formation of the bottom off this point causes the line of breakers to appear well offshore even in fair weather. The 1-fathom curve is about 300 yards offshore.

On the south side of Ocean Cape the 10-fathom curve is about 0.8 mile offshore, and from the soundings taken the water shoals regularly to the beach, where at low water a few rocks uncover about 250 yards from the beach. On the west side of Ocean Cape and **Point Carrew** the 10-fathom curve is nearly 1.5 miles offshore. Soundings of 6¼ fathoms surrounded by deeper water are noted near the 10-fathom curve nearly 2 miles westward of Ocean Cape. The northern extension of this shoal has depths of 6¼ fathoms, and its outer end is 2 miles north-northwestward of Point Carrew. The long and usually heavy ocean swell causes this shoal to be covered with a heavy swell and surf rollers, and makes the breakers appear to extend well offshore even in fair weather. The 3-fathom curve is found about 0.5 mile offshore westward of Ocean Cape and Point

Carrew. A lighted whistle buoy, moored in 25 fathoms, is about 3 miles westward of Ocean Cape Light.

Monti Bay has its entrance on the east side of Yakutat Bay, between Point Carrew and Khantaak Island, and 2 miles northward of Ocean Cape. The bay is 1.5 miles wide at its entrance, and extends about 2 miles southeastward and 1.5 miles eastward to Yakutat, where the bay turns northward and is called Yakutat Roads, which is the anchorage used by vessels. The depths in Monti Bay are 21 to 40 fathoms, and the south side from Point Carrew to the head of the bay is clear, but the Khantaak Island side is foul.

A group of lighted buoys, each showing a fixed white light, 12 feet above water, have been established 0.7 mile 280° from the western end of the Government wharf.

Ankau Creek has its entrance on the south side of Monti Bay, 1.2 miles eastward of Point Carrew. It is the outlet of an intricate system of shallow lagoons within the peninsula between Monti Bay and the ocean. A depth of 9 feet can be carried through the entrance near the east side. The currents are strong during changes of tide and no attempt to enter should be made except at or near slack water. The narrow channels and small bays inside are unsurveyed.

Khantaak Island, northward of Point Carrew, is about 5 miles long; at its south end it is about 1.8 miles wide from **Point Munoz** to Point Turner. The southwest end of the island is marked by a light shown from a white wooden house on a skeleton structure. The light is 40 feet above the water, visible 9 miles, and obscured from 154° to 309°. The island is low and wooded, except **Point Turner,** which is a tongue of sand covered with grass and bushes and is a good mark. Off the northern end of the island a ledge extends 1.5 miles in a northerly direction.

A boulder ledge extends nearly 0.5 mile off Point Munoz, with a depth of 4½ fathoms near its end; the 3-fathom curve is about 0.3 mile from shore. A reef extends nearly 0.3 mile off the southwest side of the spit ending in Point Turner, and drops off quickly from the 3-fathom curve into 30 fathoms; it is marked by a lighted buoy off its south side. In ordinary weather the breakers along this shore are a sufficient guide.

Southeast Shoal is about midway between Point Turner and the south end of Yakutat village and is marked by a buoy off its southeasterly side. It uncovers about 2 hours after high water, and except at highest tides a few of the larger rocks at the southwest portion show above water. At low water the bare shoal is about 200 yards in extent. At a distance of about 0.2 mile northward of the center of the shoal are two rocks awash at lowest tides; there are 2 to 3 fathoms between the shoal and rocks.

Yakutat, at the eastern end of Monti Bay, is a native village with a population of about 250 during the summer and about 200 during the winter. It has a small hospital, supervised by a registered nurse, a Government school, post office, and two general stores. There is no regular steamer service, stops being made only when the movement of freight demands. A United States Commissioner is stationed here.

There are two wharves. The cannery wharf is at the northeast extremity of Monti Bay and the Government wharf nearly opposite on the southern side of the bay about 300 yards distant. In 1951 the cannery wharf had a face of 226 feet with a controlling depth of 18 feet alongside. A float for small craft is on its inner face. The cannery was reactivated in 1951 after being idle for several years. Fresh water is available at the cannery wharves only during canning season. The cannery store is operated the year around. There is a local radio station, call letters KWJ56, Yakutat.

In 1951 the Government wharf had a face of 263 feet and a controlling depth of 35 feet. Diesel oil, gasoline, and other petroleum products may be obtained from stock carried at the air field and delivered to the wharf by truck. Arrangement for this service may be made by phone through the cannery storekeeper. Water is not available at this wharf.

The air field is about 4 miles south of the village. Service to Anchorage, Cordova, and Juneau is three times weekly with stops being made on the other days of the week for two or more passengers or in emergencies. There is no regular transportation between the village and the air field.

The shore at the mission and village should not be approached closer than 100 yards. The cove northward of the village is nearly all bare at low water. The 10-fathom curve is about 140 yards from the 3-fathom curve in the entrance of the cove.

Yakutat Roads is between Yakutat and the shoals extending from the southeast end of Khantaak Island. It has a clear width of 0.4 mile, a length of nearly 1 mile, depths of 5 to 25 fathoms, muddy bottom, and anchorage can be made in almost any part of it. The best anchorage for large vessels is in 22 to 23 fathoms with the point at the north end of the village bearing 141°, distant 700 yards, and Point Turner 250°. Smaller vessels can anchor closer in off the middle of the shoal cove northward of the village in as little as 10 fathoms, but care must be taken not to anchor in less depth. Anchorage may also be made at the head of Monti Bay below the cannery in 20 to 25 fathoms, muddy bottom.

Yakutat Roads at its north end connects through **Johnstone Passage** with a number of bays and arms which separate the numerous islands and rocks eastward of Khantaak Island. The channels are not navigable at low water except for small craft, though the inclosed bodies of water have depths from 20 to over 100 fathoms.

Port Mulgrave is suitable only for small craft with local knowledge. It is 0.8 mile long and 200 yards wide, and its north side is formed by Village and Middle Shoals. Its entrance is close to the north side of Point Turner, between it and Middle Shoal, and is 60 feet wide and 16 feet deep. **Middle Shoal** shows at one-quarter ebb; parts of **Village Shoal** show at high water.

Rurik Harbor is a narrow shallow indentation in Khantaak Island northward of Village Shoal with depths of 9 to 15 fathoms in its entrance. Small vessels can anchor here, but should not go above the south point at the entrance. Its entrance is from Yakutat Roads northward of Southeast Shoal. **Prince Shoal,** partly bare at low water, extends 0.4 mile southeastward from the north point at the entrance.

Point Manby, the western point at the entrance to Yakutat Bay, is low and wooded. There is usually a heavy surf on the beach, rendering it dangerous for boats to land. The great Malaspina Glacier descends to within about 4 miles of Point Manby.

Just northward of Point Latouche, temporary anchorage in 20 fathoms is reported about 400 yards off the sand beach. Heavy ice will probably be troublesome at times.

Haenke Island is about 4.5 miles northward of Point Latouche; an anchorage in 6 fathoms is reported inside of it.

Northward of Haenke Island there are reported to be a number of reefs, some of which show at some stage of the tide; the exact positions of the reefs are not known, but their approximate positions are indicated on Chart 8455. It is very probable that there are other reefs in this vicinity which are not even indicated on the chart.

Osier Island is close to the turning point from Disenchantment Bay into Russell Fiord. The water is shoal inside it and a rock awash at high water is about 100 yards off its northwest end.

Disenchantment Bay, from Point Latouche, continues northward for about 10 miles to Hubbard Glacier.

Chart 8402.—Russell Fiord is an arm extending 28 miles southeastward from the head of Disenchantment Bay. **Nunatak Fiord** extends 7 miles eastward from Russell Fiord at 10 miles above Disenchantment Bay. The shores of these arms are surveyed, but no sounding has been done. From Point Latouche to Nunatak Fiord there is much ice. The only known dangers are on the east side between Haenke and Osier Islands.

Ice.—The ice in Yakutat Bay comes from **Turner** and **Hubbard Glaciers** at the head of Disenchantment Bay and from **Nunatak Glacier** at the head of Nunatak Fiord. It is usually quite thick from Point Latouche to Nunatak Fiord, while at times it is scarce. Ordinarily it banks on the western shore of the bay as far south as Blizhni Point. Occasional pieces find their way as far south as Ocean Cape and Point Manby, and scattering pieces are usually found in the body of the bay.

Directions, Yakutat Bay.—In approaching Yakutat Bay, mountains with numerous glaciers first appear in clear weather, and the low, wooded land near the coast will be made when within 10 to 12 miles of Ocean Cape. When approaching the entrance it is advisable to make Ocean Cape and use it as the landmark for entering the bay; it is marked by a light. In approaching Ocean Cape in thick weather the lead should be used until the cape is made, and the water should not be shoaled to less than about 35 fathoms, which depth is found about 2 miles offshore at the cape. A bar about 0.5 mile wide extends in a general east and west direction across the entrance to Yakutat Bay. The soundings on this bar show general depths of 8½ to 16 fathoms, deepening quickly to 30 fathoms on its north and south sides except on the Point Manby side of the bay, and it can be readily located by the use of the lead.

From Yakutat Bay Entrance lighted whistle buoy, steer **040°** for 4.8 miles to Yakutat Bay lighted whistle buoy 4, then change course to **141°**, heading for the survey tower and clearing on the hillside on the south side of Monti Bay. This latter course clears the 10-fathom curve at the end of the shoal extending 2 miles northwestward of Point Carrew by a distance of about 300 yards, and the 10-fathom curve 0.8 mile westward of Point Munoz by a distance of about 250 yards.

When the lighted buoy off Point Turner is abeam, distant about 450 yards, change course to **105°**, heading for the twin elevated tanks in Yakutat, and then proceed to the wharves or anchorage as desired.

For courses approaching and entering Yakutat Bay, see Chapter 3.

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Appendix

COAST and GEODETIC SURVEY.—COAST PILOTS.—Atlantic Coast, Section A, St. Croix River to Cape Cod, 1950.
Atlantic Coast, Section B, Cape Cod to Sandy Hook, 1950.
Atlantic Coast, Section C, Sandy Hook to Cape Henry, 1947.
Atlantic Coast, Section D, Cape Henry to Key West, 1948.
Gulf Coast, Key West to Rio Grande, 1949.
West Indies, Puerto Rico and Virgin Islands, 1949.
Pacific Coast, California, Oregon, and Washington, 1951.
Southeast Alaska, Dixon Entrance to Yakutat Bay, 1952.
Alaska, Part II, Yakutat Bay to Arctic Ocean, 1947.
Hawaiian Islands, 1950.
Distances between United States Ports, 1938.

DISTRICT OFFICES.—Northeastern District: Tenth Floor, Customhouse, Boston 9, Mass.
Eastern District: 602 Federal Office Bldg., 90 Church St., New York 7, N. Y.
Southeastern District: 418 U. S. Post Office Bldg., Norfolk 10, Va.
Southern District: 314 Customhouse, 423 Canal St., New Orleans 16, La.
Caribbean District: Post Office Box 3067, Santurce, San Juan, Puerto Rico.
Southwestern District: 1434 U. S. Post Office and Courthouse, Los Angeles 12, Calif.
Western District: 114 Customhouse, San Francisco 26, Calif.
Midwestern District: 502 Panama Bldg., 534 Southwest Third Ave., Portland 4, Oreg.
Northwestern District: 705 Federal Office Bldg., Seattle 4, Wash.
Pacific District: 244 Federal Office Bldg., Honolulu, T. H.

CHART AGENCIES.—Agents marked with an (*) asterisk also handle certain United States Hydrographic Office publications.

Agents marked with a (†) dagger also handle United States Coast Guard publications.

Anchorage: Thomas B. Bourne Associates of Alaska, Inc., P. O. Box 1295.
Cordova: Cordova Drug Co.
Craig: J. L. Lucier.
Hoonah: P. S. Ganty Co.
Juneau: The Hayes Shop. The Northern Commercial Co.

Ketchikan: *†Ryus Drug Co. *†Ketchikan Instrument Co., 706 Water St.
Kodiak: Donnelly and Acheson.
Pelican: Pelican Cold Storage Co.
Petersburg: The Trading Union, Inc.
Seldovia: H. S. Young Mercantile Co.
Seward: J. Vic Brown and Sons, Alaska Shop.
Sitka: †Sitka Arts and Crafts.
Tenakee Springs: Snyder Mercantile Co.
Valdez: Valdez Drug Co., Inc.
Wrangell: Campbell Brothers.

Monthly Mean Surface Water Temperatures

Place	Years of record	Jan. °F.	Feb. °F.	Mar. °F.	Apr. °F.	May °F.	June °F.	July °F.	Aug. °F.	Sept. °F.	Oct. °F.	Nov. °F.	Dec. °F.	Mean °F.
Ketchikan	30	41.2	40.9	41.7	43.7	48.4	54.5	56.9	57.3	53.8	48.9	44.8	42.2	47.9
Sitka	10	40.0	39.8	40.1	42.4	48.1	52.2	56.0	57.0	53.7	48.8	44.4	41.9	47.0
Juneau	14	36.5	35.7	37.3	40.3	46.1	51.0	51.8	51.4	48.7	44.0	40.0	37.3	43.3
Haines	2	33.4	30.4	37.2	39.8	47.8	54.6	55.0	54.8	51.0	44.2	38.1	35.2	43.5
Skagway	6	36.8	35.9	36.4	38.2	45.4	50.7	51.6	50.3	47.8	43.6	39.9	37.8	42.9
Yakutat	11	39.9	39.0	39.6	42.1	46.8	51.8	55.4	55.7	52.5	48.3	44.3	40.9	46.4

For temperature data in greater detail, see U. S. Coast and Geodetic Survey publication, *Surface Water Temperatures, Pacific Ocean.*

Monthly Mean Sea Water Densities

Reduced to 15° C. (59° F.)

Place	Years of record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
Ketchikan	30	1.0208	1.0215	1.0217	1.0216	1.0206	1.0192	1.0187	1.0186	1.0189	1.0186	1.0184	1.0197	1.0199
Sitka	10	1.0221	1.0230	1.0223	1.0220	1.0194	1.0181	1.0178	1.0185	1.0182	1.0199	1.0208	1.0215	1.0203
Juneau	14	1.0207	1.0217	1.0216	1.0201	1.0141	1.0105	1.0093	1.0100	1.0109	1.0136	1.0174	1.0204	1.0159
Haines	2	1.0231	1.0228	1.0232	1.0224	1.0199	1.0133	1.0064	1.0053	1.0073	1.0175	1.0208	1.0222	1.0170
Skagway	6	1.0232	1.0237	1.0232	1.0231	1.0155	1.0058	1.0033	1.0029	1.0070	1.0151	1.0207	1.0223	1.0155
Yakutat	11	1.0222	1.0225	1.0222	1.0220	1.0208	1.0194	1.0176	1.0175	1.0188	1.0205	1.0218	1.0223	1.0206

For density data in greater detail, see U. S. Coast and Geodetic Survey publication, *Density of Sea Water, Pacific Ocean.*

Distance Table

Distances are Given in Nautical Miles

From	Ketchikan 55°20'.5 N., 131°38'.7 W.	Hyder 56°54'.2 N., 130°00'.6 W.	Cape Chacon 54°40'.6 N., 131°39'.7 W.	Metlakahtla 55°07'.8 N., 131°34'.2 W.	Craig 55°28'.7 N., 133°09'.2 W.	Cape Decision 55°50'.4 N., 134°08'.1 W.	Port Alexander 56°14'.8 N., 134°38'.8 W.	Wrangell 56°28'.2 N., 132°23'.2 W.	Petersburg 56°48'.8 N., 132°57'.7 W.	Juneau 58°17'.0 N., 134°24'.7 W.	Haines 59°13'.8 N., 135°26'.1 W.	Skagway 59°26'.8 N., 135°19'.3 W.	Gustavus 58°23'.3 N., 135°43'.6 W.	Pelican 57°57'.6 N., 136°13'.8 W.	Sitka 57°03'.1 N., 135°20'.5 W.	Cape Spencer 58°10'.0 N., 136°38'.3 W.	Yakutat 59°32'.9 N., 139°43'.9 W.	Cape Hinchinbrook 60°13'.3 N., 146°40'.9 W.	Cordova 60°33'.4 N., 145°45'.3 W.	Valdez 61°06'.7 N., 146°16'.3 W.	Whittier 60°46'.8 N., 148°39'.6 W.	Latouche 60°03'.3 N., 147°54'.1 W.	Seward 60°06'.0 N., 149°26'.3 W.	Seldovia 59°29'.5 N., 151°43'.0 W.	Anchorage 61°14'.2 N., 149°53'.3 W.	Unimak Pass 54°20'.5 N., 164°44'.5 W.	Seattle 47°36'.2 N., 122°20'.3 W.	Swiftsure Bank Lightship 48°31'.4 N., 125°06'.6 W.	Columbia River Lightship 46°11'.1 N., 124°11'.7 W.	San Francisco Lightship 37°44'.4 N., 122°42'.5 W.
Ketchikan	.....	144	45	16	121	129	154	89	115	224	295	306	290	332	[1] 232	316	457	650	703	716	723	705	715	792	920	1,192	660	582	708	1,192
Hyder	144	.....	136	160	212	273	285	233	259	367	438	450	434	476	[1] 376	460	601	793	847	859	867	848	806	883	1,010	1,282	690	673	799	1,284
Cape Chacon	45	136	.....	32	76	162	149	122	148	256	328	339	323	365	[1] 265	349	490	595	649	662	669	651	670	748	875	1,147	652	537	663	1,148
Metlakahtla	16	160	32	.....	109	145	169	105	131	239	310	322	306	348	[1] 248	332	473	665	719	732	739	721	703	780	907	1,179	665	570	696	1,180
Craig	121	212	76	109	.....	49	74	126	127	206	255	266	216	258	[1] 152	242	383	576	629	642	649	631	602	685	812	1,113	728	565	691	1,175
Cape Decision	129	273	162	145	49	.....	24	76	78	157	206	217	167	209	[1] 103	193	334	473	526	539	546	528	552	636	763	1,064	789	591	717	1,201
Port Alexander	154	285	149	169	74	24	.....	101	102	139	186	197	148	189	[1] 92	173	314	507	560	573	580	562	543	626	754	1,056	814	608	734	1,219
Wrangell	89	233	122	105	126	76	101	.....	40	149	220	231	216	257	[1] 180	241	382	575	628	641	648	630	629	712	840	1,140	749	660	786	1,270
Petersburg	115	259	148	131	127	78	102	40	.....	109	180	191	176	217	[1] 181	201	342	535	588	601	608	590	623	714	841	1,142	775	664	790	1,275
Juneau	224	367	256	239	206	157	139	149	109	.....	88	100	84	126	[2] 190	110	251	443	497	510	517	499	532	624	752	1,097	884	747	873	1,358
Haines	295	438	328	310	255	206	186	220	180	88	.....	14	98	140	[2] 204	124	265	457	511	524	531	512	546	638	766	1,111	955	791	917	1,402
Skagway	306	450	339	322	266	217	197	231	191	100	14	.....	110	151	[2] 216	136	277	469	522	535	543	524	557	650	777	1,122	966	803	929	1,413
Gustavus	290	434	323	306	216	167	148	216	176	84	98	110	.....	48	[2] 133	32	174	366	419	432	440	421	454	547	674	1,019	950	753	879	1,364
Pelican	332	476	365	348	258	209	189	257	217	126	140	151	48	.....	[2] 93	22	163	355	408	421	429	410	443	536	663	1,008	992	735	861	1,345
Sitka	[1] 232	[1] 376	[2] 350	[1] 248	[1] 152	[2] 188	[1] 92	[1] 180	[2] 191	[2] 190	[2] 204	[2] 216	[2] 133	[2] 93	.....	106	231	412	465	478	485	467	494	580	708	1,027	[1] 892	681	807	1,292
Cape Spencer	316	460	349	332	242	193	173	241	201	110	124	136	32	22	106	.....	141	333	387	400	407	388	422	514	642	987	976	739	865	1,349
Yakutat	457	601	490	473	383	334	314	382	342	251	265	277	174	163	231	141	.....	215	268	281	288	270	316	411	538	918	1,117	870	1,000	1,480
Cape Hinchinbrook	650	793	595	665	576	473	507	575	535	443	457	469	366	355	412	333	215	.....	54	66	74	55	116	228	356	732	1,309	1,033	1,159	1,630
Cordova	703	847	649	719	629	526	560	628	588	497	511	522	419	408	465	387	268	54	.....	77	100	86	148	260	387	764	1,363	1,087	1,213	1,683
Valdez	716	859	662	732	642	539	573	641	601	510	524	535	432	421	478	400	281	66	77	.....	92	84	145	257	335	761	1,376	1,099	1,225	1,696
Whittier	723	867	669	739	649	546	580	648	608	517	531	543	440	429	485	407	288	74	100	92	.....	64	125	237	364	742	1,383	1,107	1,233	1,704
Latouche	705	849	651	721	631	528	562	630	590	499	512	524	421	410	467	388	270	55	86	84	64	.....	64	176	304	680	1,365	1,088	1,214	1,685
Seward	715	806	670	703	602	552	543	629	623	532	546	557	454	443	494	422	316	116	148	145	125	64	.....	147	274	652	1,398	1,100	1,224	1,686
Seldovia	792	883	748	780	685	636	626	712	714	624	638	650	547	536	580	514	411	228	260	257	237	176	147	.....	139	562	1,491	1,168	1,291	1,742
Anchorage	920	1,010	875	907	812	763	754	840	841	752	766	777	674	663	708	642	538	356	387	385	364	304	274	139	.....	688	1,518	1,295	1,418	1,869
Unimak Pass	1,192	1,282	1,147	1,179	1,113	1,064	1,056	1,140	1,142	1,097	1,111	1,122	1,019	1,008	1,027	987	918	732	764	761	742	680	652	562	688	.....	1,963	1,510	1,608	1,974

[1] Via Sumner Strait and Cape Ommaney.
[2] Via Peril Strait.

Notes.—Distances to Seattle (inside) are via inside route to Cape Spencer.
Distances to Latouche from points eastward are via Cape Hinchinbrook.
Seattle to Swiftsure Bank Lightship 133 miles.

CORPS OF ENGINEERS DISTRICT.—Anchorage, T. A. This district consists of the Territory of Alaska.

BRANCH HYDROGRAPHIC OFFICE.—453 Federal Office Bldg., Seattle, Wash.

COAST GUARD DISTRICT.—17th Coast Guard District, Box 2991, Community Bldg., Juneau, T. A. The district comprises the Territory of Alaska.

Marine Inspection Office: Juneau.

COLLECTOR OF CUSTOMS.—The 31st Customs District consists of the Territory of Alaska. Juneau is the district headquarters. Marine documents are issued. Other ports of entry are: (an asterisk indicates that marine documents are issued)

Craig, *Eagle, Hyder, *Ketchikan, Pelican, Petersburg, *Sitka, *Skagway, and *Wrangell.

PUBLIC HEALTH SERVICE

Quarantine Stations:

Juneau, Ketchikan, Petersburg, and Wrangell.

Public Health Service Hospital:

Seattle, Wash.: Judkins and 14th Avenues South; outpatient office, Federal Office Building.

Outpatient Offices:

Juneau, Ketchikan: Koel Bldg.; Petersburg, Wrangell.

NATIONAL PARK SERVICE

Headquarters: Box 738, Sitka.

National Monuments.—Glacier Bay, Old Kasaan, Sitka.

FOREST SERVICE

Research Center, Sub Port: Juneau.

IMMIGRATION AND NATURALIZATION

Ports of Entry: Haines, Juneau, Ketchikan (including Sitka and Wrangell), Skagway, Pelican.

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Ports at which inspectors are located: **Anchorage,** 136 Federal Bldg.
Fairbanks, 403 Federal Bldg.

FOREIGN CONSULS

France: Anchorage.

Norway: Juneau.

FEDERAL COMMUNICATIONS COMMISSION

Regional Office: Anchorage, Room 52, U. S. Courthouse.

District Office: Juneau, Engineer in charge: Chattuck Bldg.

FISH AND WILDLIFE SERVICE

Enforcement agent: P. O. Box 2021, Juneau.

National Wildlife Refuges: Forrester Island, Hazy Islands, St. Lazaria Islands.

WEATHER BUREAU.—Offices: Barometers may be compared with standards at these offices:

Anchorage, Alaska: Merrill Field.

Juneau, Alaska: Juneau Airport.

Seattle, Washington: Federal Office Building, First Avenue and Marion Street.

STORM WARNING DISPLAY STATIONS.—No storm warning display stations are now being maintained in this area by the Weather Bureau; storm warnings are being disseminated by other methods, principally by radio.

Radiotelephone Broadcasts of Weather Information.—Regular broadcasts including weather forecasts, small craft and storm warnings, and other marine information are made by the following radiotelephone stations in plain language.

Station	*Frequency (Kcs.)*	*Local Time*
NMJ....Ketchikan..	2698.....	0900, 2100
ALF....Juneau.....	2894, 2970..	0730, 1930
ALB44..Cordova....	2970.....	0900, 1100, 1300, 1500, 1700, 1900.
ALB22..Whittier....	2970.....	0800, 1000, 1200, 1400, 1600, 1800, 2000.
ALB....Anchorage..	2980.....	0800, 1900
ALB99..Kodiak.....	2970.....	0930, 1130, 1330, 1530, 1730, 1930, 2130.

Weather Broadcasts by Commercial Radio Stations.—The following table lists alphabetically the radio stations that have installed microphones in nearby Weather Bureau offices. From these offices forecasts and weather summaries, including coastal and offshore information, are broadcast on regular schedule by Weather Bureau personnel.

Station	Call Sign	Frequency (kcs.)	Power (watts)	Weekdays	Saturdays (local time)	Sundays
Anchorage	KBYR	1240	250	0725	0725	None
Anchorage	KENI	550	5,000	0740 2135	0740 2135	2110
Anchorage	KFQD	600	10,000	0700	0700	1215
Juneau	KINY	1460	5,000	0825 1855	0825 1855	1000 1855
Seward	KIBH	1340	250	1815	1815	1815

Hours of Operation of Fog Signals

Light Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Tree Point	20	16	17	7	8	8	19	34	24	17	8	19	197
Mary Island	21	17	14	6	9	3	13	25	19	16	17	19	179
Guard Islands	26	23	22	18	6	2	19	8	9	12	12	20	177
Lincoln Rock	20	22	27	7	1	5	10	12	7	12	16	19	158
Five Finger	54	45	42	10	6	16	19	40	29	28	27	40	356
Sentinel Island	65	55	44	11	2	2	6	10	13	12	49	60	329
Eldred Rock	72	66	37	11	2	2	4	7	6	10	67	68	352
Point Retreat	1	7	20	10	23	33	34	44	39	6	0	1	218
Cape Spencer	104	107	101	10	62	65	52	64	64	18	15	45	707

NOTE.—These data are from a record of about 15 years, except for Point Retreat and Cape Spencer, where the record is of about 5 years.

Climatological Tables

COMPILED BY CLIMATOLOGICAL SERVICES DIVISION, U. S. WEATHER BUREAU

Annette Island.—Position: Latitude 55°02′ N., Longitude 131°35′ W.

ELEVATION: 114 FEET. YEARS OF RECORD: 5-10

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
VISIBILITY (percent of all observations):													
All cases less than 3 miles	11	10	9	4	5	6	7	10	12	10	11	8	9
0700 LST, (percent of all observations)	10	10	14	6	6	5	11	16	17	10	11	7	10
Less than ½ mile	1	3	1	3	2	2	3	7	6	1	1	0	3
½ to 3 miles	9	7	13	3	4	3	8	9	11	9	10	7	7
1300 LST, (percent of all observations)	11	12	6	4	3	6	7	7	10	10	12	11	8
Less than ½ mile	1	1	1	0	0	1	0	2	0	1	0	2	1
½ to 3 miles	10	11	5	4	3	5	7	5	10	9	12	9	7
1900 LST, (percent of all observations)	13	7	8	3	5	7	4	8	10	11	10	6	8
Less than ½ mile	1	2	1	0	1	1	1	1	2	0	1	0	1
½ to 3 miles	12	5	7	3	4	6	3	7	8	11	9	6	7
PRECIPITATION:													
Mean amount, inch	9.41	7.00	8.40	8.26	4.60	4.72	6.14	5.19	9.59	15.42	10.52	9.57	96.82
Least amount, inch	0.77	2.95	2.29	1.23	1.34	1.03	1.72	0.62	4.32	9.51	6.02	5.36	0.62
Greatest amount, inch	14.22	11.69	13.07	21.35	8.78	9.74	10.17	10.16	16.93	20.38	14.97	14.35	21.35
Maximum amount in 24 hours, inch	3.19	2.66	3.07	2.78	2.02	2.36	2.37	4.23	3.92	3.90	2.76	2.30	4.23
Mean number of days, 0.01 inch or more	20	17	19	20	15	13	15	13	16	26	23	22	219
AIR TEMPERATURE:													
Mean, °F	34	36	39	43	50	55	57	58	54	47	40	36	46
Minimum:													
Extreme, °F	—4	7	20	25	30	37	40	42	30	29	15	2	—4
32° or less, mean number of days	17	15	14	4	1	0	0	0	1	1	9	17	78
Maximum:													
Extreme, °F	56	58	63	70	81	86	90	87	77	64	63	59	90
32° or less, mean number of days	3	1	0	0	0	0	0	0	0	0	2	3	8

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots	9	5	3	6	6
17–27 knots	[1]	[1]	[1]	[1]	[1]
28 knots or over	0	0	0	0	0
NE. 1–16 knots	7	3	[1]	6	4
17–27 knots	1	[1]	[1]	1	[1]
28 knots or over	[1]	0	0	0	[1]
E. 1–16 knots	12	8	2	10	8
17–27 knots	5	2	[1]	4	3
28 knots or over	[1]	[1]	0	[1]	[1]
SE. 1–16 knots	17	21	28	24	22
17–27 knots	9	17	6	7	10
28 knots or over	1	1	[1]	1	[1]
S. 1–16 knots	9	17	23	11	15
17–27 knots	4	3	1	3	3
28 knots or over	1	[1]	[1]	[1]	[1]
SW. 1–16 knots	6	9	6	5	6
17–27 knots	1	[1]	[1]	[1]	[1]
28 knots or over	[1]	0	0	0	[1]
W. 1–16 knots	3	7	11	5	6
17–27 knots	[1]	[1]	0	[1]	[1]
28 knots or over	0	0	0	0	0
NW. 1–16 knots	9	15	19	14	14
17–27 knots	0	0	0	0	0
28 knots or over	5	2	1	3	3
Calm	5	2	1	3	3
Maximum velocity, knots	44 SE	48 SE	32 SE	40 SE	48 SE

[1]Less than 0.5 percent.

Cape Decision.—Position: Latitude 56°00′ N., Longitude 134°08′ W.

ELEVATION: 39 FEET. YEARS OF RECORD: 4-8

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
VISIBILITY (percent of all observations):													
All cases less than 3 miles	2	6	2	1	7	7	4	17	9	4	3	2	6
0700 LST, (percent of all observations)	3	8	2	1	9	8	4	22	12	4	5	4	7
Less than ½ mile	1	2	0	0	5	3	1	10	7	2	1	1	3
½ to 3 miles	2	6	2	1	4	5	3	12	5	2	4	3	4
1400 LST, (percent of all observations)	2	7	3	2	4	6	5	14	13	3	3	3	5
Less than ½ mile	0	1	1	0	2	1	1	5	6	1	0	1	2
½ to 3 miles	2	6	2	2	2	5	4	9	7	2	3	2	4
2200 LST, (percent of all observations)	2	4	0	1	7	8	4	14	3	6	1	0	4
Less than ½ mile	0	0	0	0	3	5	1	8	0	2	0	0	2
½ to 3 miles	2	4	0	1	4	3	3	6	3	4	1	0	2
PRECIPITATION:													
Mean amount, inch	7.44	5.74	6.23	4.48	3.68	3.59	3.63	3.47	6.02	13.14	10.03	7.07	74.52
Least amount, inch	2.81	3.11	1.88	0.51	1.84	1.29	0.89	1.02	1.12	10.93	4.85	3.16	0.51
Greatest amount, inch	10.24	10.25	11.34	7.59	6.33	4.46	5.41	6.84	12.10	16.07	16.09	10.69	16.09
Maximum amount in 24 hours, inch	2.26	2.94	3.76	1.34	1.50	1.93	1.24	1.25	2.15	2.85	4.02	1.57	4.02
Mean number of days, 0.01 inch or more	24	16	19	17	13	13	13	16	15	23	24	23	215
AIR TEMPERATURE:													
Mean, °F	37	36	38	42	47	51	53	63	51	47	40	39	45
Minimum:													
Extreme, °F	3	1	13	21	35	41	43	43	41	32	21	17	1
32° or less, mean number of days	10	8	11	3	0	0	0	0	0	1	7	6	46
Maximum:													
Extreme, °F	49	51	49	59	79	69	81	65	71	59	59	53	81
32° or less, mean number of days	3	3	1	0	0	0	0	0	0	0	2	2	11

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots	1	3	3	1	2
17–27 knots	1	1	[1]	0	[1]
28 knots or over	[1]	[1]	0	[1]	[1]
NE. 1–16 knots	14	6	6	11	9
17–27 knots	4	[1]	[1]	1	1
28 knots or over	[1]	[1]	[1]	[1]	[1]
E. 1–16 knots	16	13	10	16	14
17–27 knots	9	4	1	4	4
28 knots or over	3	2	[1]	2	1
SE. 1–16 knots	7	7	5	12	8
17–27 knots	6	4	1	5	4
28 knots or over	3	2	[1]	3	2
S. 1–16 knots	5	9	10	5	7
17–27 knots	3	3	1	3	2
28 knots or over	1	[1]	[1]	1	[1]
SW. 1–16 knots	3	3	4	5	3
17–27 knots	1	1	[1]	2	1
28 knots or over	1	[1]	0	1	[1]
W. 1–16 knots	5	14	25	10	13
17–27 knots	3	6	6	4	5
28 knots or over	5	1	[1]	1	7
NW. 1–16 knots	2	8	16	5	8
17–27 knots	1	3	3	1	2
28 knots or over	1	[1]	0	1	[1]
Calm	5	10	9	6	7
Maximum velocity, knots	42 W	45 W	40 W	58 W	58 W

[1]Less than 0.5 percent.

Cape Spencer.—Position: Latitude 58°12′ N., Longitude 136°38′ W.

ELEVATION: 81 FEET. YEARS OF RECORD: 8-9

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
VISIBILITY (percent of all observations):													
All cases less than 3 miles	6	4	4	1	4	7	7	8	7	1	4	6	5
0700 LST, (percent of all observations)	7	4	3	2	7	11	9	14	9	1	3	5	6
Less than ½ mile	1	1	1	1	5	6	6	8	3	0	1	2	3
½ to 3 miles	6	3	2	1	2	5	3	6	6	1	2	3	3
1300 LST, (percent of all observations)	4	4	6	[1]	2	4	6	5	7	2	4	5	4
Less than ½ mile	1	1	1	0	1	2	4	2	3	0	0	1	1
½ to 3 miles	3	3	5	[1]	1	2	2	3	4	2	4	4	3
1900 LST, (percent of all observations)	7	4	4	1	4	7	5	6	4	1	4	8	5
Less than ½ mile	2	0	1	0	3	4	1	2	1	0	0	4	2
½ to 3 miles	5	4	3	1	1	3	4	4	3	1	4	4	3
PRECIPITATION:													
Mean amount, inch	8.08	5.20	7.71	3.88	5.91	4.36	7.73	11.93	13.22	17.68	12.19	10.87	10876
Least amount, inch	2.45	1.76	3.65	0.35	2.70	0.39	0.15	0.07	0.97	0.34	0.39	0.75	0.07
Greatest amount, inch	14.80	10.95	12.30	5.29	10.36	8.20	11.90	17.93	24.34	25.90	22.23	24.96	25.90
Maximum amount in 24 hours, inch	3.65	3.47	3.71	1.30	2.30	1.75	2.34	2.45	7.20	4.77	5.93	3.65	7.20
Mean number of days, 0.01 inch or more	18	15	20	15	15	14	21	21	20	26	19	22	225
AIR TEMPERATURE:													
Mean, °F	34	33	31	40	46	50	52	52	50	49	36	34	42
Minimum:													
Extreme, °F	10	4	22	6	26	32	32	33	30	24	12	6	4
32° or less, mean number of days	18	16	18	5	1	1	1	0	1	1	14	16	92
Maximum:													
Extreme, °F	49	55	53	61	69	75	67	67	69	61	59	51	75
32° or less, mean number of days	4	5	2	1	0	0	0	0	0	0	3	6	21

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots	[1]	[1]	[1]	[1]	[1]
17–27 knots	[1]	[1]	[1]	[1]	[1]
28 knots or over	[1]	[1]	0	[1]	[1]
NE. 1–16 knots	18	19	18	22	19
17–27 knots	19	12	5	16	13
28 knots or over	14	3	1	7	6
E. 1–16 knots	7	12	13	12	11
17–27 knots	9	8	2	8	7
28 knots or over	6	2	[1]	3	3
SE. 1–16 knots	2	1	[1]	3	1
17–27 knots	1	1	[1]	1	1
28 knots or over	[1]	0	0	[1]	[1]
S. 1–16 knots	[1]	4	5	2	3
17–27 knots	2	2	1	2	2
28 knots or over	1	[1]	0	1	[1]
SW. 1–16 knots	4	5	11	5	6
17–27 knots	2	3	2	4	3
28 knots or over	2	1	[1]	1	1
W. 1–16 knots	3	9	19	4	9
17–27 knots	3	4	5	3	4
28 knots or over	2	1	[1]	1	1
NW. 1–16 knots	3	6	9	2	5
17–27 knots	1	3	3	1	2
28 knots or over	[1]	1	[1]	[1]	[1]
Calm	1	3	6	2	3
Maximum velocity, knots	56 NE	52 NW	40 NW	74 NE	74 NE

[1]Less than 0.5 percent.

Juneau Airport[1].—Position: Latitude 58°22′ N., Longitude 134°35′ W.

ELEVATION: 24 FEET. YEARS OF RECORD: 7-11

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
VISIBILITY (percent of all observations):													
All cases less than 3 miles	10	12	8	2	1	1	1	4	6	4	6	9	5
0800 LST, (percent of all observations)	7	15	9	6	2	1	2	5	10	8	7	6	6
Less than ½ mile	1	2	1	1	[2]	0	[2]	0	3	2	1	0	1
½ to 3 miles	6	13	8	5	2	1	2	5	7	6	6	6	5
1300 LST, (percent of all observations)	13	9	8	[2]	[2]	1	1	4	2	2	6	12	5
Less than ½ mile	2	1	0	0	0	0	0	[2]	0	[2]	1	2	1
½ to 3 miles	11	8	8	[2]	[2]	1	1	4	2	2	5	10	4
1900 LST, (percent of all observations)	10	11	8	1	1	1	1	4	5	2	6	9	5
Less than ½ mile	2	1	[2]	0	0	0	0	0	0	0	1	2	1
½ to 3 miles	8	10	8	1	1	1	1	4	5	2	5	7	4
PRECIPITATION:													
Mean amount, inch	4.58	2.36	3.88	2.94	3.04	3.21	5.42	5.05	8.11	8.80	6.30	4.05	57.74
Least amount, inch	0.94	1.14	1.29	0.27	1.25	1.08	2.01	3.39	3.69	2.71	2.13	2.35	0.27
Greatest amount, inch	7.33	4.03	5.80	4.33	4.39	5.34	7.76	8.47	11.51	12.39	10.38	9.86	12.39
Maximum amount in 24 hours, inch	2.74	2.37	1.81	0.97	1.39	1.11	1.67	2.38	2.30	4.66	3.34	1.44	4.66
Mean number of days, 0.01 inch or more	21	16	18	18	15	16	20	17	21	24	20	22	228
AIR TEMPERATURE:													
Mean, °F	26	26	33	38	47	54	55	59	50	42	32	28	40
Minimum:													
Extreme, °F	−19	−12	1	7	26	33	36	27	27	16	−3	−21	−21
32° or less, mean number of days	24	24	23	15	6	0	0	1	1	9	18	23	143
Maximum:													
Extreme, °F	48	46	49	58	82	83	82	78	72	61	56	54	83
32° or less, mean number of days	13	12	2	1	0	0	0	0	0	0	9	11	48

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots	10	6	14	9	10
17–27 knots	[2]	[2]	0	0	[2]
28 knots or over	0	0	0	0	0
NE. 1–16 knots	13	7	4	8	8
17–27 knots	2	[2]	0	[2]	[2]
28 knots or over	[2]	0	0	0	[2]
E. 1–16 knots	18	13	11	18	15
17–27 knots	3	2	1	2	2
28 knots or over	[2]	[2]	0	[2]	[2]
SE. 1–16 knots	20	26	19	21	22
17–27 knots	4	2	1	4	3
28 knots or over	[2]	[2]	0	[2]	[2]
S. 1–16 knots	10	17	23	18	17
17–27 knots	[2]	0	0	[2]	[2]
28 knots or over	0	0	0	[2]	[2]
SW. 1–16 knots	3	8	6	5	5
17–27 knots	0	0	0	0	0
28 knots or over	0	0	0	0	0
W. 1–16 knots	10	13	13	10	12
17–27 knots	0	0	0	0	0
28 knots or over	0	0	0	0	0
NW. 1–16 knots	2	2	4	[2]	2
17–27 knots	0	0	0	0	0
28 knots or over	0	0	0	0	0
Calm	5	4	4	5	4
Maximum velocity, knots	59 SE	50 SE	39 SE	53 SE	59 SE

[1] See Chapter 2 for additional remarks concerning Juneau climate.
[2] Less than 0.5 percent.

Sitka (Japonski).—Position: Latitude 57°03′ N., Longitude 135°21′ W.

ELEVATION: 15 FEET. YEARS OF RECORD: 5-12

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
VISIBILITY (percent of all observations):													
All cases less than 3 miles	6	7	8	2	3	2	4	7	10	7	6	9	6
0800 LST, (percent of all observations)	8	8	9	3	5	3	4	8	8	10	8	8	7
Less than ½ mile	2	3	4	1	2	2	1	2	2	2	2	2	2
½ to 3 miles	6	5	5	2	3	1	3	6	6	8	6	6	5
1300 LST, (percent of all observations)	6	8	6	[1]	3	2	5	6	11	8	4	9	6
Less than ½ mile	0	3	2	0	0	0	[1]	1	2	1	0	4	1
½ to 3 miles	6	5	4	[1]	3	2	5	5	9	7	4	5	5
1900 LST, (percent of all observations)	5	6	8	2	1	2	3	8	10	2	7	11	5
Less than ½ mile	0	2	0	0	0	1	0	0	2	0	0	1	[1]
½ to 3 miles	5	4	8	2	1	1	3	8	8	2	7	10	5
PRECIPITATION:													
Mean amount, inch	6.89	9.94	8.35	5.04	4.36	2.47	4.66	8.97	14.03	14.30	10.00	8.11	97.12
Least amount, inch	3.73	1.83	5.08	3.00	2.38	1.39	1.80	0.52	6.03	7.77	4.11	5.31	0.52
Greatest amount, inch	12.18	5.12	10.71	7.65	6.51	3.10	8.78	18.74	19.17	22.96	13.35	12.49	22.96
Maximum amount in 24 hours, each	1.86	3.40	2.41	1.26	1.92	0.76	1.61	4.23	4.25	3.53	2.63	1.52	4.25
Mean number of days, 0.01 inch or more	22	13	20	17	17	14	18	19	22	25	22	24	231
AIR TEMPERATURE:													
Mean, °F	37	35	38	42	48	53	56	56	53	47	39	37	45
Minimum:													
Extreme, °F	—2	4	16	22	30	38	40	40	30	26	18	16	—2
32° or less, mean number of days	17	15	17	6	1	0	0	0	1	3	13	14	87
Maximum:													
Extreme, °F	61	53	63	65	85	79	91	77	75	63	59	57	91
32° or less, mean number of days	2	2	1	0	0	0	0	0	0	0	1	2	8

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots	1	1	3	1	1
17–27 knots	[1]	0	[1]	[1]	[1]
28 knots or over	0	0	0	0	0
NE. 1–16 knots	6	7	5	5	6
17–27 knots	[1]	[1]	[1]	[1]	[1]
28 knots or over	0	0	0	0	0
E. 1–16 knots	16	8	3	13	10
17–27 knots	2	1	[1]	1	1
28 knots or over	[1]	[1]	0	[1]	[1]
SE. 1–16 knots	31	22	10	27	23
17–27 knots	4	2	[1]	3	2
28 knots or over	1	[1]	0	[1]	[1]
S. 1–16 knots	5	7	9	6	7
17–27 knots	1	1	0	1	1
28 knots or over	0	0	0	0	0
SW. 1–16 knots	4	11	19	8	10
17–27 knots	[1]	[1]	0	1	[1]
28 knots or over	0	[1]	0	0	[1]
W. 1–16 knots	3	6	9	5	6
17–27 knots	[1]	[1]	0	[1]	[1]
28 knots or over	0	0	0	0	0
NW. 1–16 knots	6	12	21	8	12
17–27 knots	[1]	[1]	[1]	[1]	[1]
28 knots or over	0	0	0	0	0
Calm	20	22	21	21	21
Maximum velocity, knots	37 SE	33 SE	24 SE	38 SE	38 SE

[1] Less than 0.5 percent.

Wrangell.—Position: Latitude 56°28′ N., Longitude 132°23′ W.

ELEVATION: 37 FEET. YEARS OF RECORD: 4-10

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
VISIBILITY (percent of all observations):													
All cases less than 3 miles	8	6	3	1	[1]	1	1	4	3	4	4	6	3
0700 LST, (percent of all observations)	11	6	3	1	1	2	2	9	8	5	6	9	5
Less than ½ mile	4	3	0	1	0	0	0	2	4	2	1	5	2
½ to 3 miles	7	3	3	0	1	2	2	7	4	3	4	4	3
1300 LST, (percent of all observations)	5	5	4	2	[1]	1	1	[1]	2	2	1	3	2
Less than ½ mile	1	3	2	[1]	0	0	0	[1]	[1]	1	0	2	1
½ to 3 miles	4	2	2	2	[1]	1	1	0	2	1	1	1	1
1900 LST, (percent of all observations)	8	4	2	0	0	1	1	2	0	5	4	3	2
Less than ½ mile	2	1	1	0	0	0	0	0	0	0	0	0	[1]
½ to 3 miles	6	3	1	0	0	1	1	2	0	5	4	3	2
PRECIPITATION:													
Mean amount, inch	7.22	5.16	6.63	5.25	3.95	3.88	5.40	6.94	8.45	13.52	9.69	8.01	84.10
Least amount, inch	3.39	2.10	2.32	3.43	0.92	1.00	3.18	1.82	3.58	8.73	5.27	3.88	0.92
Greatest amount, inch	11.41	8.24	9.25	7.03	5.42	6.35	7.91	11.47	12.88	21.59	14.72	11.42	21.59
Maximum amount in 24 hours, inch	1.69	3.05	2.93	1.85	1.30	1.34	1.31	3.00	2.71	3.19	2.59	2.11	3.19
Mean number of days, 0.01 inch or more	21	17	21	22	17	17	19	18	20	25	22	24	243
AIR TEMPERATURE:													
Mean, °F	32	32	37	43	50	55	57	55	51	45	37	38	45
Minimum:													
Extreme, °F	—10	—8	2	22	26	34	38	30	28	22	14	8	—10
32° or less, mean number of days	22	20	19	9	1	0	0	1	1	4	16	20	113
Maximum:													
Extreme, °F	57	57	59	77	87	81	89	79	75	67	57	53	89
32° or less, mean number of days	6	4	1	1	0	0	0	0	0	0	3	6	21

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots	17	5	6	10	9
17–27 knots	[1]	0	0	0	[1]
28 knots or over	0	0	0	0	0
NE. 1–16 knots	20	9	5	15	12
17–27 knots	[1]	[1]	0	[1]	[1]
28 knots or over	0	0	0	0	0
E. 1–16 knots	21	19	10	19	17
17–27 knots	1	1	[1]	[1]	[1]
28 knots or over	[1]	0	0	0	[1]
SE. 1–16 knots	11	14	6	15	12
17–27 knots	1	[1]	[1]	1	[1]
28 knots or over	0	0	0	0	0
S. 1–16 knots	6	8	7	10	8
17–27 knots	[1]	0	0	[1]	[1]
28 knots or over	0	0	0	0	0
SW. 1–16 knots	5	12	16	7	10
17–27 knots	[1]	0	0	[1]	[1]
28 knots or over	0	0	0	0	0
W. 1–16 knots	7	20	30	10	18
17–27 knots	[1]	[1]	0	[1]	[1]
28 knots or over	0	0	0	0	0
NW. 1–16 knots	9	8	12	7	9
17–27 knots	[1]	0	0	0	[1]
28 knots or over	0	0	0	0	0
Calm	2	4	8	6	5
Maximum velocity, knots	34 E	22 SE	17 E	22 E	34 E

[1] Less than 0.5 percent.

Yakutat.—Position: Latitude 59°31′ N., Longitude 139°40′ W.

ELEVATION: 31 FEET. YEARS OF RECORD: 6-8

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
VISIBILITY (percent of all ovservations):													
All cases less than 3 miles	17	20	21	9	8	10	16	23	17	10	9	22	15
0700 LST, (percent of all observations)	17	16	21	10	12	18	21	32	15	9	5	16	16
Less than ½ mile	1	3	2	1	3	4	1	6	5	0	0	1	2
½ to 3 miles	16	13	19	9	9	14	20	26	10	9	5	15	14
1300 LST, (percent of all observations)	13	21	20	8	5	7	14	17	16	8	14	25	14
Less than ½ mile	1	4	4	1	0	1	0	1	1	1	1	2	1
½ to 3 miles	12	17	16	7	5	6	14	16	15	7	13	23	13
1900 LST, (percent of all observations)	22	24	23	8	6	6	13	19	19	14	9	24	16
Less than ½ mile	1	5	2	1	0	0	1	0	2	0	0	1	1
½ to 3 miles	21	19	21	7	6	6	12	19	17	14	9	23	15
PRECIPITATION:													
Mean amount, inch [1]	11.56	8.67	9.48	7.78	7.68	4.82	8.21	11.17	15.83	19.31	15.11	12.36	131.98
Least amount, inch [1]	0.60	3.31	3.15	0.75	3.30	0.52	1.25	3.73	4.92	6.68	4.36	3.51	0.52
Greatest amount, inch [1]	29.45	15.67	19.83	16.94	17.11	13.11	17.66	26.81	27.10	36.45	29.43	28.54	36.45
Maximum amount in 24 hours, inch	5.10	2.66	3.07	2.69	2.77	2.50	2.33	3.49	3.16	3.90	5.32	2.01	5.32
Mean number of days, 0.01 inch or more	23	17	22	21	14	13	15	13	15	24	23	22	222
AIR TEMPERATURE:													
Mean, °F. [1]	28	30	32	37	44	50	53	53	49	42	34	30	40
Minimum:													
Extreme, °F.	−23	−19	−7	2	8	32	36	30	27	18	−10	−15	−23
32° or less, mean number of days	24	23	28	21	8	1	0	0	1	9	19	25	159
Maximum:													
Extreme, °F.	49	51	50	65	79	78	78	81	71	63	59	51	81
32° or less, mean number of days	9	7	4	1	0	0	0	0	0	0	6	11	38

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots	2	2	3	3	2
17–27 knots	0	0	0	0	0
28 knots or over	0	0	0	0	0
NE. 1–16 knots	17	9	4	15	11
17–27 knots	1	1	[2]	1	1
28 knots or over	[2]	0	0	[2]	[2]
E. 1–16 knots	36	26	20	36	30
17–27 knots	4	5	2	4	4
28 knots or over	1	[2]	[2]	1	1
SE. 1–16 knots	9	13	15	11	12
17–27 knots	3	3	2	2	2
28 knots or over	1	1	[2]	1	1
S. 1–16 knots	3	4	8	4	5
17–27 knots	1	[2]	[2]	1	[2]
28 knots or over	[2]	[2]	0	[2]	[2]
SW. 1–16 knots	2	8	11	5	6
17–27 knots	1	1	[2]	1	1
28 knots or over	0	0	0	[2]	[2]
W. 1–16 knots	1	6	17	3	7
17–27 knots	1	[2]	[2]	[2]	[2]
28 knots or over	[2]	0	0	[2]	[2]
NW. 1–16 knots	2	8	11	3	6
17–27 knots	0	[2]	[2]	[2]	[2]
28 knots or over	0	0	0	0	0
Calm	15	13	7	9	11
Maximum velocity, knots	50 SE	42 SE	40 SE	43 SE	50 SE

[1] 30 years of record.
[2] Less than 0.5 percent.

Prince Rupert, B.C.—Position: Latitude 54°18′ N., Longitude, 130°18′ W.

ELEVATION: 170 FEET. YEARS OF RECORD: 10-20

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
VISIBILITY (percent of all observations):													
All cases less than 3 miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.... LST, (percent of all observations)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Less than ½ mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
½ to 3 miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.... LST, (percent of all observations)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Less than ½ mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
½ to 3 miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.... LST, (percent of all observations)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Less than ½ mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
½ to 3 miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
PRECIPITATION:													
Mean amount, inch [1]	9.76	7.57	8.43	6.67	5.30	4.05	4.76	5.15	7.72	12.22	12.25	11.28	95.16
Least amount, inch	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greatest amount, inch	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum amount in 24 hours, inch	3.2	2.6	4.1	2.3	1.9	1.4	2.0	2.7	3.7	3.3	2.4	4.4	4.4
Mean number of days, 0.01 inch or more	19	15	20	19	18	14	16	16	71	23	22	23	222
AIR TEMPERATURE:													
Mean, °F. [1]	35	36	39	44	48	53	56	58	54	47	42	36	46
Minimum:													
Extreme, °F.	−6	5	11	19	30	36	40	40	30	27	13	5	−6
32° or less, mean number of days	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum:													
Extreme, °F.	57	62	68	71	85	88	83	86	81	70	66	63	88
32° or less, mean number of days	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots, 17–27 knots, 28 knots or over	4	3	1	3	3
NE. 1–16 knots, 17–27 knots, 28 knots or over	4	2	1	3	2
E. 1–16 knots, 17–27 knots, 28 knots or over	16	12	5	12	11
SE. 1–16 knots, 17–27 knots, 28 knots or over	22	18	11	22	18
S. 1–16 knots, 17–27 knots, 28 knots or over	5	6	6	7	6
SW. 1–16 knots, 17–27 knots, 28 knots or over	2	6	10	5	6
W. 1–16 knots, 17–27 knots, 28 knots or over	3	10	14	5	8
NW. 1–16 knots, 17–27 knots, 28 knots or over	1	3	2	2	2
Calm	43	40	50	41	44
Maximum velocity, knots	.....	.....	.....	.....	.....

[1] 26 years of record.
[2] Less than 0.5 percent.

Masset (Queen Charlotte Islands).—Position: Latitude 54°02′ N., Longitude 132°08′ W.

ELEVATION: 10 FEET. YEARS OF RECORD: 18-33

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
VISIBILITY (percent of all observations:													
All cases less than 3 miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.... LST, (percent of all observations)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Less than ½ mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
½ to 3 miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.... LST, (percent of all observations)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Less than ½ mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
½ to 3 miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.... LST, (percent of all observations)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Less than ½ mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
½ to 3 miles	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
PRECIPITATION:													
Mean amount, inch [1]	5.59	4.40	3.98	4.57	4.05	2.43	3.07	2.73	4.17	6.66	7.18	6.89	55.72
Least amount, inch [1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greatest amount, inch	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum amount in 24 hours, inch	2.0	2.7	2.0	1.9	2.0	1.1	1.7	1.3	2.0	2.3	2.1	2.6	2.7
Mean number of days, 0.01 inch or more	15	12	12	14	13	13	11	13	15	20	18	22	178
AIR TEMPERATURE:													
Mean, ° F. [1]	36	37	39	42	48	53	57	58	53	47	41	38	46
Minimum:													
Extreme, °F.	−2	8	16	22	27	32	35	38	27	17	12	9	−2
32° or less, mean number of days	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum:													
Extreme, °F.	60	55	64	69	76	80	83	84	75	68	66	60	84
32° or less, mean number of days	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

	Winter	Spring	Summer	Autumn	Year
WIND (percent of all observations):					
N. 1–16 knots, 17–27 knots, 28 knots or over	14	10	4	9	9
NE. 1–16 knots, 17–27 knots, 28 knots or over	16	11	6	9	10
E. 1–16 knots, 17–27 knots, 28 knots or over	7	4	3	8	5
SE. 1–16 knots, 17–27 knots, 28 knots or over	29	29	25	36	30
S. 1–16 knots, 17–27 knots, 28 knots or over	2	2	2	3	2
SW. 1–16 knots, 17–27 knots, 28 knots or over	10	11	8	11	10
W. 1–16 knots, 17–27 knots, 28 knots or over	8	14	27	10	15
NW. 1–16 knots, 17–27 knots, 28 knots or over	13	19	25	13	18
Calm	1	0	0	1	1
Maximum velocity, knots	.....	.....	.....	.....	.....

[1] 42 years of record.
[2] Less than 0.5 percent.

Ocean Area 40120.—Position: Latitude 40°-45° N., Longitude 120°-125° W., 17,000
Greenwich Noon Observations—Years of Record: 53

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	15	13	1	7	0	6	1	27	2	13	1	8	1	7	1	10	1	4	15	17	0	4	5	6	48	51
February	15	13	1	7	0	8	0	19	3	18	1	7	1	5	1	11	1	5	14	18	1	3	6	6	49	50
March	13	16	1	4	0	6	1	19	1	13	1	10	1	6	1	18	1	4	13	13	1	4	8	6	49	50
April	12	15	1	4	1	4	0	13	2	11	1	9	1	10	1	24	2	4	9	13	1	4	6	6	50	50
May	10	20	1	2	0	3	0	9	1	10	1	8	0	8	0	29	2	7	20	10	0	4	4	6	52	52
June	10	20	1	3	0	3	0	9	0	7	1	5	1	4	0	35	4	9	23	6	0	1	1	6	54	53
July	9	29	1	1	0	2	0	8	1	5	1	4	0	4	1	35	4	7	32	2	0	1	1	6	55	54
August	9	22	1	3	0	2	0	8	1	5	0	4	1	4	0	39	2	10	43	3	1	1	0	6	56	54
September	9	27	1	3	0	1	0	12	1	12	1	2	0	3	0	28	1	10	35	3	0	1	1	5	56	55
October	11	21	1	5	1	6	0	18	1	15	1	4	1	2	0	19	1	8	31	6	1	2	2	5	54	54
November	15	14	1	5	1	5	0	21	2	17	4	7	1	5	1	12	0	6	18	18	1	3	6	6	52	53
December	16	9	1	7	0	12	0	25	4	11	4	7	1	6	1	9	1	4	10	14	1	5	8	7	50	51
MEAN	12	18	1	4	1	5	1	16	1	12	1	6	1	5	1	22	2	7	22	10	1	3	4	6	52	52

Compiled by the U. S. Weather Bureau.

[1]Less than 0.5 percent.

Ocean Area 40125.—Position: Latitude 40°-45° N., Longitude 125°-130° W., 9,000
Greenwich Noon Observations—Years of Record: 51

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperatur	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	15	12	1	5	[1]	5	[1]	11	3	17	2	14	2	10	1	13	2	2	15	13	[1]	6	13	6	50	50
February	15	10	1	5	0	5	[1]	12	2	15	3	16	3	10	1	14	1	2	18	16	1	4	11	6	50	50
March	13	14	1	7	[1]	4	0	11	2	11	2	10	2	13	1	17	2	3	12	12	1	3	13	6	50	50
April	13	17	1	3	[1]	2	[1]	9	1	13	2	12	1	13	[1]	21	1	4	10	9	[1]	4	8	6	51	51
May	10	15	1	3	[1]	3	0	7	0	9	1	15	1	15	1	25	1	3	16	12	[1]	3	5	6	53	53
June	10	23	1	3	[1]	1	0	6	0	7	1	8	1	11	[1]	33	1	4	14	9	0	1	1	6	57	56
July	13	33	2	2	0	2	0	1	0	3	1	6	[1]	7	0	38	2	3	14	3	0	3	3	6	60	59
August	10	33	1	3	[1]	2	0	4	0	3	0	5	0	9	[1]	37	1	2	18	3	0	2	2	6	62	61
September	11	30	1	3	[1]	2	0	4	1	9	[1]	8	[1]	10	[1]	28	1	3	14	5	[1]	3	3	6	61	60
October	11	20	1	4	[1]	4	[1]	11	1	14	1	9	2	10	1	18	1	3	14	10	0	3	8	5	59	58
November	10	11	1	4	[1]	4	0	13	4	18	5	12	3	8	3	9	2	3	12	19	[1]	5	12	6	55	56
December	15	10	[1]	4	1	4	1	12	4	18	5	13	3	8	2	10	1	4	13	13	[1]	4	13	6	52	53
MEAN	12	19	1	4	[1]	3	[1]	9	1	11	2	11	2	10	1	22	1	3	14	10	[1]	3	8	6	55	55

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 45120.—Position: Latitude 45°-50° N., Longitude 120°-125° W., 8,000
Greenwich Noon Observations—Years of Record: 54

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	11	6	[1]	12	[1]	15	0	18	3	12	1	10	1	10	[1]	6	[1]	6	9	20	3	3	7	6	44	47
February	12	8	[1]	10	[1]	13	1	16	4	10	2	10	3	10	1	7	[1]	5	11	17	1	5	9	6	45	46
March	10	8	1	8	1	12	[1]	12	2	8	1	12	1	15	1	10	1	7	10	15	1	3	8	6	45	47
April	9	6	[1]	6	[1]	7	[1]	14	3	12	1	11	[1]	16	1	14	1	8	7	15	[1]	2	7	5	48	48
May	7	8	0	4	0	5	[1]	11	1	9	[1]	13	1	19	[1]	20	[1]	9	17	11	[1]	3	6	6	50	50
June	6	8	0	1	0	4	0	11	1	10	0	12	[1]	19	0	20	1	13	18	8	[1]	3	2	6	54	53
July	5	7	0	2	0	3	0	10	0	10	0	9	0	20	[1]	22	[1]	17	26	6	[1]	2	1	6	56	55
August	5	10	[1]	3	0	4	0	11	0	10	[1]	9	0	17	[1]	18	[1]	18	34	5	0	1	1	5	57	56
September	5	12	0	5	0	5	[1]	13	2	8	[1]	9	[1]	14	[1]	16	0	16	33	7	0	1	2	5	56	54
October	8	8	0	7	[1]	11	1	18	3	7	2	9	[1]	9	1	11	0	13	21	10	[1]	3	3	5	53	53
November	11	5	0	11	[1]	13	1	22	4	8	3	11	1	7	1	8	0	5	12	20	2	3	9	6	50	50
December	12	4	0	10	[1]	13	2	19	5	10	3	10	2	9	1	5	1	6	9	16	1	4	6	6	46	49
MEAN	8	8	[1]	5	[1]	9	[1]	15	2	10	1	10	1	14	1	13	[1]	10	17	13	1	2	5	6	50	51

Compiled by the U. S. Weather Bureau.

[1]Less than 0.5 percent.

Ocean Area 45125.—Position: Latitude 45°-50° N., Longitude 125°-130° W., 17,000
Greenwich Noon Observations—Years of Record: 54

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	15	6	[1]	6	1	8	2	14	7	14	5	11	3	9	2	9	2	1	11	19	2	5	8	7	45	47
February	15	6	1	5	1	10	2	13	7	15	3	10	3	9	2	9	2	2	14	20	1	3	8	7	46	46
March	13	7	[1]	7	[1]	6	1	13	4	11	3	11	2	14	2	13	3	3	10	14	1	4	10	6	46	46
April	12	6	0	3	0	7	1	15	3	12	2	12	1	16	1	17	2	2	11	14	1	3	9	6	47	47
May	10	6	0	3	0	4	[1]	14	1	11	1	12	1	20	[1]	24	1	3	13	11	[1]	4	4	6	50	50
June	10	5	[1]	2	[1]	3	0	11	1	9	[1]	11	1	21	2	29	1	4	15	9	[1]	4	2	6	53	53
July	9	7	0	2	[1]	2	0	7	[1]	8	[1]	10	[1]	25	[1]	34	1	4	19	7	[1]	3	2	7	57	56
August	9	10	[1]	2	0	4	0	7	[1]	7	[1]	8	0	21	1	32	2	6	23	7	[1]	2	2	6	59	58
September	9	11	[1]	5	[1]	6	[1]	8	1	9	1	8	1	14	1	28	2	5	19	8	[1]	2	6	6	57	57
October	11	7	[1]	5	0	9	1	17	5	11	2	10	2	13	1	12	1	4	20	14	[1]	4	8	6	55	55
November	15	5	1	5	[1]	8	2	14	8	13	5	8	5	10	3	8	2	3	11	21	4	4	11	7	51	49
December	16	4	[1]	4	1	9	2	16	6	13	6	11	4	9	4	6	3	2	9	21	1	4	13	7	48	25
MEAN	12	7	[1]	4	[1]	6	1	13	4	11	2	10	2	15	2	18	2	3	15	14	1	4	7	6	51	51

Compiled by the U. S. Weather Bureau.

[1]Less than 0.5 percent.

Ocean Area 45130.—Position: Latitude 45°-50° N., Longitude 130°-135° W., 7,000
Greenwich Noon Observations—Years of Record: 54

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0–10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	15	7	1	4	0	6	1	12	2	15	3	17	1	13	2	13	2	1	11	19	2	3	6	7	44	46
February	15	8	1	6	1	8	1	13	2	13	4	15	2	12	1	11	1	2	10	20	1	4	5	7	44	45
March	13	8	1	3	1	7	1	10	2	17	1	13	1	17	1	16	1	3	13	14	2	4	9	7	44	45
April	13	5	1	4	1	4	1	12	1	16	2	17	1	16	2	14	3	2	10	14	1	4	10	7	45	46
May	12	7	0	2	0	7	1	11	1	15	1	18	1	18	1	15	1	2	12	11	0	3	6	7	48	48
June	10	8	0	4	0	5	0	5	1	13	1	15	1	20	0	25	1	3	18	9	1	2	2	7	51	52
July	10	10	0	2	1	4	0	5	1	14	1	14	1	20	1	25	1	3	19	7	1	3	3	8	56	55
August	11	13	1	1	0	3	0	6	1	10	1	13	1	20	1	30	1	1	23	7	1	4	3	7	59	58
September	13	15	1	4	0	3	1	8	1	13	1	12	2	14	1	23	2	1	13	8	0	3	7	6	57	58
October	14	10	1	4	1	6	1	11	3	17	3	13	2	14	2	10	2	2	14	14	1	3	9	7	55	55
November	15	4	1	3	1	5	2	12	4	15	4	17	3	14	2	11	2	1	11	21	1	5	8	7	50	51
December	18	7	1	5	1	4	1	10	4	16	6	16	3	11	4	10	1	1	9	21	3	4	14	8	47	48
MEAN	13	8	1	3	1	5	1	10	2	15	2	15	1	16	1	17	1	2	14	14	1	4	7	7	50	51

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 45135.—Position: Latitude 45°-50° N., Longitude 135°-140° W., 4,000
Greenwich Noon Observations—Years of Record: 54

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0–10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	16	6	2	2	1	6	2	9	1	18	1	17	4	15	4	9	3	[1]	15	11	3	3	9	3	43	45
February	15	5	2	7	[1]	8	[1]	15	2	18	4	15	1	9	2	10	1	1	15	15	2	2	10	7	43	44
March	15	7	1	5	0	3	1	9	1	15	1	10	3	18	3	21	2	0	9	16	6	4	9	7	42	44
April	15	7	0	5	0	5	0	10	2	17	2	12	2	12	3	11	5	2	9	15	3	4	14	7	44	44
May	12	5	0	2	0	7	[1]	13	1	17	1	17	1	18	2	13	1	2	12	12	0	5	7	8	46	46
June	11	7	0	4	0	8	0	12	1	16	[1]	12	1	19	[1]	20	0	1	21	13	0	2	1	8	50	49
July	9	12	0	5	0	4	0	12	0	11	[1]	14	1	19	1	16	[1]	5	28	12	0	1	3	8	54	54
August	10	9	0	4	0	6	[1]	8	0	12	1	17	[1]	20	0	21	[1]	2	26	13	0	5	4	8	58	57
September	11	10	0	5	[1]	4	0	8	1	14	1	14	1	18	2	18	2	4	15	7	[1]	4	7	7	57	57
October	15	6	0	4	0	3	1	11	2	19	3	14	2	21	2	10	1	1	12	17	[1]	4	11	7	54	54
November	17	7	2	3	0	5	1	11	3	15	3	16	3	15	3	11	1	1	7	14	0	5	11	7	48	49
December	18	10	[1]	3	0	6	1	5	2	19	4	16	5	16	4	8	1	0	11	14	2	4	10	7	45	46
MEAN	14	7	1	4	[1]	5	1	10	1	16	2	15	2	17	2	14	1	2	15	13	1	4	8	7	49	49

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 45140.—Position: Latitude 45°-50° N., Longitude 140°-145° W., 3,000
Greenwich Noon Observations—Years of Record: 54

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0–10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	15	7	1	7	0	6	1	8	3	15	1	10	2	21	4	10	3	1	18	18	1	1	7	7	43	44
February	15	6	2	5	1	8	2	11	4	19	2	12	3	12	2	5	4	2	18	18	1	3	8	7	42	44
March	16	8	1	3	1	3	1	10	3	15	2	11	3	16	3	16	3	1	16	12	4	2	9	7	42	43
April	14	8	1	5	0	7	[1]	9	[1]	17	2	11	3	14	5	14	2	2	14	13	3	3	10	7	43	44
May	14	6	1	2	1	8	0	7	[1]	17	2	19	2	19	2	19	1	3	17	16	0	4	10	8	46	45
June	11	8	0	4	0	7	[1]	10	[1]	19	1	19	[1]	18	1	9	1	3	25	12	0	4	3	9	49	49
July	8	9	0	5	0	4	1	11	0	14	0	18	0	20	0	14	[1]	4	32	11	0	2	2	8	54	53
August	10	8	[1]	5	0	5	0	11	[1]	16	0	21	1	17	1	12	[1]	3	30	10	0	1	2	8	57	57
September	13	9	0	7	[1]	7	1	9	1	16	2	18	2	15	4	11	2	1	19	11	[1]	5	5	7	57	57
October	16	4	1	1	0	6	1	11	1	18	3	23	3	14	3	9	1	1	10	14	0	6	10	7	52	53
November	16	8	1	4	1	4	1	7	1	13	3	19	6	17	7	5	2	1	11	14	[1]	4	15	6	47	49
December	18	6	3	2	2	4	1	6	5	14	4	11	7	14	4	13	3	1	11	14	[1]	4	11	7	44	46
MEAN	14	7	1	4	1	6	1	9	1	16	2	15	3	16	3	11	2	2	18	14	1	3	8	7	48	49

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 45145.—Position: Latitude 45°-50° N., Longitude 145°-150° W., 3,000 Greenwich Noon Observations—Years of Record: 54

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0–10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	16	9	2	5	1	7	1	11	2	15	3	12	3	11	6	8	3	1	14	15	5	2	8	7	42	43
February	17	9	0	4	0	6	2	10	1	18	3	13	3	19	3	6	3	0	11	13	4	3	8	7	41	43
March	17	9	1	7	1	4	0	10	1	10	3	11	3	21	4	11	4	0	14	14	2	4	8	7	41	43
April	14	8	[1]	5	0	5	0	8	1	12	2	14	4	20	3	13	2	3	13	13	5	4	9	5	42	42
May	14	3	1	5	[1]	4	1	9	1	20	2	16	2	16	3	14	1	2	13	16	[1]	4	10	8	45	44
June	11	6	0	6	0	10	0	12	1	20	0	18	[1]	15	1	9	0	2	25	14	0	4	0	8	48	48
July	10	8	0	4	0	7	0	8	0	18	0	20	[1]	17	0	14	0	4	34	12	0	2	2	8	53	52
August	11	7	0	3	0	7	0	12	1	18	[1]	22	2	16	1	9	[1]	2	25	14	0	1	2	9	57	56
September	14	6	[1]	3	1	9	[1]	14	1	15	3	16	2	14	3	11	1	1	18	12	[1]	3	5	7	57	56
October	17	6	[1]	4	[1]	3	0	10	2	19	5	14	4	15	6	10	2	0	15	19	0	6	13	7	51	52
November	17	4	1	6	1	8	1	12	1	16	1	13	5	16	4	9	1	1	7	16	3	5	10	7	47	48
December	18	4	3	2	1	8	1	4	3	17	3	19	6	14	6	9	1	1	10	16	1	3	9	7	44	45
MEAN	15	6	1	4	1	6	1	10	1	17	2	16	3	16	3	10	2	1	17	15	2	3	7	7	47	48

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 45150.—Position: Latitude 45°-50° N., Longitude 150°-155° W., 3,000
Greenwich Noon Observations—Years of Record: 54

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	17	1	1	4	2	8	2	9	1	16	1	18	6	12	5	7	6	1	12	17	2	3	7	7	41	42
February	16	6	1	3	1	11	2	10	3	17	2	9	2	15	4	11	2	1	15	13	4	2	6	7	41	42
March	16	6	[1]	4	1	7	[1]	7	2	18	1	15	3	14	2	18	2	0	14	12	6	1	11	7	41	42
April	13	8	1	5	0	7	[1]	6	2	12	[1]	18	[1]	20	3	14	2	2	14	15	3	5	7	7	41	42
May	14	3	2	7	[1]	7	0	7	[1]	16	1	20	3	17	3	11	2	1	21	15	1	4	9	8	44	44
June	11	5	0	4	0	7	[1]	14	[1]	14	[1]	21	1	19	2	10	[1]	3	25	16	0	3	1	9	47	47
July	10	9	[1]	3	0	7	[1]	11	0	16	0	19	0	20	[1]	12	0	3	35	17	0	1	1	7	52	51
August	12	7	0	3	0	6	0	10	1	18	1	20	2	18	[1]	12	0	2	32	19	[1]	3	2	8	56	55
September	15	3	2	3	[1]	5	[1]	10	2	19	4	18	1	15	2	12	2	2	21	12	[1]	4	8	7	56	55
October	13	5	1	2	1	5	1	7	4	12	3	15	5	20	6	8	5	0	10	13	0	6	11	7	50	51
November	17	5	1	3	0	8	1	6	2	14	3	11	5	19	3	16	3	[1]	8	14	2	5	9	7	45	47
December	17	10	1	4	1	7	1	12	1	11	4	16	4	13	3	7	4	1	12	14	3	3	13	7	43	44
MEAN	15	6	1	3	1	7	1	9	2	15	2	17	2	17	3	11	2	1	18	15	2	3	7	7	46	47

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 45155.—Position: Latitude 45°-50° N., Longitude 155°-160° W., 3,000
Greenwich Noon Observations—Years of Record: 51

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	16	4	1	5	1	13	1	11	4	12	3	16	2	12	2	11	2	0	11	16	3	2	8	7	41	41
February	16	5	2	5	2	8	2	8	1	13	4	10	4	22	1	11	2	[1]	13	10	5	1	9	7	39	41
March	16	6	1	5	1	8	0	7	2	17	3	16	1	15	4	13	1	[1]	16	13	7	2	9	8	40	40
April	15	8	2	5	0	6	0	8	0	9	1	15	2	21	5	14	3	1	14	11	5	4	6	7	40	41
May	14	7	0	6	0	5	1	10	1	11	1	15	1	18	3	17	3	1	18	19	1	5	8	7	43	42
June	12	6	[1]	3	0	6	0	12	1	16	1	17	1	21	1	14	0	1	28	11	0	4	2	9	46	45
July	10	6	0	4	0	4	0	10	[1]	21	1	19	1	18	[1]	13	0	3	30	14	0	1	[1]	8	51	50
August	11	5	0	4	0	6	[1]	11	[1]	19	2	18	1	16	1	15	0	2	33	15	0	3	1	9	54	54
September	16	7	[1]	2	1	4	1	12	2	20	3	16	2	15	3	8	2	2	18	15	[1]	2	6	8	55	54
October	18	4	1	4	[1]	6	3	7	2	9	2	17	3	21	5	12	3	1	9	16	0	8	12	7	49	50
November	18	7	1	8	[1]	6	1	8	2	11	2	16	5	14	5	11	2	1	8	14	1	4	7	7	44	46
December	18	5	3	4	1	9	2	8	2	11	6	13	3	11	8	9	4	1	9	14	6	2	12	7	41	43
MEAN	15	6	1	4	1	7	1	9	2	14	2	16	2	17	3	12	2	1	17	14	2	3	6	8	45	46

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 50130.—Position: Latitude 50°-55° N., Longitude 130°-135° W., 4,000
Greenwich Noon Observations—Years of Record: 49

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	16	8	1	8	1	7	1	16	1	16	2	7	2	14	2	12	3	1	9	16	2	4	12	7	43	45
February	15	6	0	6	1	5	0	17	4	15	3	10	3	13	2	12	1	3	13	21	5	3	9	7	42	44
March	15	7	0	4	1	4	1	12	2	16	1	16	1	17	3	13	1	2	9	15	5	3	13	7	42	44
April	13	4	1	5	0	4	1	19	1	19	0	15	1	13	1	13	1	2	10	16	2	6	10	7	44	45
May	11	5	0	3	0	6	1	11	1	14	1	14	1	23	1	17	1	3	14	14	0	4	5	7	46	47
June	10	5	0	2	0	6	0	13	1	11	1	15	1	20	1	22	1	5	15	12	0	5	2	8	50	50
July	10	4	0	3	0	5	0	12	1	11	1	14	0	23	1	22	2	4	20	14	0	3	3	8	54	54
August	10	4	0	3	0	3	1	9	1	11	1	14	1	25	0	29	1	2	17	14	0	4	2	7	57	57
September	13	8	0	3	1	3	1	8	2	11	1	14	1	18	3	25	1	2	15	10	0	4	6	6	56	56
October	14	6	0	4	0	4	1	12	4	17	2	14	5	16	1	12	1	2	10	18	1	5	13	7	52	53
November	15	5	1	4	0	6	1	13	3	14	4	15	2	18	2	10	1	3	6	19	1	8	10	7	47	50
December	18	7	1	4	1	5	1	8	4	18	4	14	4	14	6	9	2	0	9	22	2	5	10	7	45	46
MEAN	13	6	0	4	0	5	0	12	2	14	2	13	2	18	2	16	1	3	12	16	1	5	8	7	48	49

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 50135.—Position: Latitude 50°-55° N., Longitude 135°-140° W., 5,000 Greenwich Noon Observations—Years of Record: 49

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0–10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	17	10	1	5	1	4	1	11	2	11	5	11	2	16	6	10	3	2	11	13	3	3	10	7	42	44
February	16	8	1	3	0	5	1	9	2	20	3	15	2	18	3	8	3	0	10	14	3	3	7	7	41	43
March	17	7	1	3	0	5	1	8	1	18	2	18	1	17	4	12	2	1	14	17	3	4	12	8	41	43
April	15	5	0	3	0	8	1	11	2	20	1	14	2	19	4	10	1	0	12	17	2	4	9	7	42	43
May	13	7	0	2	1	6	1	14	1	18	1	20	2	16	1	12	1	0	16	16	1	5	5	8	45	45
June	10	9	1	4	1	7	0	10	0	14	1	17	1	20	1	17	1	2	22	15	1	3	2	8	49	49
July	10	7	0	3	0	4	1	6	0	15	0	22	1	22	0	17	1	3	23	12	0	4	2	8	53	53
August	12	7	0	3	0	2	0	6	1	18	1	20	1	26	1	14	1	1	25	13	0	2	3	8	56	56
September	14	8	1	1	0	2	1	5	2	13	1	15	2	30	2	17	1	1	13	13	1	3	5	7	55	55
October	17	6	1	2	0	5	1	10	2	16	5	18	4	17	5	21	1	1	6	13	0	4	9	7	51	52
November	17	3	1	6	1	4	1	12	3	18	3	17	3	13	4	5	1	1	8	17	1	6	14	7	47	48
December	19	8	1	4	1	5	1	7	3	15	6	17	5	15	8	8	2	0	7	14	2	2	10	7	44	46
MEAN	15	7	1	3	1	5	1	9	2	16	2	17	2	19	4	12	1	1	14	15	1	4	7	7	47	48

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 50140.—Position: Latitude 50°-55° N., Longitude 140°-145° W., 6,000
Greenwich Noon Observations—Years of Record: 49

Month	Wind																	Weather								
		Percentages of observations from —																Percentages of observations recording—								
		N		NE		E		SE		S		SW		W		NW										
	Mean velocity (knots)	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls	Mean Cloud Amount (0–10)	Average air temperature	Average sea surface temperature
January	17	7	1	4	1	10	1	10	2	17	3	14	2	14	4	9	1	1	15	19	4	3	9	7	41	42
February	16	6	2	5	0	8	2	11	3	16	2	14	2	16	5	6	1	1	12	15	5	3	5	7	40	42
March	17	6	1	5	0	3	1	10	1	14	2	17	2	18	5	12	2	1	12	13	6	3	12	7	40	41
April	15	6	1	6	1	4	1	8	1	16	2	17	2	19	4	11	1	1	12	16	4	4	12	7	40	41
May	13	4	1	3	1	6	1	10	1	21	1	19	1	18	1	11	1	1	18	17	1	4	6	8	43	44
June	10	7	0	6	0	7	0	10	1	16	1	18	1	19	1	12	1	2	23	15	0	2	2	8	47	47
July	10	5	0	3	0	5	0	9	1	16	1	22	1	25	1	12	0	2	29	15	1	1	2	9	52	51
August	11	5	1	2	0	6	0	9	1	19	1	18	1	25	1	10	1	2	28	15	1	2	5	8	55	55
September	14	4	1	4	1	3	1	8	2	17	3	16	3	23	2	10	2	2	17	15	0	3	6	7	54	54
October	18	3	1	4	1	4	1	11	2	15	4	15	3	20	8	6	3	0	8	15	1	5	12	7	49	51
November	19	6	1	4	1	5	1	9	3	14	5	18	5	13	6	7	2	0	8	19	1	4	17	7	45	46
December	19	7	1	3	1	6	1	10	2	15	3	17	3	18	5	6	2	0	10	16	3	2	12	7	42	44
MEAN	15	5	1	4	1	5	1	9	2	17	2	17	2	19	4	10	1	1	16	16	2	3	8	7	46	47

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 50145.—Position: Latitude 50°-55° N., Longitude 145°-150° W., 7,000
Greenwich Noon Observations—Years of Record: 51

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0–10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	16	7	1	6	1	6	1	13	1	12	3	15	2	17	3	9	3	0	13	15	5	2	8	7	40	41
February	17	7	[1]	4	1	7	2	14	2	19	2	11	2	15	2	7	4	1	15	15	4	3	6	7	38	40
March	17	5	1	5	[1]	7	[1]	10	1	12	2	13	2	24	4	10	4	0	13	13	6	2	11	7	38	40
April	15	5	1	4	1	6	1	9	1	17	2	17	2	19	2	10	1	2	12	16	6	2	8	7	39	40
May	13	5	1	3	1	6	1	9	1	18	1	19	2	19	3	10	[1]	1	13	17	[1]	4	6	8	42	42
June	10	10	0	3	[1]	7	0	13	[1]	16	1	20	1	17	[1]	10	0	2	25	17	0	1	2	9	46	46
July	10	5	[1]	3	0	4	0	7	[1]	16	[1]	24	[1]	28	1	10	0	2	33	15	0	2	3	9	50	50
August	12	5	[1]	2	0	6	[1]	10	1	17	3	21	2	20	2	10	[1]	1	25	18	0	2	3	8	54	53
September	16	3	1	3	[1]	2	1	8	2	15	5	21	3	24	3	6	2	1	16	14	[1]	3	7	8	52	53
October	18	5	1	3	[1]	4	1	8	2	15	4	17	6	16	8	5	4	1	7	16	1	5	15	7	48	49
November	18	7	1	3	1	5	1	6	2	14	4	18	4	16	7	6	4	1	8	16	1	5	15	7	43	45
December	19	5	1	5	1	8	1	11	2	12	4	12	4	13	7	9	4	1	10	16	4	3	12	7	41	42
MEAN	15	5	1	3	1	5	1	10	1	15	3	17	3	19	4	9	2	1	16	16	2	3	8	8	44	45

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 50150.—Position: Latitude 50°-55° N., Longitude 150°-155° W., 6,000
Greenwich Noon Observations—Years of Record: 49

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	17	8	1	5	1	8	1	9	1	16	3	13	2	16	3	9	3	1	15	8	5	2	8	8	38	40
February	17	8	[1]	4	1	8	2	15	2	16	2	10	2	16	2	7	4	1	14	14	5	2	8	7	37	39
March	17	6	1	3	[1]	7	[1]	12	1	13	2	13	2	21	4	10	4	1	14	13	6	3	8	8	37	39
April	16	6	1	4	1	5	1	9	1	15	2	18	2	19	2	12	1	1	8	14	5	2	10	7	38	39
May	13	5	1	6	1	8	1	12	1	14	1	14	2	19	3	11	[1]	1	14	15	1	3	6	8	41	41
June	10	7	0	6	[1]	7	0	11	[1]	13	1	16	1	21	[1]	12	0	5	25	16	[1]	2	2	8	45	45
July	10	4	[1]	3	0	4	0	11	[1]	17	[1]	26	[1]	25	1	8	0	1	35	16	0	2	2	9	50	49
August	13	4	[1]	2	0	4	[1]	9	1	17	3	26	2	20	2	8	[1]	2	29	16	0	2	3	8	53	52
September	16	2	1	4	[1]	4	1	10	2	16	5	18	3	19	3	9	2	1	19	16	0	4	7	8	52	52
October	19	4	1	3	[1]	6	1	7	2	11	4	17	6	18	8	8	4	0	11	16	2	5	15	7	47	48
November	19	4	1	2	1	7	1	9	2	9	4	14	4	21	7	10	4	0	7	13	4	4	16	7	42	44
December	19	10	1	3	1	6	1	12	2	10	4	12	4	13	7	9	4	1	11	13	4	3	13	7	39	41
MEAN	16	5	1	3	1	6	1	11	1	14	2	16	3	19	4	10	2	1	17	14	3	3	8	8	43	44

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 50155.—Position: Latitude 50°-55° N., Longitude 155°-160° W., 7,000
Greenwich Noon Observations—Years of Record: 49

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0–10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Force 1–6	Force 7 or over	Clam	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	17	9	2	6	1	11	1	10	2	14	2	11	3	14	3	8	2	1	14	14	6	1	9	7	38	39
February	17	7	1	4	1	9	2	15	3	18	3	11	2	11	2	8	2	1	16	17	5	3	9	7	37	38
March	17	8	1	5	[1]	7	[1]	10	1	17	3	11	3	16	3	11	3	1	16	12	6	1	10	7	36	38
April	16	6	1	4	1	7	0	7	2	12	1	18	2	21	4	11	3	[1]	13	13	5	1	11	7	37	38
May	13	7	1	7	0	6	1	11	2	12	1	14	2	20	1	11	2	2	16	14	1	3	4	8	41	40
June	11	5	0	8	0	9	[1]	9	1	18	1	16	1	19	[1]	11	0	2	28	13	0	1	1	8	45	44
July	11	4	0	3	0	4	0	7	1	16	2	21	1	29	[1]	10	[1]	2	35	15	[1]	2	2	8	49	48
August	12	3	1	5	[1]	6	0	8	1	22	2	18	2	20	1	8	1	2	26	16	0	4	3	8	52	52
September	15	4	1	3	1	4	2	9	1	16	1	19	3	21	3	10	2	[1]	14	13	[1]	3	4	8	51	51
October	19	4	2	5	1	5	2	4	3	9	3	14	6	16	7	12	6	1	7	14	[1]	5	13	7	46	47
November	17	9	1	3	1	7	[1]	9	1	9	1	15	4	20	5	11	4	[1]	7	14	2	4	16	7	41	43
December	18	7	2	5	2	6	2	8	2	10	3	13	3	14	4	14	4	1	12	13	8	3	10	8	38	40
MEAN	15	6	1	5	1	7	1	9	2	14	2	15	3	18	3	10	2	1	17	14	3	3	8	8	43	43

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Ocean Area 55135.—Position: Latitude 55°-60° N., Longitude 135°-140° W., 2,000
Greenwich Noon Observations—Years of Record: 48

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	12	6	2	14	3	17	5	16	2	10	0	5	0	6	0	10	2	2	4	13	10	4	12	5	36	41
February	13	9	2	19	0	6	0	15	5	4	0	13	0	7	3	14	0	1	10	12	18	7	11	5	35	39
March	11	13	1	19	1	20	3	14	1	6	2	8	1	1	1	5	0	4	7	16	14	3	10	6	37	39
April	10	7	0	5	1	14	3	21	2	11	1	10	0	7	0	13	0	5	4	24	8	3	11	6	40	42
May	7	6	0	7	1	14	2	20	2	9	1	9	0	7	0	10	0	12	9	19	0	2	4	6	45	45
June	4	9	0	9	0	9	0	11	0	8	[1]	7	0	15	0	12	0	20	16	12	0	4	2	3	49	49
July	5	3	0	11	0	10	0	15	0	8	0	12	0	14	0	12	1	14	17	16	0	4	0	7	53	53
August	4	5	0	6	0	11	1	15	1	9	0	12	0	7	0	9	0	24	25	25	0	3	4	8	54	54
September	6	7	0	6	1	9	3	18	2	6	0	4	0	10	0	12	0	22	18	26	0	8	6	6	51	50
October	10	6	0	12	2	17	2	15	3	7	0	10	2	8	0	8	0	8	4	31	1	8	11	7	46	47
November	12	9	0	5	1	12	1	20	5	14	2	8	0	5	0	9	1	8	5	18	3	3	3	6	41	45
December	12	11	0	12	0	3	0	21	1	9	3	11	4	6	3	12	0	4	4	17	13	10	8	7	37	42
MEAN	9	8	[1]	10	1	12	2	17	2	8	1	9	1	7	1	11	[1]	10	10	19	6	5	7	6	44	46

Compiled by the U. S. Weather Bureau

[1] Less than 0.5 percent.

Ocean Area 55140.—Position: Latitude 55°-60° N., Longitude 140°-145° W., 1,000 Greenwich Noon Observations—Years of Record: 47

Month	Wind																	Weather								
	Mean velocity (knots)	Percentages of observations from —																Percentages of observations recording —						Mean Cloud Amount (0-10)	Average air temperature	Average sea surface temperature
		N		NE		E		SE		S		SW		W		NW										
		Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Force 1-6	Force 7 or over	Calm	Fog, Mist, or Haze	Rain or Drizzle	Snow	Showers	Squalls			
January	13	6	0	24	2	21	3	12	2	2	0	12	2	6	3	4	0	1	3	7	4	0	6	4	36	40
February	12	6	0	11	0	21	1	15	5	8	0	11	0	11	0	9	0	2	8	12	8	7	18	6	37	41
March	12	5	0	11	2	25	3	13	3	5	0	8	0	9	0	14	0	2	8	10	15	3	7	3	36	38
April	12	2	0	12	4	23	5	12	2	5	0	4	0	17	0	7	1	6	4	19	9	2	13	7	40	41
May	9	4	0	9	0	19	3	16	1	9	0	11	0	11	2	9	0	6	17	20	1	5	6	6	43	44
June	7	5	0	15	0	18	0	8	1	7	0	21	1	14	0	5	0	5	29	16	0	3	7	7	48	47
July	7	6	0	8	0	13	3	12	0	7	0	17	0	20	0	4	0	10	18	8	0	5	2	5	53	52
August	7	8	0	11	0	10	0	19	0	7	0	13	0	18	0	7	0	7	11	15	0	4	6	7	54	54
September	11	2	0	14	1	18	2	20	1	4	0	18	2	12	2	2	0	2	8	27	1	11	9	6	51	51
October	13	6	0	9	3	25	6	17	4	6	3	10	0	7	0	1	0	3	4	15	0	4	9	9	47	48
November	11	6	0	15	2	9	4	15	2	17	0	9	4	0	2	13	0	2	2	11	5	0	9	5	41	46
December	14	2	0	13	5	18	5	10	5	2	0	16	3	8	0	10	0	3	3	12	5	5	11	6	39	42
MEAN	11	5	0	12	2	18	3	14	2	7	[1]	13	1	11	1	7	[1]	4	10	14	4	4	9	6	44	45

Compiled by the U. S. Weather Bureau.

[1] Less than 0.5 percent.

Conversion Tables

FEET TO METERS

Feet	0	1	2	3	4	5	6	7	8	9
0	0. 00	0. 30	0. 61	0. 91	1. 22	1. 52	1. 83	2. 13	2. 44	2. 74
10	3. 05	3. 35	3. 66	3. 96	4. 27	4. 57	4. 88	5. 18	5. 49	5. 79
20	6. 10	6. 40	6. 71	7. 01	7. 32	7. 62	7. 92	8. 23	8. 53	8. 84
30	9. 14	9. 45	9. 75	10. 06	10. 36	10. 67	10. 97	11. 28	11. 58	11. 89
40	12. 19	12. 50	12. 80	13. 11	13. 41	13. 72	14. 02	14. 33	14. 63	14. 93
50	15. 24	15. 54	15. 85	16. 15	16. 46	16. 76	17. 07	17. 37	17. 68	17. 98
60	18. 29	18. 59	18. 90	19. 20	19. 51	19. 81	20. 12	20. 42	20. 73	21. 03
70	21. 34	21. 64	21. 95	22. 25	22. 55	22. 86	23. 16	23. 47	23. 77	24. 08
80	24. 38	24. 69	24. 99	25. 30	25. 60	25. 91	26. 21	26. 52	26. 82	27. 13
90	27. 43	27. 74	28. 04	28. 35	28. 65	28. 96	29. 26	29. 57	29. 87	30. 17

FATHOMS TO METERS

Fathoms	0	1	2	3	4	5	6	7	8	9
0	0. 00	1. 83	3. 66	5. 49	7. 32	9. 14	10. 97	12. 80	14. 63	16. 46
10	18. 29	20. 12	21. 95	23. 77	25. 60	27. 43	29. 26	31. 09	32. 92	34. 75
20	36. 58	38. 40	40. 23	42. 06	43. 89	45. 72	47. 55	49. 38	51. 21	53. 03
30	54. 86	56. 69	59. 52	60. 35	62. 18	64. 01	65. 84	67. 67	69. 49	71. 32
40	73. 15	74. 98	76. 81	78. 64	80. 47	82. 30	84. 12	85. 95	87. 78	89. 61
50	91. 44	93. 27	95. 10	96. 93	98. 75	100. 58	102. 41	104. 24	106. 07	107. 90
60	109. 73	111. 56	113. 39	115. 21	117. 04	118. 87	120. 70	122. 53	124. 36	126. 19
70	128. 02	129. 85	131. 67	133. 50	135. 33	137. 16	138. 99	140. 82	142. 65	144. 47
80	146. 30	148. 13	149. 96	151. 79	153. 62	155. 45	157. 28	159. 11	160. 93	162. 76
90	164. 59	166. 42	168. 25	170. 08	171. 91	173. 74	175. 56	177. 39	179. 22	181. 05

NAUTICAL MILES TO STATUTE MILES

1 nautical mile=6,080.20 feet. 1 statute mile=5,280 feet.

Nautical miles	0	1	2	3	4	5	6	7	8	9
0	0. 000	1. 152	2. 303	3. 455	4. 606	5. 758	6. 909	8. 061	9. 212	10. 364
10	11. 515	12. 667	13. 819	14. 970	16. 122	17. 273	18. 425	19. 576	20. 728	21. 880
20	23. 031	24. 183	25. 334	26. 486	27. 637	28. 789	29. 940	31. 092	32. 243	33. 395
30	34. 547	35. 698	36. 850	38. 001	39. 153	40. 304	41. 456	42. 607	43. 759	44. 911
40	46. 062	47. 214	48. 365	49. 517	50. 668	51. 820	52. 971	54. 123	55. 275	56. 426
50	57. 578	58. 729	59. 881	61. 032	62. 184	63. 335	64. 487	65. 639	66. 790	67. 942
60	69. 093	70. 245	71. 396	72. 548	73. 699	74. 851	76. 003	77. 154	78. 306	79. 457
70	80. 609	81. 760	82. 912	84. 063	85. 215	86. 366	87. 518	88. 670	89. 821	90. 973
80	92. 124	93. 276	94. 427	95. 579	96. 730	97. 882	99. 034	100. 185	101. 337	102. 488
90	103. 640	104. 791	105. 942	107. 094	108. 246	109. 397	110. 549	111. 701	112. 852	114. 004

STATUTE MILES TO NAUTICAL MILES

Statute miles	0	1	2	3	4	5	6	7	8	9
0	0. 000	0. 868	1. 737	2. 605	3. 474	4. 342	5. 210	6. 079	6. 947	7. 816
10	8. 684	9. 552	10. 421	11. 289	12. 158	13. 026	13. 894	14. 763	15. 631	16. 500
20	17. 368	18. 236	19. 105	19. 973	20. 842	21. 710	22. 578	23. 447	24. 315	25. 184
30	26. 052	26. 920	27. 789	28. 657	29. 526	30. 394	31. 262	32. 131	32. 999	33. 868
40	34. 736	35. 604	36. 473	37. 341	38. 210	39. 078	39. 946	40. 815	41. 683	42. 552
50	43. 420	44. 288	45. 157	46. 025	46. 894	47. 762	48. 630	49. 499	50. 367	51. 236
60	52. 104	52. 972	53. 841	54. 709	55. 578	56. 446	57. 314	58. 183	59. 051	59. 920
70	60. 787	61. 655	62. 524	63. 392	64. 261	65. 129	65. 997	66. 866	67. 734	68. 603
80	69. 471	70. 339	71. 208	72. 076	72. 945	73. 813	74. 681	75. 550	76. 418	77. 287
90	78. 155	79. 023	79. 892	80. 760	81. 629	82. 497	83. 365	84. 234	85. 102	85. 971

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Number in parentheses immediately following any item in this Index is the number of the largest-scale United States Coast and Geodetic Survey, or Hydrographic Office chart, on which that feature appears.

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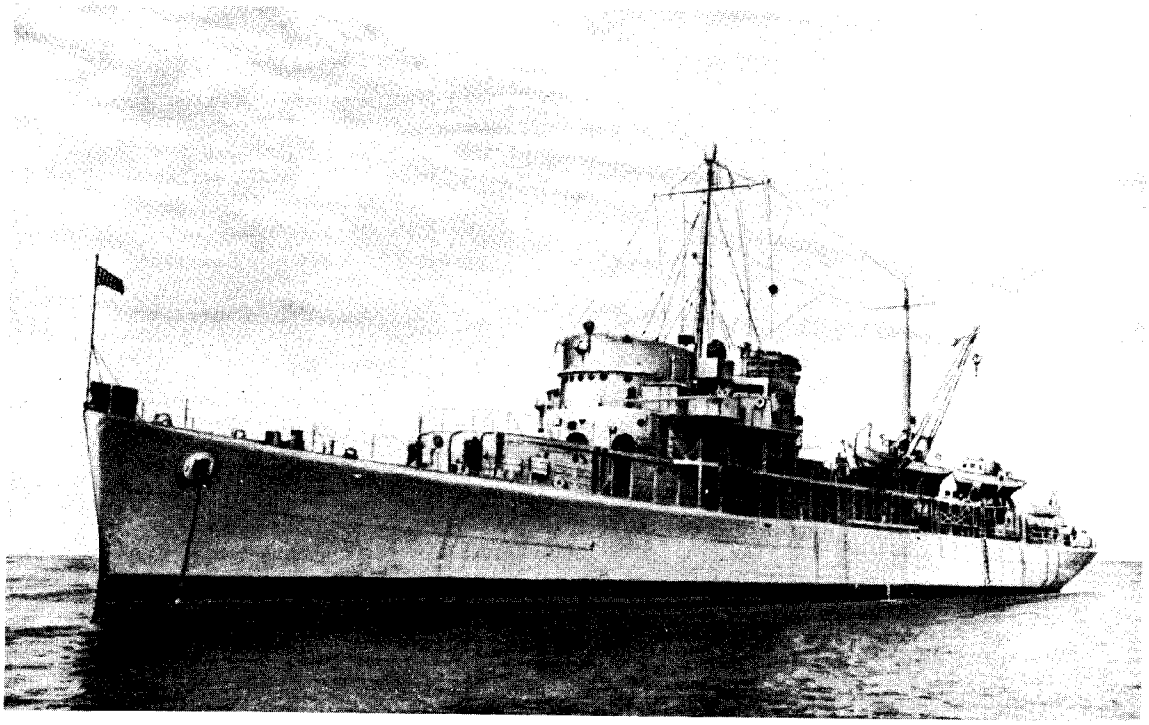
NAUTICAL CHART
SYMBOLS AND ABBREVIATIONS



COAST AND GEODETIC SURVEY SHIP *PIONEER*

Chart No. 1

SYMBOLS AND ABBREVIATIONS FOR NAUTICAL CHARTS

The standard symbols and abbreviations which have been approved for use on nautical charts published by the United States of America are reproduced on the following pages.

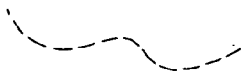
Symbols and abbreviations are numbered in accordance with a standard form proposed by the International Hydrographic Bureau of 1939.

Vertical figures indicate that the symbol or abbreviation is in accordance with the I. H. B. standard.

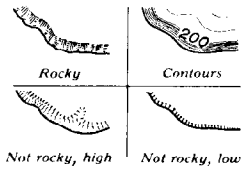
Symbols or abbreviations which differ from those of the I. H. B., or which do not appear on the standard are indicated by slant figures.

Figures in parentheses indicate that the symbol or abbreviation is in addition to those shown on the standard.

A. The Coastline



1 *Shoreline unsurveyed*

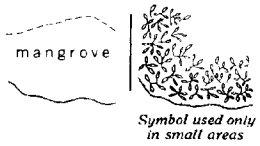


3 *Cliffy coastline (Bluffs)*

4 *Sandhills or dunes*

5 *Stony or shingly shore*

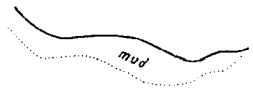
6 *Sandy shore*



7 *Mangrove*

8 *Swamp or marsh*

11 Foreshores



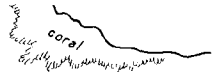
a Mud flats

b Sand

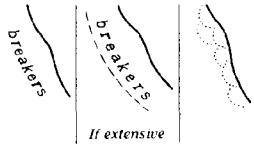
c Stones or gravel

d Rock, uncovers at datum of soundings

f Sand and gravel



g Coral, uncovers at datum of soundings (See O-10)



12 *Breakers along a shore*

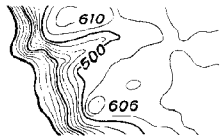
13 *Limiting danger line*

B. Coast Features

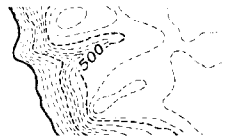
1	*G.*	*Gulf*
2	*B.*	*Bay*
(2a)	*B.*	*Bayou*
3	*Fd.*	*Fjord*
4	*L.*	*Loch, Lough, Lake*
5	*Cr.*	*Creek*
(5a)	*C.*	*Cove*
6	*In.*	*Inlet*
7	*Str.*	*Strait*
8	*Sd.*	*Sound*
9	*Pass.*	*Passage, Pass*
10	*Chan.*	*Channel*
11	*Entr.*	*Entrance*
13	*Mth.*	*Mouth*
14	*Rds.*	*Roads, Roadsted*
15	*Anch.*	*Anchorage*
16	*Hbr.*	*Harbor*
17	*P.*	*Port*
(17a)	*P.*	*Pond*
18	I.	*Island*
19	It.	*Islet*
20	Arch.	*Archipelago*
21	Pen.	*Peninsula*
22	C.	*Cape*
23	Prom.	*Promontory*
24	Hd.	*Head*
25	Pt.	*Point*
26	Mt.	*Mountain* *Mount*
27	Rge.	*Range*
29	Pk.	*Peak*
30	Vol.	*Volcano*
32	*Bld.*	*Boulder*
(33)	*Str.*	*Stream*
(34)	*R.*	*River*
(35)	*Slu.*	*Slough*
(36)	*Lag.*	*Lagoon*
(37)	*Thoro.*	*Thorofare*

A-3944-1(15)++

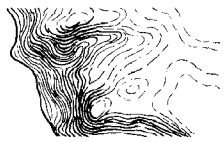
C. The Land



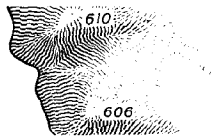
1 *Contours*



(a) Contours, approximate



(b) Form lines, no definite interval



2 *Hachures*

3 *Glacier*

A conspicuous clump or single tree of any kind useful as a landmark.

5 *Isolated trees*

wooded

9 *Deciduous woodland*

wooded

10 *Coniferous woodland*

·2560 T.T.

(11) Elevation of top of trees

D. Control Points

1	△		*Triangulation point (station)*
2	⊙		*Fixed point*
3	·256		*Summit of height (Peak) (when not a landmark)*
(a)	256		*Peak, accentuated by contours*
(b)	256		*Peak, accentuated by hachures*
(c)			*Peak, when elevation has not been determined*
(d)	⊙256		*Peak, when a landmark*
4	⊕	Obs. Spot	*Observation spot*
5		B.M.	*Bench mark*
6	∘	See View	*View point*
(9)		Astro.	*Astronomical*
(10)		Tri.	*Triangulation*
(11)		C. of E.	*Corps of Engineers*
(12)			
(13)			

E. Units

1	hr.	*hour*
2	m., min.	*minute*
3	sec.	*second*
4	m.	*meter*
5	km.	*kilometer*
6	in.	*inch*
7	ft.	*foot*
8	yd.	*yard*
9	fm.	*fathom*
11	M.	*nautical mile*
12	kn.	*knot*
13	lat.	*latitude*
14	long.	*longitude*
17	cor.	*correction*
(18)	alt.	*altitude*
(19)	ht.	*height*
(20)		
(21)		
(22)		

F. Adjectives

and other abbreviations

1	gt.	great
3	lrg.	large
4	sml.	small
7	mid.	middle
9	anc.	ancient
12	conspic.	conspicuous
16	dist.	distant
17	abt.	about
(19)	aband.	abandoned
(20)	extr.	extreme
(21)	concr.	concrete
(22)	bet.	between
(23)	estab.	established
(24)	exper.	experimental
(25)	discontd.	discontinued
(26)	fl.	flood
(27)	mod.	moderate
(28)	maintd.	maintained
(29)	elec.	electric
(30)	priv.	private, privately
(31)	prom.	prominent
(32)	std.	standard
(33)	subm.	submerged
(34)	approx.	approximate
(35)	cor.	corner
(36)	CL.	clearance
(37)	No.	number
(38)	Ave.	avenue
(39)	Hy.	highway
(40)	explos.	explosive
(41)	Blvd.	boulevard
(42)		
(43)		
(44)		
(45)		
(46)		

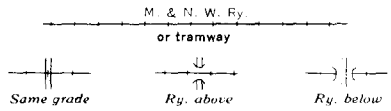
G. Harbors

1		Anch.	Anchorage, large vessels (see No. P-12)
2		Anch.	Anchorage, small vessels
3		Hbr.	Harbor
6		Bkw.	breakwater
8			jetty (partly below M H W)
(8a)			jetty (small scale)
9		Pier	pier
11			groin (partly below M H W)
12	Anchorage prohibited	Anch. prohib.	Anchorage prohibited
13	spoil area		spoil ground
14	Trap		fish traps (actual shape charted)
(14a)		Fsh. stk.	fishing stakes when dangerous
16		Ldg.	landing place
18		Whf.	wharf
21		Dol.	dolphin
26		Quar.	Quarantine
29		Cus. Ho.	Customhouse
33		B. Hbr.	Boat Harbor
35			dock
36			dry dock (actual shape shown on large scale charts)
37			floating dock (actual shape shown on large scale charts)
39			patent slip (marine railway)
(39a)		Ramp	ramp
40	Lock		lock (point upstream)
45		Obsy.	Observatory
(46)			
(47)			

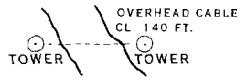
H. Topography

1 Roads (Rds.)

2 Track, footpath, or trail



3 Railway (single or double track)
Railway (Ry.) Railroad (R.R.)



4 Overhead cable (OVHD. CAB.)

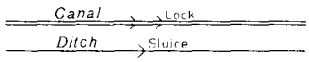
5 Power transmission line

8 River or Stream

9 Intermittent stream

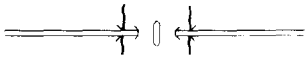
10 Lake (L.)

12 Marsh (See No. A-8)

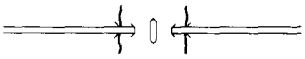


13 Canal or ditch (point upstream)

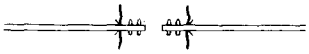
14 Bridge (fixed) (BR.)



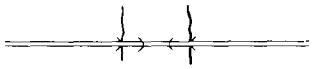
15 Drawbridge, in general



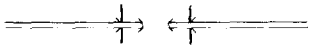
16 Swing bridge, that can be opened



17 Pontoon bridge, that can be opened



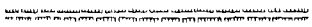
(17a) Lift bridge



(b) Bascule bridge, that can be opened

19 Ferry (Fy.)

21 Dam

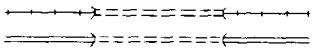


(25) Levee

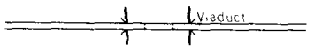
(26) Lava flow

(27) Log boom

(28) Submerged piling, piling, stumps, and snags



(29) Tunnel (railroad or road)



(30) Viaduct

I. Buildings

When the buildings are prominent, they may be shown by landmark symbol with descriptive note. (see L-63)
The landmark symbol is used to indicate positions of objects when accurately determined.

1			City or town (large scale)
(1a)			City or town (small scale)
3		Vil.	Village
4		Cas.	Castle
5		Ho.	House
8		Ch.	Church
10			Temple
12			Mosque
13			Minaret
14		Pag.	Pagoda
16		Mony.	Monastery
18	Cem.	Cem.	Cemetery
19		Ft.	Fort (actual shape charted)
23	Airport		Airplane landing field
24			Airport (large scale)
			Small scale
(24a)			Airport (military)
(24b)			Airport (civil)
26	First St.		Street
27		Tel.	Telegraph
29		P.O.	Post Office
30		Govt.	Government
32		Hosp.	Hospital
34		Magz.	Magazine
35	MON.		Monument
36	CUP.		Cupola
37		elev.	elevation elevator elevated
40	Ruins		Ruins
41	TR.		Tower
42			Windmill
44	CHY.		Chimney
46			Oil tank
47		Facty.	Factory
(56)	GAB		Gable
(57)		Sch.	School
(58)		H.S.	High School
(59)		Univ.	University
(60)		Inst.	Institute
(61)		Co.	Company
(62)		Corp.	Corporation
(63)		Cap.	Capitol
(64)			Courthouse
(65)		Cath.	Cathedral
(66)		Bldg.	Building
(67)		Pav.	Pavilion
(68)		Ltd.	Limited
(69)		Apt.	Apartment
(70)		T.	Telephone
(71)			
(72)			

J. Miscellaneous Stations

2	Sta.	*Station*
3	C. G.	*Coast Guard (similar to LS.S.)*
(3a)	C. G. WALLIS SANDS	*When the building is a landmark*
6	LS.S.	*Lifesaving station (See J-3)*
7	Rkt. Sta.	*Rocket station*
8	PIL. STA.	*Pilot station*
9	Sig. Sta.	*Signal station*
10	Sem.	*Semaphore*
19	FS.	*Flagstaff*
(20)	W. B. SIG. STA.	*Weather Bureau signal station*
(21)	FP.	*Flagpole*
(22)	F. TR.	*Flag tower*
(23)	LOOK. TR.	*Lookout tower*
(24)	S'PIPE	*Standpipe*
(25)	°BELL	*On land*
(26)		
(27)		

K. Lights

1		*Position of light*
2	Lt.	*Light*
3	LH.	*Lighthouse*
4	AERO	*Aeronautical light*
5		*Lighted beacon*
6		*Lightship*
7		*Lighted buoy*
10	REF	*Reflector*
(17)	Priv maintd	*Private light (maintained by private interests; to be used with caution)*
21	F	*Fixed*
22	Occ	*Occulting*
23	Fl	*Flashing*
24	Qk Fl	*Quick flashing*
(24a)	I Qk	*Interrupted quick*
26	Alt	*Alternating*
27	Gp Occ	*Group occulting*
28	Gp Fl	*Group flashing*
(28a)	S-L	*Short - long*
29	F Fl	*Fixed and flashing*
30	F Gp Fl	*Fixed and group flashing*
31	Rot.	*Rotating*
(39)	m.; min.	*minutes*
(40)	sec.	*seconds*
44		*visible*
44a	M.	*nautical mile*
47	Gp.	*group*
49	SEC	*sector*
61	Vi.	*violet*
63	Bu.	*blue*
64	G.	*green*
65	Or.	*orange*
66	R.	*red*
67	W.	*white*
(67a)	Am.	*amber*
68	OBSC	*obscured*
69	(U)	*unwatched*
70	Occas	*occasional*
71	Irreg.	*irregular*
73	Temp.	*temporary*
80	Vert.	*vertical*
81	Hor.	*horizontal*
(82)	D.	*destroyed*
(82a)	Exting.	*extinguished*
(83)	V. B.	*vertical beam*
(84)	Exper.	*experimental*
(85)	RGE	*range*
(86)	AERO	*aeronautical*

L. Buoys and Beacons

On entering a channel from seaward, buoys on starboard side are red with even numbers, on port side black with odd numbers. Lights on buoys on starboard side of channel are red or white, on port side white or green. Mid-channel buoys have black and white vertical stripes. Obstruction buoys are green, or have red and black horizontal bands. This system does not always apply to foreign waters. The dot of the buoy symbol, and the small circle of the light vessel and mooring buoy symbols and the center of the beacon symbol indicate their positions.

1		Position of buoy
2		Lighted buoy
3	BELL	Bell buoy
(3a)	GONG	Gong buoy
4	WHIS	Whistle buoy
5	C	Can buoy
6	N	Nun buoy
7	SP	Spherical buoy
8	S	Spar buoy
(8a)		Checkered buoy
12		Lightship
14	BW	Fairway buoy (B. & W. V.S.) (Mid-Channel)
18	RB RB	Junction buoy (R. & B. H.B.)
19	RB RB	Isolated danger buoy (R. & B. H.B.)
20	RB G	Wreck or obstruction buoy (R. & B. H.B.) or (G.)
22		Mooring buoy
24	Y Quar.	Quarantine buoy
(27)	BW	Fish trap buoy (W. & B. H.B.)
(28)		Anchorage buoy
(29)	Priv. maintd.	Maintained by private interests, to be used with caution
31	H. B.	Horizontal bands
32	V. S.	Vertical stripes
33	Chec.	checkered
41	W.	white
42	B.	black
43	R.	red
44	Y.	yellow
45	G.	green
(46)	Br.	brown
(47)	Gy.	gray
(48)	T.B.	temporary buoy
52	△RW Bn △W Bn ▲R Bn ▲ Bn	Unlighted beacon (Daybeacon)
(52a)	MARKER	Private aid to navigation
53	Bn	Beacon (See L-52)
63		Landmark
(63a)		Landmark, position approx
(64)	REF	Reflector
(65)	WOr WOr	Special purpose buoy

Note: Buoy and beacon symbols with topmarks may be shown on charts of foreign waters.

M. Radio and Radar Stations

1	R. Sta.	Radio station
2	R.T.	Radio telephone
3	R. Bn.	Radiobeacon
7	R. D. F.	Radio direction finder station
9	R. TR.	Radio tower
(9a)	R. MAST	Radio mast
(10)	R. TR. (WEAF)	Commercial broadcast
11	Ra.	Coast radar station
12	Racon	Radar responder beacon
(13)	Ra. Ref.	Radar reflector
(14)	Ra. (conspic.)	Radar conspicuous object
(15)	Ramk.	Ramark

N. Fog Signals

1	Fog Sig.	Fog signal station
6	SUB-BELL	Submarine fog bell (mechanical)
7	SUB-OSC	Submarine oscillator
8	NAUTO.	Nautophone
9	DIA.	Diaphone
11	SIREN	Fog siren
12	HORN	Fog trumpet
13	HORN	Fog horn
14	BELL	Fog bell
15	WHIS.	Fog whistle
16	REED	Reed horn
17	GONG	Gong
(18)	D. F. S.	Distance finding station
(19)	GUN	Fog gun
(20)		

O. Dangers

(25)	
1	Rocks which do not cover; with their elevations above M.H.W.
* uncovers 2 ft | *(2)	
2	Rocks that cover and uncover, with heights in feet above datum of soundings
*	
(3a)	When rock of 2 is considered a danger to navigation
+	
(4a)	Sunken rock
+	
(4b)	When rock of 4a is considered a danger to navigation
(2) Rk	
(4c)	Shoal sounding on isolated rock replaces symbol
[21] Rk [21] Wk [21] Obstr	
6a	Sunken danger with depth cleared by wire drag (Feet or fathoms)
reef line	
10	Coral or rocky reef (below datum of soundings) See A-11g
11	Stranded wreck (any portion of hull above datum of soundings)
masts	
12	Sunken wreck with only masts visible
14	Dangerous sunken wreck with less than 10 fathoms of water over it (See 6a)
wreckage	
(14a)	A number of sunken wrecks
(21) Obstr	
(14b)	Obstruction of any kind

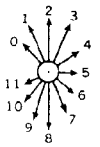
(5½) wreck	
15	Wreck of known depth
16	Sunken wreck, not dangerous to surface navigation or over which the depth exceeds 10 fathoms
foul	
17	Foul ground
tide rips | Symbol used only in small areas	
18	Overfalls or tide rips
eddies	
19	Eddies
kelp | Symbol used only in small areas	
20	Kelp, any kind
(20a)	

21	Bk.	bank
22	Shl.	shoal
23	Rf.	reef
24	Le.	ledge
25		breakers (see A-12)
27	Obstr.	obstruction
28	Wk.	wreck
(28a)	Wks.	wreckage
33	cov.	covers
34	uncov.	uncovers
35	Rep.	reported
(35a)	Shoal (rep. 1945)	shoal reported
36	Discol.	discolored
41	P. A.	position approximate
42	P. D.	position doubtful
43	E. D.	existence doubtful
44	Pos.	position
(46)		
(47)		

P. Various Limits

1		*Leading line (Range line)*
4		*Limit of sector*
5		*Channel or course recommended*
(5a)		*Alternate course*
7	Cable area	*Submarine cable*
8	Pipeline Pipeline area	*Submarine pipe line*
9		*Maritime limits in general*
10		*Limit of fishing zone (fish trap areas bounded by broken lines)*
11		*Limit of dumping ground (see Nos. P-9 & G-13)*
12		*Anchorage limit*
13	Airport	*Limit of airport*
16		*International boundary (also State boundary)*
18		*Ice limits*
(21)	Bdy.	*Boundary*
(22)	Bdy. Mon.	*Boundary monument*
(23)		*Reservation line*

T. Tides and Currents

1	H.W.	*high water*
(1a)	H.H.W.	*higher high water*
2	L.W.	*low water*
(2a)	L.L.W.	*lower low water*
3	M.T.L.	*mean tide level*
4	M.S.L.	*mean sea level*
6	Sp.	*spring tide*
7	Np.	*neap tide*
(8a)	M.H.W.	*mean high water*
(8b)	M.H.H.W.	*mean higher high water*
(9a)	M.L.W.	*mean low water*
(9b)	M.L.L.W.	*mean lower low water*
10	I.S.L.W.	*Indian spring low water*
17	Str.	*stream*
18		*current, general*
19	2 kn	*flood stream*
20	2 kn	*ebb stream*
23	vel.	*velocity*
24	kn.	*knots*
(25)		*Current Diagram, with explanatory note*
(26)		

Q. Soundings

2	27	*No bottom sounding*
5	30 FEET MAY 1939	*Dredged channels (controlling depth may be shown in separate note)*
9	17 119	*Swept areas (shown by green tint) (not yet covered by sufficient hydrographic surveys to show adequate soundings)*
(9a)		*Areas swept by wire drag to depth indicated*
(12)	19	*Soundings taken from older surveys or smaller scale charts*
(16)	6 5 2	*Stream*
(17)	6	*Soundings on reefs that uncover*
(18)		

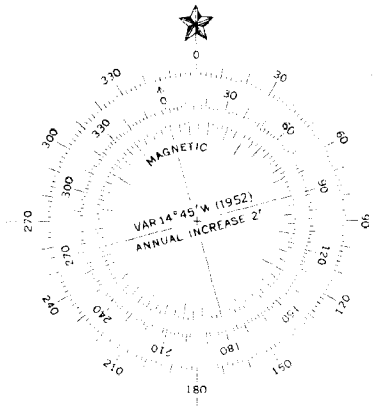
R. Depth Contours & Tints

Feet	Fathoms	
0	0	
6	1	
12	2	
18	3	
24	4	
30	5	
36	6	
60	10	
120	20	
180	30	
240	40	
300	50	
600	100	
1,200	200	
1,800	300	
2,400	400	
3,000	500	
6,000	1,000	
12,000	2,000	
18,000	3,000	
Or 10 fathoms and greater		10 Or 100 (blue)

S. Quality of the Bottom

1	Grd.	ground
2	S.	sand
3	M.	mud
4	Oz.	ooze
5	Ml.	marl
6	Cl.	clay
7	G.	gravel
8	Sn.	shingle
9	P.	pebbles
10	St.	stones
(10a)	Sp.	specks
11	Rk.	rock
(11a)	Bld. (s)	boulder (s)
12	Ck.	chalk
13	Qz.	quartz
14	Co.	coral
(14a)	Co. Hd.	coral head
15	Md.	madrepore
(16a)	Vol. Ash.	volcanic ash
17	La.	lava
18	Pm.	pumice
19	T.	tufa
20	Sc.	scoriae
21	Cn.	cinders
22	Mn.	manganese
23	Sh.	shells
24	Oys.	oysters
25	Ms.	mussels
26	Spg.	sponge
27	Grs.	grass
28	Wd.	weeds
32	Fr.	foraminifera
33	Gl.	globigerina
34	Di.	diatom
35	Rd.	radiolaria
36	Pt.	pteropod
37	Po.	polyzoa
39	fne.	fine
40	crs.	coarse
41	sft.	soft
42	hrd.	hard
43	stf.	stiff
44	sml.	small
45	lrg.	large
46	stk.	sticky
47	brk.	broken
(47a)	rky.	rocky
50	spk.	speckled
51	gty.	gritty
53	fly.	flinty
54	glac.	glacial
56	wh.	white
57	bk.	black
59	bu.	blue
60	gn.	green
61	yl.	yellow
63	rd.	red
64	br.	brown
66	gy.	gray
67	lt.	light
68	dk.	dark
(69)	Ca.	calcareous
(70)		

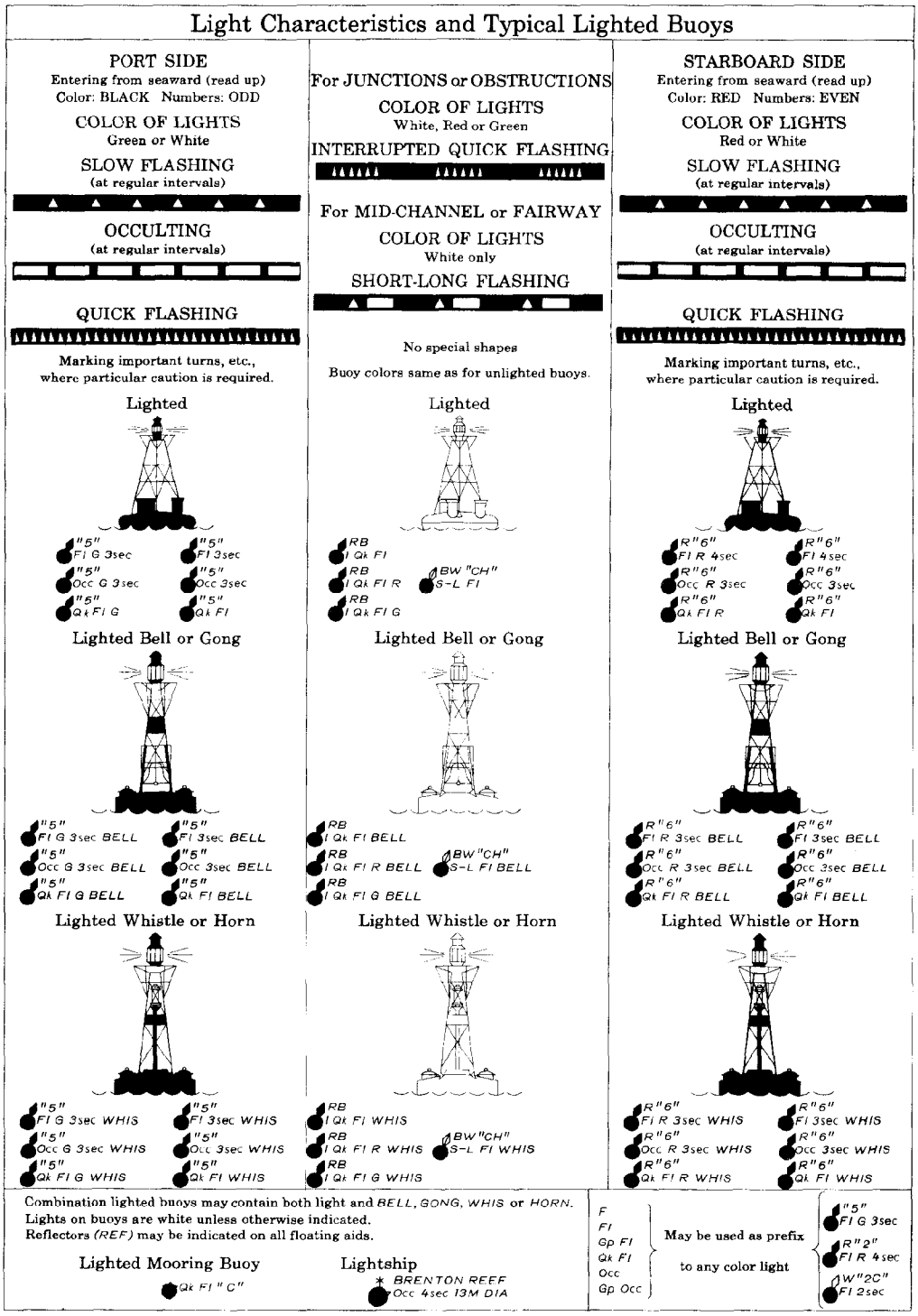
U. Compass



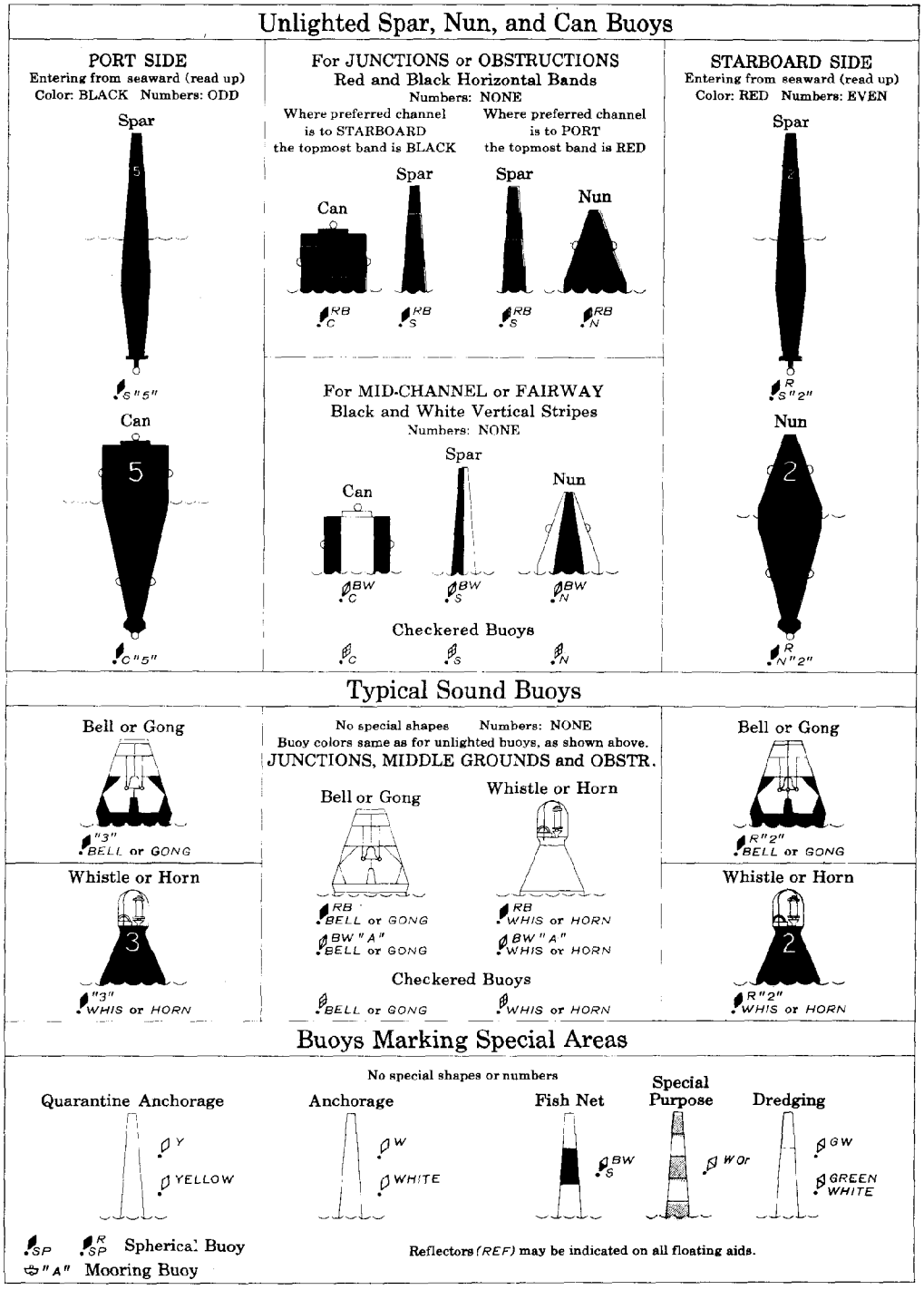
Compass Rose

The outer circle is in degrees with zero at true north. The inner circles are in points and degrees with the arrow indicating magnetic north.

1	N.	north
2	E.	east
3	S.	south
4	W.	west
5	NE.	northeast
6	SE.	southeast
7	SW.	southwest
8	NW.	northwest
21	brg.	bearing
23	mag.	magnetic
24	var.	variation
(27)	deg.	degrees
(28)	dev.	deviation

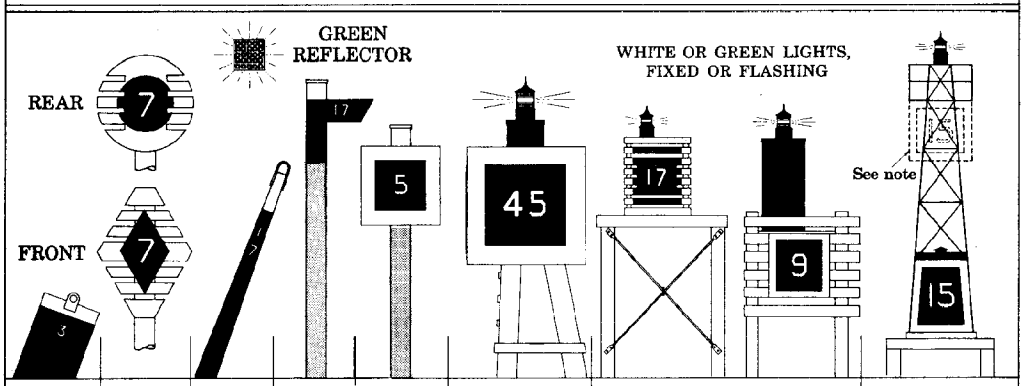


Lighted buoyage of the United States with explanation of their standard chart symbols and abbreviations.



Unlighted buoyage of the United States with explanation of their standard chart symbols and abbreviations.

TYPES OF AIDS TO NAVIGATION
INTRACOASTAL WATERWAY

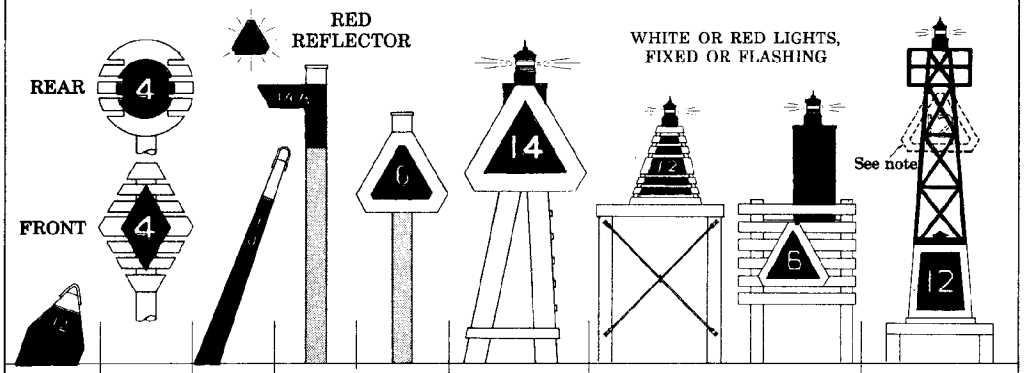


SPECIAL (S) CAN BUOY	RANGES ROUND, OVAL OR DIAMOND	SPAR BUOY 2nd.-4th. Class	DAYBEACONS Pointer	DAYBEACONS Daymark	3 PILE DOLPHIN	SLATTED, PILE STRUCTURES	SKELETON STRUCTURES
C "3"	"7" "7"	S "17"	"17"	"5"	Fl 2sec "45"	Fl G 5sec "17" F "9"	F G "15"

Supporting Structure may be painted White or Aluminum.

Note:- Daymark (shown dotted) added where needed. Border and number on Daymark where used.

PORT Side of channel (Black with Odd Numbers) entering from north and east and traversed to south and west respectively.

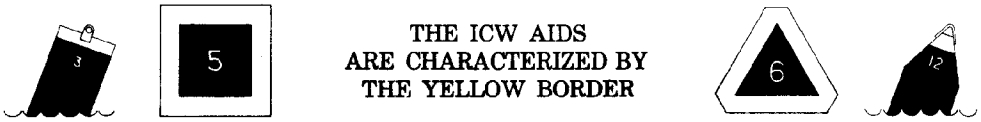


SPECIAL (S) NUN BUOY	RANGES ROUND, OVAL OR DIAMOND	SPAR BUOY 2nd.-4th. Class	DAYBEACONS Pointer	DAYBEACONS Daymark	3 PILE DOLPHIN	SLATTED, PILE STRUCTURES	SKELETON STRUCTURES
R N "12"	R "4" R "4"	R S "14"	R "14 A"	R "6"	Fl 2sec "14"	Fl R 5sec "12" F "6"	F R "12"

Supporting Structure may be painted White or Aluminum.

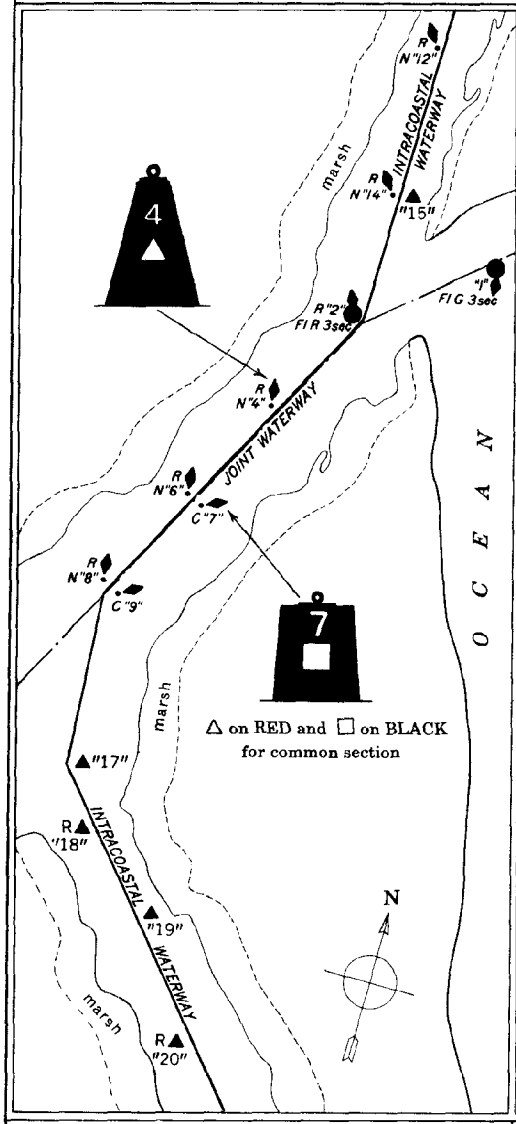
Note:- Daymark (shown dotted) added where needed. Border and number on Daymark where used.

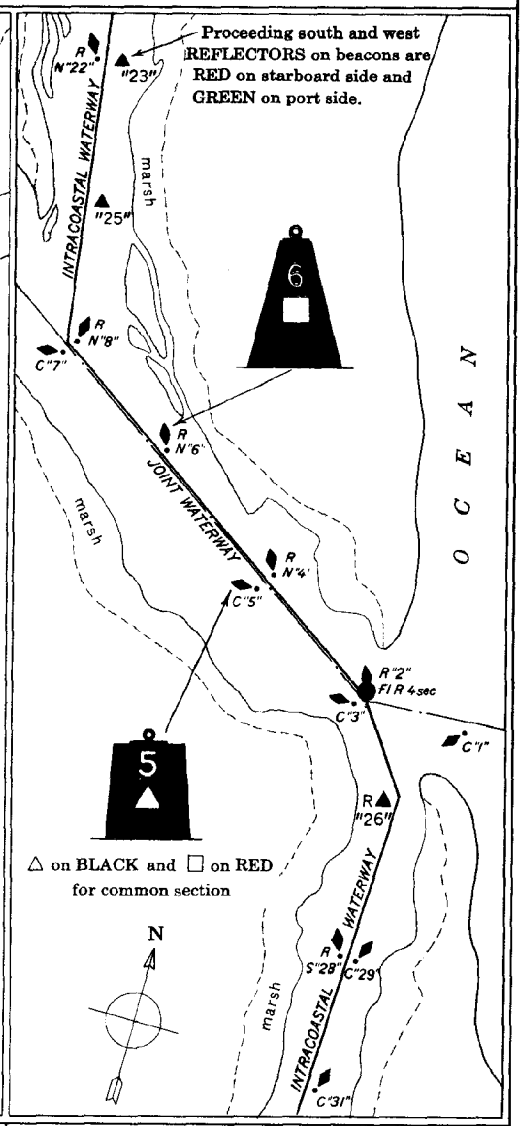
STARBOARD Side of channel (Red with Even Numbers) entering from north and east and traversed to south and west respectively.



THE ICW AIDS ARE CHARACTERIZED BY THE YELLOW BORDER

ILLUSTRATING THE SYSTEM OF DUAL PURPOSE MARKING WHERE THE ICW AND OTHER WATERWAYS COINCIDE





SKETCH A:

ICW joins another waterway, which is numbered from seaward, at buoy No. 2 and is common with it to buoy No. 9. ICW numbers and yellow borders are omitted in this section but the △ or □ is used on the regular aids to designate the ICW.

SKETCH B:

ICW joins another waterway at buoy No. 8 and is common with it to buoy No. 3. This section is numbered in the opposite direction to that of the ICW. The ICW numbers and yellow borders are omitted from the regular aids but a △ or □ is shown to designate the ICW.

Conversion Table, Degrees to Points and Vice Versa

° ′	Points	° ′	Points	° ′	Points	° ′	Points
0 00	N	90 00	E	180 00	S	270 00	W
1 24		91 24		181 24		271 24	
2 49	N ¼ E	92 49	E ¼ S	182 49	S ¼ W	272 49	W ¼ N
4 13		94 13		184 13		274 13	
5 38	N ½ E	95 38	E ½ S	185 38	S ½ W	275 38	W ½ N
7 02		97 02		187 02		277 02	
8 26	N ¾ E	98 26	E ¾ S	188 26	S ¾ W	278 26	W ¾ N
9 51		99 51		189 51		279 51	
11 15	N x E	101 15	E x S	191 15	S x W	281 15	W x N
12 39		102 39		192 39		282 39	
14 04	N x E ¼ E	104 04	ESE ¾ E	194 04	S x W ¼ W	284 04	WNW ¾ W
15 28		105 28		195 28		285 28	
16 53	N x E ½ E	106 53	ESE ½ E	196 53	S x W ½ W	286 53	WNW ½ W
18 17		108 17		198 17		288 17	
19 41	N x E ¾ E	109 41	ESE ¼ E	199 41	S x W ¾ W	289 41	WNW ¼ W
21 06		111 06		201 06		291 06	
22 30	NNE	112 30	ESE	202 30	SSW	292 30	WNW
23 54		113 54		203 54		293 54	
25 19	NNE ¼ E	115 19	SE x E ¾ E	205 19	SSW ¼ W	295 19	NW x W ¾ W
26 43		116 43		206 43		296 43	
28 08	NNE ½ E	118 08	SE x E ½ E	208 08	SSW ½ W	298 08	NW x W ½ W
29 32		119 32		209 32		299 32	
30 56	NNE ¾ E	120 56	SE x E ¼ E	210 56	SSW ¾ W	300 56	NW x W ¼ W
32 21		122 21		212 21		302 21	
33 45	NE x N	123 45	SE x E	213 45	SW x S	303 45	NW x W
35 09		125 09		215 09		305 09	
36 34	NE ¾ N	126 34	SE ¾ E	216 34	SW ¾ S	306 34	NW ¾ W
37 58		127 58		217 58		307 58	
39 23	NE ½ N	129 23	SE ½ E	219 23	SW ½ S	309 23	NW ½ W
40 47		130 47		220 47		310 47	
42 11	NE ¼ N	132 11	SE ¼ E	222 11	SW ¼ S	312 11	NW ¼ W
43 36		133 36		223 36		313 36	
45 00	NE	135 00	SE	225 00	SW	315 00	NW
46 24		136 24		226 24		316 24	
47 49	NE ¼ E	137 49	SE ¼ S	227 49	SW ¼ W	317 49	NW ¼ N
49 13		139 13		229 13		319 13	
50 38	NE ½ E	140 38	SE ½ S	230 38	SW ½ W	320 38	NW ½ N
52 02		142 02		232 02		322 02	
53 26	NE ¾ E	143 26	SE ¾ S	233 26	SW ¾ W	323 26	NW ¾ N
54 51		144 51		234 51		324 51	
56 15	NE x E	146 15	SE x S	236 15	SW x W	326 15	NW x N
57 39		147 39		237 39		327 39	
59 04	NE x E ¼ E	149 04	SSE ¾ E	239 04	SW x W ¼ W	329 04	NNW ¾ W
60 28		150 28		240 28		330 28	
61 53	NE x E ½ E	151 53	SSE ½ E	241 53	SW x W ½ W	331 53	NNW ½ W
63 17		153 17		243 17		333 17	
64 41	NE x E ¾ E	154 41	SSE ¼ E	244 41	SW x W ¾ W	334 41	NNW ¼ W
66 06		156 06		246 06		336 06	
67 30	ENE	157 30	SSE	247 30	WSW	337 30	NNW
68 54		158 54		248 54		338 54	
70 19	ENE ¼ E	160 19	S x E ¾ E	250 19	WSW ¼ W	340 19	N x W ¾ W
71 43		161 43		251 43		341 43	
73 08	ENE ½ E	163 08	S x E ½ E	253 08	WSW ½ W	343 08	N x W ½ W
74 32		164 32		254 32		344 32	
75 56	ENE ¾ E	165 56	S x E ¼ E	255 56	WSW ¾ W	345 56	N x W ¼ W
77 21		167 21		257 21		347 21	
78 45	E x N	168 45	S x E	258 45	W x S	348 45	N x W
80 09		170 09		260 09		350 09	
81 34	E ¾ N	171 34	S ¾ E	261 34	W ¾ S	351 34	N ¾ W
82 58		172 58		262 58		352 58	
84 23	E ½ N	174 23	S ½ E	264 23	W ½ S	354 23	N ½ W
85 47		175 47		265 47		355 47	
87 11	E ¼ N	177 11	S ¼ E	267 11	W ¼ S	357 11	N ¼ W
88 36		178 36		268 36		358 36	

Distance of Visibility of Objects at Sea

The table following gives the approximate geographic range of visibility for an object which may be seen by an observer whose eye is at sea level; in practice, therefore, it is necessary to add to these a distance of visibility corresponding to the height of the observer's eye above sea level.

Height, feet	Nautical miles	Statute miles	Height, feet	Nautical miles	Statute miles	Height, feet	Nautical miles	Statute miles
1	1. 1	1. 3	100	11. 5	13. 2	760	31. 6	36. 4
2	1. 7	1. 9	105	11. 7	13. 5	780	32. 0	36. 9
3	2. 0	2. 3	110	12. 0	13. 8	800	32. 4	37. 3
4	2. 3	2. 6	115	12. 3	14. 1	820	32. 8	37. 8
5	2. 5	2. 9	120	12. 6	14. 5	840	33. 2	38. 3
6	2. 8	3. 2	125	12. 9	14. 8	860	33. 6	38. 7
7	2. 9	3. 5	130	13. 1	15. 1	880	34. 0	39. 2
8	3. 1	3. 7	135	13. 3	15. 3	900	34. 4	39. 6
9	3. 5	4. 0	140	13. 6	15. 6	920	34. 7	40. 0
10	3. 6	4. 2	145	13. 8	15. 9	940	35. 2	40. 5
11	3. 8	4. 4	150	14. 1	16. 2	960	35. 5	40. 9
12	4. 0	4. 6	160	14. 5	16. 7	980	35. 9	41. 3
13	4. 2	4. 8	170	14. 9	17. 2	1, 000	36. 2	41. 7
14	4. 3	4. 9	180	15. 4	17. 7	1, 100	38. 0	43. 8
15	4. 4	5. 1	190	15. 8	18. 2	1, 200	39. 6	45. 6
16	4. 6	5. 3	200	16. 2	18. 7	1, 300	41. 3	47. 6
17	4. 7	5. 4	210	16. 6	19. 1	1, 400	42. 9	49. 4
18	4. 9	5. 6	220	17. 0	19. 6	1, 500	44. 4	51. 1
19	5. 0	5. 8	230	17. 4	20. 0	1, 600	45. 8	52. 8
20	5. 1	5. 9	240	17. 7	20. 4	1, 700	47. 2	54. 4
21	5. 3	6. 1	250	18. 2	20. 9	1, 800	48. 6	56. 0
22	5. 4	6. 2	260	18. 5	21. 3	1, 900	49. 9	57. 5
23	5. 5	6. 3	270	18. 9	21. 7	2, 000	51. 2	59. 0
24	5. 6	6. 5	280	19. 2	22. 1	2, 100	52. 5	60. 5
25	5. 7	6. 6	290	19. 6	22. 5	2, 200	53. 8	61. 9
26	5. 8	6. 7	300	19. 9	22. 9	2, 300	55. 0	63. 3
27	6. 0	6. 9	310	20. 1	23. 2	2, 400	56. 2	64. 7
28	6. 1	7. 0	320	20. 5	23. 6	2, 500	57. 3	66. 0
29	6. 2	7. 1	330	20. 8	24. 0	2, 600	58. 5	67. 3
30	6. 3	7. 2	340	21. 1	24. 3	2, 700	59. 6	68. 6
31	6. 4	7. 3	350	21. 5	24. 7	2, 800	60. 6	69. 8
32	6. 5	7. 5	360	21. 7	25. 0	2, 900	61. 8	71. 1
33	6. 6	7. 6	370	22. 1	25. 4	3, 000	62. 8	72. 3
34	6. 7	7. 7	380	22. 3	25. 7	3, 100	63. 8	73. 5
35	6. 8	7. 8	390	22. 7	26. 1	3, 200	64. 9	74. 7
36	6. 9	7. 9	400	22. 9	26. 4	3, 300	65. 9	75. 9
37	6. 9	8. 0	410	23. 2	26. 7	3, 400	66. 9	77. 0
38	7. 0	8. 1	420	23. 5	27. 1	3, 500	67. 8	78. 1
39	7. 1	8. 2	430	23. 8	27. 4	3, 600	68. 6	79. 2
40	7. 2	8. 3	440	24. 1	27. 7	3, 700	69. 7	80. 3
41	7. 3	8. 4	450	24. 3	28. 0	3, 800	70. 7	81. 4
42	7. 4	8. 5	460	24. 6	28. 3	3, 900	71. 6	82. 4
43	7. 5	8. 7	470	24. 8	28. 6	4, 000	72. 5	83. 5
44	7. 6	8. 8	480	25. 1	28. 9	4, 100	72. 4	84. 5
45	7. 7	8. 9	490	25. 4	29. 2	4, 200	74. 3	85. 6
46	7. 8	9. 0	500	25. 6	29. 5	4, 300	75. 2	86. 6
47	7. 9	9. 0	520	26. 1	30. 1	4, 400	76. 1	87. 6
48	7. 9	9. 1	540	26. 7	30. 7	4, 500	76. 9	88. 5
49	8. 0	9. 2	560	27. 1	31. 2	4, 600	77. 7	89. 5
50	8. 1	9. 3	580	27. 6	31. 8	4, 700	78. 6	90. 5
55	8. 5	9. 8	600	28. 0	32. 3	4, 800	79. 4	91. 4
60	8. 9	10. 2	620	28. 6	32. 9	4, 900	80. 2	92. 4
65	9. 2	10. 6	640	29. 0	33. 4	5, 000	81. 0	93. 3
70	9. 6	11. 0	660	29. 4	33. 9	6, 000	88. 8	102. 2
75	9. 9	11. 4	680	29. 9	34. 4	7, 000	96. 0	110. 5
80	10. 3	11. 8	700	30. 3	34. 9	8, 000	102. 6	118. 1
85	10. 6	12. 2	720	30. 7	35. 4	9, 000	108. 7	125. 2
90	10. 9	12. 5	740	31. 1	35. 9	10, 000	114. 6	132. 0
95	11. 2	12. 9						