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THE
VANCOUVER ISLAND



CONTAINING

SAILING DIRECTIONS

FOR THE

COASTS OF VANCOUVER ISLAND, AND
PART OF BRITISH COLUMBIA.

COMPILED FROM THE SURVEYS MADE BY
CAPTAIN GEORGE HENRY RICHARDS, R.N., IN H.M. SHIPS PLUMPER
AND HECATE, BETWEEN THE YEARS 1858 AND 1864.

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

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P R E F A C E.

THE Vancouver Island Pilot contains Sailing Directions for the whole of the coasts of Vancouver Island, including Juan de Fuca Strait; and the shores of British Columbia as far north as the parallel of 51° N., with the exception of some of the deep inlets, the examination of which is not yet completed. That portion from the entrance of Juan de Fuca Strait on the west, to Discovery Passage on the east, is by Captain G. H. Richards, R.N., during his survey of these coasts in H.M. Ships *Plumper* and *Hecate*, from 1858 to 1862; the remainder has been compiled from the journals of that officer and other documents, up to 1864, by E. P. Bedwell, Master, R.N., who assisted in the survey.

G. H. R.

Hydrographic Office, Admiralty, London.
October 1864.

CONTENTS.

CHAPTER I.

JUAN DE FUCA AND HARO STRAITS.

	Page
Juan de Fuca strait. Tides. Winds. Lights. Soundings - -	1-6
Cape Flattery, or Classet. Tatouch island light. Duncan and Duntz rocks - - - - -	6, 7
The coast south of Cape Flattery. Destruction island. Directions - -	7-9
Neeah bay. Callam and Freshwater bays - - - - -	9-11
Port Angelos, or False Dungeness. Directions. New Dungeness. Light. Fog-bell. Tides - - - - -	11-13
Port Discovery. Admiralty inlet. Light. Port Townshend - - - -	13-15
Port San Juan. Sooke inlet - - - - -	15-17
Becher bay. Race islands. Light. Race passage. Bentinck island. Pedder and Parry bays. Royal bay, or roads. Esquimalt harbour; winds; water; light - - - - -	17-22
Victoria harbour; supplies; anchorage. Brotchy ledge. Enterprize channel. Trial island. Directions - - - - -	22-26
Inner channels. Discovery and Chatham islands. Directions. Tides. Constance bank. Fronté bank - - - - -	26-30
Haro strait. Middle bank. Zero rock. Kelp reefs. Directions. Cor- morant bay. Tides - - - - -	30-34
Plumper sound. Browning harbour. Lyall harbour. Winter cove. Water. Navy channel. Conconi and Enterprize reefs. Directions -	34-36
Bedwell harbour. Camp bay. Stuart and Johns islands. Spieden island and channel, with reefs. Directions - - - - -	37-40
San Juan island. Mosquito passage. Roche harbour. Waldron island, and anchorages. Danger rock - - - - -	40-42

CHAPTER II.

THE WESTERN CHANNELS AND ISLANDS TO GABRIOLA PASS.

The western channels of Haro strait. Directions - - - - -	43
Cordova and Miners channels. Shute passage. Moresby passage and dangers - - - - -	44-47
Prevost passage, and dangers. Satellite channel. Saanich inlet; Cowitchin harbour - - - - -	47-51
Sansum narrows. Burgoyne and Maple bays - - - - -	51

	Page
Stuart channel. Osborn bay. Horse-shoe bay. Oyster harbour.	
Chemainos bay. Escape reef. Danger reef. Vesuvius bay. Telegraph harbour. Preedy harbour - - - - -	52-56
Swanson channel. Admiral island. Fulford, Ganges, and Long harbours.	
Captain passage - - - - -	57-60
Prevost and Hawkins islands. Active pass. Tides - - - - -	60-62
Trincomalie channel. Montague harbour. Atkins reef. Governor and Walker rocks. Directions. Houston passage - - - - -	62-66
Portier pass. Clam bay. Centre reef. Anchorage - - - - -	66-68
Dodd narrows. Directions. Tides. Pylades channel. Gabriola pass -	68-70

CHAPTER III.

MIDDLE CHANNEL.—LOPEZ SOUND.—ORCAS, WEST AND EAST SOUNDS.

The Middle channel. Directions. Griffin bay. Tides. Turn island, and rock. Friday harbour. Reid rock. Spring passage - - -	71-75
Douglas channel. Tides. Patos and Sucia islands. Parker reef. Matia island. Skipjack and Penguin islands - - - - -	75-79
Lopez island. McKaye harbour. Upright channel. Shoal bay. Lopez sound - - - - -	79-81
Frost island. Black and Crown islands. Thatcher passage. Lawson rock. Maury and Obstruction passages. Tides. Shaw island -	82-85
Wasp islands, and passages. North passage. Orcas island; its harbours and bays - - - - -	85-90

CHAPTER IV.

ROSARIO STRAIT.—BRITISH COLUMBIA; AND SOUTH SHORE OF STRAIT OF GEORGIA.

Rosario strait. Smith or Blunt island. Light. Directions - - -	91
Cape Colville, with rocks. Anchorage. Burrows bay. Dennis rock. Deception pass - - - - -	93
Bird rock. Belle rock. James island. White and Black rocks -	94
Cypress island. Strawberry bay. Cypress reef. Sinclair island -	95-97
Peapod islets. Tides. Summi island. Clark and Barnes islands. Matia island. Alden bank - - - - -	97-99
Birch bay. Semiahmoo or Boundary bays. Drayton harbour. Directions. Tides. Roberts point. Roberts bank - - - - -	99-101
Strait of Georgia. Tides - - - - -	101-103
Strait of Georgia, North shore. Fraser river. Directions. New Westminster, Derby, or New Langley. The North fork - - - - -	104-108
Burrard inlet. English bay. Directions. Tides. Coal harbour. Port Moody. North arm - - - - -	108-112
Strait of Georgia, South shore. Gabriola reefs. Entrance island. Fairway channel. Directions - - - - -	112-114
Nanaimo harbour. Coal. Departure bay. Middle channel. Northumberland channel - - - - -	114-117

CHAPTER V.

STRAIT OF GEORGIA, FROM NANAIMO HARBOUR AND BURRARD
INLET, TO CAPE MUDGE AND BUTE INLET.

	Page
Strait of Georgia, South shore. Nanoose harbour and islands off it.	
Directions - - - - -	118-120
Ballinac islands. Ballinac channel. North-west bay - - -	121
Qualicum river. Qualicum bay. Denman and Hornby islands. Baynes sound. Directions. Deep bay. Fanny bay. Henry bay. Port Augusta. Courtenay river. Lambert channel. Tribune bay. Cape Lazo - - - - -	-122-130
Mittlenatch island. Oyster bay. Cape Mudge. Directions. Tides. Winds - - - - -	130-132
Strait of Georgia, North shore. Howe sound. Queen Charlotte channel. Anvil island. Collingwood channel - - - - -	132-136
Shoal channel. Plumper cove. Gambier island. Port Graves. Texhada island. Lasqueti island. Sabine channel. Tucker bay - - -	136-138
Malaspina strait. Jervis inlet. Agamemnon channel. Pender harbour. Thunder bay. Dark cove. Princess Louisa inlet. See-chelt arm. Tides - - - - -	138-143
Harwood island. Savary island. Mystery rock. Sarah point. Direc- tions. Hernando island. Stag bay - - - - -	143-145
Baker passage. Lewis channel. Squirrel cove. Kinghorn island - - -	145-147
Sutil channel. Cortes island. Gorge harbour. Mary island. Carring- ton bay. Von Donop creek - - - - -	147-149
Drew harbour. Hoskyn inlet. Read island. Evans bay. Directions -	150, 151
Calm channel. Rendezvous islands. Bute inlet. Waddington harbour. Homalko river - - - - -	152-154

CHAPTER VI.

FROM THE STRAIT OF GEORGIA WESTWARD TO CAPE SCOTT AND
THE SCOTT ISLANDS.

Discovery passage. Tides. Quathiasky cove. Gowlland harbour. Duncan bay. Menzies bay. Seymour narrows - - - - -	155-158
Plumper bay. Nodales canal. Elk bay. Otter cove. Chatham point. Johnstone strait. Knox bay. Helmcken island. Race, and Current passages. Hardwicke island - - - - -	158-161
Blinkinsop bay. Port Neville. Port Harvey. Havannah channel. Call creek. Chatham channel. - - - - -	162-164
Escape reef. Forward bay. Boat harbour. Directions for Johnstone strait - - - - -	165
Broughton strait. Tides. Nimpkish river. Port McNeill. Cormo- rant island. Alert bay. Malcolm island. Directions - - -	166-169
Queen Charlotte sound. Beaver harbour. Fort Rupert. Directions. Hardy bay. Goletas channel. Tides - - - - -	169-172

	Page
Shushartie bay. Directions. Cape Commerell. Gordon group. Christie passage. Browning channel. Galiano island. Port Alexander. Shadwell passage. Directions. Bull harbour. Nahwitti bar. Directions	172-176
New channel. Walker group. Directions. Coast	- 176-179
Cape Scott. Scott channel. Scott islands. Tides. Directions. Remarks on the navigation of the Inner waters between Cape Mudge and the Pacific. Water. Supplies	- 179, 180

CHAPTER VII.

WEST COAST OF VANCOUVER ISLAND, FROM JUAN DE FUCA STRAIT
TO SYDNEY INLET.

General description. Making the land. Winds. Tides. Outer soundings. Natives. Supplies	- 181-183
Bonilla point. Nitinat lake. Pachena bay	- 183
Barclay sound. Eastern channel, its islands and anchorages. Alberni canal. Uchucklesit harbour. Stamp harbour. Directions. Middle channel and dangers. Satellite pass. Chain islands. Junction passage. Broken group. Island harbour. Directions. Seshart channel. Effingham inlet. Directions. Western channel. Great bank. Directions. Peacock channel. Mayne bay. Toquart harbour. Directions. Ship channel. Ugly channel. Ucluelet arm. Carolina channel. Directions. Wreck and Long bays. Point Cox	- 184-202
Clayoquot sound. Templar and Broken channels. Vargas island. Ship channel. Sea Otter rock. Hecate passage. Hecate bay. Cypress bay. Ritchie bay. Bedwell sound. Fortune channel. Mosquito harbour. Deception pass. Tofino inlet. Gunner harbour. Browning passage. North channel. Flores island. Sydney inlet. Refuge cove. Shelter and North arms. Bowden bay. Directions	- 203-213

CHAPTER VIII.

VANCOUVER ISLAND, WEST COAST; FROM REFUGE COVE TO CAPE
SCOTT.

Hesquiat harbour. Estevan point	- 215
Nootka sound. Bajo reef. Friendly cove. Plumper harbour. Tah-sis canal. Guaquina or Muchalat arm. Tupana arm. Deserted creek. Head bay. Directions	- 215-220
Nootka island. Nuchatlitz inlet, and dangers off entrance. Mary basin. Port Langford. Directions	- 221-223
Esperanza inlet. Middle channel. North channel. Catala island. Rolling roadstead. Port Eliza. Queens cove. Espinoza and Zeballos arms. Directions	- 224-228
Barrier islands. Kyuquot sound. Kyuquot channel. Union island. Narrowgut creek. Tahsish arm. Fair harbour. Kok-shittle arm. Easy creek. Directions	- 229-233
Clan-ninick harbour. Halibut channel. Directions	- 234
Ou-Ou-kinsh inlet. Sullivan reefs. Battle bay. Directions	- 235

	Page
Nasparti inlet. Mile rock breaker. Directions - - - -	237
Cape Cook. Brooks bay. Klaskish inlet. Directions. Ship rock.	
Klaskino inlet. Channel reefs. Directions. Lawn point - -	238-241
Quatsino sound. Surf islands. Danger rocks. Forward inlet. North harbour. Winter harbour. Pilley shoal. Koprino harbour. Lime- stone island. South-east arm. Hecate cove. Quatsino narrows.	
Rupert and West arms. Coal harbour. Directions - - -	242-251
The coast. Ragged point. Raft cove. San Josef bay. Sea otter cove.	
Cape Russell - - - - -	252
Table of Positions. Table of Variation - - - - -	254, 255

**IN THIS WORK THE BEARINGS, INCLUDING THE
DIRECTION OF WINDS AND CURRENTS, ARE ALL MAGNETIC
EXCEPT WHERE MARKED AS TRUE.**

**THE DISTANCES ARE EXPRESSED IN SEA MILES OF
60 TO A DEGREE OF LATITUDE.**

**A CABLE'S LENGTH IS THE TENTH PART
OF A MILE, OR 101.26 FATHOMS, BUT ASSUMED TO BE EQUAL
TO 100 FATHOMS.**

VANCOUVER ISLAND PILOT.

CHAPTER I.

JUAN DE FUCA AND HARO STRAITS.

VARIATION 22° 0' to 21° 30' East, in 1864.

JUAN DE FUCA STRAIT has its entrance between the parallels of 48° 23' and 48° 36' N., and on the meridian of 124° 45' W. ; from its geographical position it is liable to all those sudden vicissitudes of weather common to high northern latitudes; and in few parts of the world is the caution and vigilance of the navigator more called into action than in entering it.

The breadth of the strait between Cape Flattery,* its southern point, and Bonilla point, Vancouver island, its northern, is 13 miles; within these points it soon narrows to 11 miles, and carries this breadth on an East course for 40 miles, or until Race islands bear N.E. by E., distant 10 miles; it then takes an E.N.E. direction for a farther distance of 14 miles to the shore of the continent, or more properly Whidbey island.

Between Race islands and the southern shore the breadth of the strait is 8 miles, after which it immediately expands to 17 miles, leading northwards to the British possessions by various channels among the labyrinth of islands known as the Haro archipelago, and southward to those of the United States, by Admiralty inlet and Puget sound.

The coasts of Fuca strait are remarkably free from danger, and may be approached safely within half a mile; there is one breaking rock which lies nearly that distance off the west point of Crescent bay on the southern shore. The soundings in the centre are of great depth, but within $1\frac{1}{2}$ miles of either shore there is generally under 40 fathoms, and on the northern side when 5 miles eastward of Port San Juan, 8 to 12 fathoms will be found within a mile of the shore, and, if necessary, vessels may anchor. On both sides of the strait there are several anchorages or stopping

* Flattery was the name given to this cape by Cook in 1788; but Vancouver, in 1792, says it was known to the natives by the name of Classet.

places which may be taken advantage of by vessels, either inward or outward bound when meeting with adverse winds; those on the southern side are Neeah and Callam bays, Port Angelos, and New Dungeness bay, before reaching the harbours of Admiralty inlet; on the northern side are Port San Juan, Sooke inlet, and Becher bay before rounding the Race islands, after which excellent anchorage may be always obtained with westerly winds.

On the northern or Vancouver island shore of the strait the hills rise gradually and are densely wooded, but near the coast attain to no great elevation; on the southern side the almost perpetually snow-clad mountains known as the Olympian range, rise more abruptly and vary in elevation from 4,000 to more than 7,000 feet; but though exceedingly grand in their rugged outline, present no very marked summits as seen from the strait nor any great variety in their features.*

TIDES.—It is high water, full and change, at Cape Flattery at noon and at midnight; the ebb stream there commences to run strong at 2h. a.m. and p.m. and continues for about 6 hours.

In the outer part of Juan de Fuca strait there is no very great strength of tide; it varies from one to 4 knots, seldom so much as the latter unless near Cape Flattery; but when approaching the more contracted part in the neighbourhood of the Race islands, which receives the first rush of the pent up waters of the strait of Georgia, strengthened and diverted by the labyrinth of islands which choke up its southern entrance, it is not surprising that eddies, races, and irregularities occur which almost baffle any attempt at framing laws which may not rather embarrass than assist the seaman; the result, however, of observations continued throughout an entire year at Esquimalt, and partially on other parts of the coast during three seasons, appears to warrant the following conclusions, viz. :—

The flood tide sets to the northward along the outer coast of the continent and Vancouver island. It enters the strait of Fuca at Cape Flattery, running with considerable velocity, sometimes 3 or 4 knots over Duncan and Duntze rocks; it then turns sharply into the strait, passing through the various channels among the Haro archipelago into the strait of Georgia, and within about 5 miles of Cape Mudge, where it is met by a flood from the northward, which, sweeping the western coast of Vancouver island, enters Goletas channel and Queen Charlotte sound at its northern extreme, in lat. 51° , thence southerly down the narrow waters of Johnstone strait and Discovery passage, meeting the tide which enters by Fuca strait, and reaches about midway between the

* See Chart of Juan de Fuca Strait, with Admiralty Inlet and Puget Sound, No. 1,911; scale $m = 0.35$ inches.

northern and southern extremes of Vancouver island, or close to the spot where the broad expanse of the strait of Georgia merges into the narrow channels adjoining it.

On the western side of the island the tides were found to be regular—flood and ebb of six hours' duration, the times of high water on the full and change at Nootka sound, and at the entrance of Goletas channel varying very little, and occurring near noon, the greatest range 13 feet; nor is any marked irregularity observable in Johnstone strait and Discovery passage, except the not unusual circumstance that the ebb stream continues to run to the northward for two hours after it is low water by the shore, the water rising at the same time, the ebb stream being of seven hours' duration, the flood about five hours.

The great and perplexing tidal irregularities may therefore be said to be embraced between the strait of Fuca, near the Race islands, and Cape Mudge, a distance of 150 miles; and a careful investigation of the observations made at Esquimalt, and among the islands of the Haro archipelago, shows that during the summer months, May, June, and July, there occurs but one high and one low water during the 24 hours, high water at the full and change of the moon happening about midnight, and varying but slightly from that hour during any day of the three months; the springs range from 8 to 10 feet, the neaps from 4 to 5 feet. The tides are almost stationary for two hours on either side of high or low water, unless affected by strong winds outside.

During August, September, and October, there are two high and low waters in the 24 hours; a superior and an inferior tide, the high water of the superior varying between 1h. and 3h. a.m., the range during these months from 3 to 5 feet, the night tide the highest.

During winter almost a reversal of these rules appears to take place; thus, in November, December, and January, the 12-hour tides again occur, but the time of high water is at or about noon instead of midnight.

In February, March, and April, there are two tides, the superior high water occurring from 1h. to 3h. p.m. Thus it may be said that in summer months the water is low during the day, and in winter low during the night.

The ebb stream has always been found to run southward through the Haro archipelago, and out of Fuca strait for $2\frac{1}{2}$ hours after it is low water by the shore, the water rising during that time; the ebb is stronger than the flood, and generally two hours' longer duration.

The tides during those months when two high and two low waters occur in the 24 hours, are far more irregular than when there is only one 12-hour tide, and another anomaly exists, viz., the greatest range not unfrequently occurs at the first and last quarters, instead of at the full and change of the moon.

CURRENTS.—A southerly current has been found to prevail on the western coast of Vancouver island more or less throughout the year, particularly from August to November, probably in some measure caused by the N.W. winds which blow constantly during the summer. This current joining the ebb tide out of Fuca strait has been known to set vessels between 4 and 5 miles an hour to the southward, and during fogs there is great risk of being drifted on to Cape Flattery, or some of its off-lying dangers; extreme caution should therefore be observed in entering the strait at such times, especially near the full and change of the moon, when the tides are at their strongest.

WINDS.—Within the strait of Juan de Fuca, in the winter season, the winds usually assume its direction either up or down. During summer, the prevailing winds from N.W. or S.W., take a westerly direction within the strait; while the S.E. gales of winter blow fairly out.

Although a westerly wind may be blowing within the strait, it frequently during the change of the seasons blows heavily outside at the same time from S.S.W., or sometimes suddenly changes to that direction, from a light easterly wind on opening the entrance, which makes that part of the coast of Vancouver island between Port San Juan and Bonilla point a dangerous lee-shore to a ship without steam power.

The coast winds in summer prevail from S.W. and N.W., the former during the early months, and the latter blow fresh and with great regularity during June, July, and August. In September and the early part of October the winds are very uncertain and there is generally a great deal of calm, gloomy weather.

The barometer usually stands above 30.00 inches during summer; should it fall to 29.90 a south-easterly wind with thick rainy weather may be expected, but of short duration and clearing up with a westerly wind as soon as the barometer rises.

The winter winds are S.E. or S.W., more frequently the former; they set in towards the end of October, and continue until the middle of April. S.E. gales are generally preceded by a short interval of calm, cloudy weather; they spring up gradually from East or E.S.E. veering to the southward, accompanied by rain and thick weather, the barometer falling rapidly; when the barometer becomes stationary the wind shifts suddenly to S.W. and blows heavily with clear weather, but frequent squalls of rain; the barometer begins to rise immediately the wind veers to S.W., from which quarter it generally blows from 12 to 20 hours.

The violence and duration of these S.E. gales is always proportioned to the fall of the mercury; with the barometer at 29.50 a strong gale may be looked for from this quarter; it seldom falls below 29.20, when very bad

weather is certain to follow. On two or three occasions in as many years it has been known to fall to 28.90, and has been followed by S.E. gales of great violence.

A S.E. gale sometimes springs up, though very seldom, with the barometer above 30.00 inches. On such occasions the wind has always been preceded by calm, cloudy weather and rain, with a high but falling barometer; such gales are not violent and of short duration

S.E. gales are always accompanied by thick dirty weather, and rain; they seldom continue from that quarter for more than 12 or 18 hours, unless the barometer falls very low, and almost always shift to S.W.

When the S.W. gale of winter is not preceded by the south-eastern, the barometer seldom falls; it either remains stationary, when the gale may be expected to continue longer, or rises slowly, when it will gradually subside and fine weather follow. S.W. gales are accompanied by heavy banks of clouds, and passing showers of rain, sometimes snow.

The barometer has been known to fall during winter as low as 29.45 and has been followed by no gale or bad weather, but on such occasions there has been a heavy fall of snow on the hills, and a sudden fall of 15 degrees in the temperature.

A fine northerly or N.E. wind frequently occurs at intervals during the months of December, January, and February; it is always accompanied by a high barometer above 30.0, and at such times a continuance for several days together of clear, cold, frosty weather may be looked for; the barometer on these occasions will sometimes rise as high as 30.70, and the fine weather will then probably last a fortnight or more.

FOGS.—Although fogs in this region are not nearly of such frequent occurrence as on the neighbouring coast of California, where they prevail almost uninterruptedly during summer and as late as the middle of October, yet from August to November they occasionally occur in Juan de Fuca strait, and are sometimes very dense over the entrance for several days together. They are generally accompanied by calms or very light winds from N.W., which renders them more dangerous to sailing vessels closing the land.

LIGHTS.—The strait of San Juan de Fuca is fairly lighted. On the small island of Tatouch, close off Cape Flattery, is a *fixed* white light of the first order, elevated 162 feet above the mean level of the sea, and visible in clear weather from 18 to 20 miles.

At New Dungeness and Admiralty head on the southern shore, and on Smith or Blunt island, at the eastern end of the strait, are also excellent lights; while on the northern side is the *flashing* light on the Race islands, and the harbour light at the entrance of the port of Esquimalt; thus after making the light of Cape Flattery, there will only be an

interval of about 16 miles from losing sight of it, until sighting that of Race islands; and from the latter, New Dungeness and Esquimalt are both visible.

SOUNDINGS.—Between the parallels of 48° and 49° the 100 fathom bank extends for 32 miles off shore, and for 5 or 6 miles on either side of the parallel of $48^{\circ} 30'$, which passes through the centre of Juan de Fuca strait, no greater depth than 55 fathoms is found at the distance of 40 miles from the entrance. Steering for the strait within these limits of latitude, viz. a few miles on either side of $48^{\circ} 30'$, from 55 to 60 fathoms will be carried for 20 miles, the bottom fine dark sand, sometimes varied by gravel and small stones, when it will deepen to 80 and 90 fathoms, generally muddy bottom, for a farther distance of 10 miles; a vessel will then be within 8 or 10 miles of the strait: if to the northward of $48^{\circ} 30'$ the water should shoal to 36 and 40 fathoms rocky or gravel bottom; if to the southward it will continue deep and will increase to more than 100 fathoms, when within 8 or 9 miles of Cape Flattery.

The outer edge of the bank is rather steep, falling from 90 to 150 fathoms and then no bottom with the ordinary line. There is one peculiarity which should not pass unnoticed; the deep channel of over 100 fathoms, which runs through the centre of the strait, on entering the ocean is deflected to the southward, probably owing to the superior strength of the ebb stream and the southerly current, and a zone of deep water about 3 miles in width, with from 140 to 150 fathoms, extends in that direction to the 48° parallel; between it and the shore, a distance of about 8 miles, the depth decreases suddenly to 30 fathoms fine dark sand, and immediately outside it from 67 to 80 fathoms will be found.

CAPE FLATTERY or Classet is a remarkable point of land, and distinctly seen at a distance of 35 miles, rising gradually from the sea to a thickly wooded mountain nearly 2,000 feet high, with an irregular shaped summit, and falling again at the distance of 3 or 4 miles to the eastward. When seen from the southward or south-west, it has the appearance of an island, being separated by a stretch of low land from hills of the same or greater elevation, which rise again immediately southward of it.

On a nearer view, the headland itself, with its wild off-lying rocks over which the sea is almost constantly breaking, presents no inviting appearance; it is a rugged sea-worn cliff of no great elevation, and rising gradually to its more prominent feature, a densely wooded mountain. From the cape the coast trends E.N.E. for 4 miles to Neeah bay, and though no positive dangers exist half-a-mile from the shore eastward of the cape, there is generally a heavy swell with irregular tides, and vessels are by no means recommended to approach it within a mile.

TATOUCH ISLAND, lying W.N.W. half a mile from Cape Flattery, is a steep, almost perpendicular rocky islet, bare of trees, and 100 feet high, with some reefs extending a short distance off its western side; the lighthouse, known among seamen as Cape Flattery light, stands on the summit of the island, which with its outlying reef is the most western portion of the United States.*

LIGHT.—The above lighthouse consists of a keeper's dwelling of stone, with a tower of brick, whitewashed, rising above it, and surmounted by an iron lantern painted red, its height being 66 feet above the summit of the island. It shows every night from sunset to sunrise a *fixed* white light of the first order, which is elevated 162 feet above the mean level of the sea, and in clear weather should be seen from a distance of 18 miles, so that a vessel from the southward will make it before being up with the Flattery rocks. Its position, as determined by the American coast survey, is in lat. $48^{\circ} 23' 15''$ N., and long $124^{\circ} 43' 50''$ W.

DUNCAN ROCK lies N.W. by N. a mile from Tatouch island; it is a few feet above water, but the sea always breaks over it. There is deep water between it and the island, but vessels are recommended not to take the passage unless carried by the tide into a position when they may be compelled to do so, or incur greater hazard by trying to avoid it.*

DUNTZE ROCK, with 3 fathoms water on it, lies about a quarter of a mile N.W. by N. from Duncan rock, and frequently breaks. The cross sea which is created in this neighbourhood during bad weather strongly resembles heavy breakers extending a considerable distance across the strait. Sailing vessels are recommended not to approach the lighthouse on Tatouch island nearer than 3 miles. In the immediate neighbourhood of Cape Flattery, and among these rocks, the tides are strong and irregular.

The **COAST** southward of Cape Flattery trends S.S.E. for 25 miles, the land being mountainous and thickly wooded. At the distance of 11 miles are the Flattery rocks, a group of remarkable bare rugged islets, the outer rock lying $2\frac{1}{2}$ miles from the shore. At 12 miles from them in the same direction is a remarkable square white rock, nearly a mile from the shore, which, when the sun's rays are reflected on it, is particularly conspicuous. From this rock the direction of the coast is S.E. for 21 miles to Destruction island, and is fronted by numerous wooded islets and rocks extending about half a mile from the shore. Destruction island is $1\frac{1}{2}$ miles long, and narrow, lying nearly parallel with the

* See Plans of Tatouch island, Duntze and Duncan Rocks and Neeah Bay, on Plan of Port San Juan, No. 1,910; scale, $m = 4$ inches, and views on Chart, No. 1,911.

coast and distant a mile from it. It has steep white cliffy shores, is over 100 feet high, and covered with grass, but no trees; a channel is shown within it of 12 fathoms. Between Destruction island and Cape Flattery, a distance of 45 miles, the soundings vary from 15 to 20 fathoms at 2 miles off shore, until northward of Flattery rocks, when the depth somewhat increases.

DIRECTIONS.—Vessels from the southward or westward bound for Fuca strait, except the coasting steamers which all carry pilots, should make Cape Flattery; there is no inducement to hug the coast, on which a long rolling swell frequently sets, and this swell meeting the southeasterly gales of winter, causes a confused sea. The Cape and its off-lying rocks should not be approached within a distance of at least 3 miles, as the tide occasionally sets over Duncan and Duntze rock with great velocity (page 7), an additional reason why these dangers should not be too closely approached. It is equally necessary either in entering or leaving the strait to avoid the coast of Vancouver island between Port San Juan and Bonilla point, when there is any appearance of bad weather.

It is recommended to pass at the distance of at least 10 miles from the coast, unless working to windward against a fine northerly wind, which is frequently found during summer, when it may be safely approached within 3 miles or less.

To vessels making the strait in bad weather it will be more desirable to run in and seek shelter than to remain outside. If the land has been made either to the southward of Cape Flattery or on the Vancouver island shore within a moderate distance of the entrance, or if the latitude can be relied upon within 2 or 3 miles, it will be advisable to run for the strait. The powerful light of Cape Flattery will, unless in very thick weather, or fog, be seen at the distance of 5 miles, and as soon as a vessel is actually within the strait she will have comparatively smooth water, with sufficient sea room, and may run boldly up the centre for the Race light, or by the assistance of that on Cape Flattery, maintain her position in the strait if preferred. It is to be remarked, that when Cape Flattery light is brought to bear to the westward of W.S.W., it becomes shut in by the land about Neeah bay, and that the Race island light from a similar cause becomes obscured by Beechey head when brought to bear eastward of E. by N. $\frac{1}{4}$ N.; therefore, when either of these lights are obscured, the distance from either coast will be accurately judged, and in the latter case a ship will be getting too close to the northern shore.

Coming from the westward with a heavy westerly or north-west gale, thick weather, and uncertain of the latitude, it would be prudent to lay by at not less than 30 miles from the entrance of the strait, or on the

edge of the bank of soundings. These gales seldom last more than 12 hours, and if they veer towards the S.W. the weather will clear, and a vessel may immediately bear up for the strait.

With a S.E. gale it is recommended to close the land, smoother water will be obtained, and the bank of soundings off the Vancouver island shore will give a vessel pretty accurately her distance from the land. Gales from this quarter sometimes continue in the winter season for 30 hours, and when a vessel strikes soundings on the edge of the bank in 90 fathoms, and carries them in to 60 she may put her head to the S.W., and will have plenty of room for drift.

It is of great importance in making the strait during bad weather to strike the outer edge of the bank of soundings, as the ship's distance from the land will then be accurately known. It has been already observed (page 6) that after running 20 miles eastward the depth increases from 55 to 80 and 90 fathoms, which latter depths, if the lead has not been previously kept going, might be mistaken for the outer edge.

Should a sailing vessel be overtaken by one of those dense fogs which sometimes hang over the entrance of the strait (page 5) she should not close the land but stand off sufficiently far to avoid being set by the southerly current too near Cape Flattery. If a steamer has made the land or light, and is certain of her position, she should get the northern or Vancouver island shore aboard, when, with the assistance of the chart and lead, she may feel her way in. When 8 or 10 miles eastward of Port San Juan there is anchoring ground in 12 fathoms a mile from the shore, and if the fog is very dense a stranger should anchor; it must be remarked, however, that not unfrequently the weather is clear a few miles within the strait while the entrance is totally obscured.

NEEAH BAY is between Koikla point and Wyadda island; the latter, half a mile long in a N.W. and S.E. direction, is narrow and covered with pine trees. Koikla point is 4 miles E.N.E. from the lighthouse on Tatouch island. The bay offers a safe and convenient anchorage to vessels meeting S.W. or S.E. gales at the entrance of the strait, and is sheltered from W. by S. round by south to N.E. The western shore is steep and cliffy, a reef extends for more than a cable off Koikla point, and within the point a sand-bank which dries extends off a quarter of a mile at low water. The head of the bay is a low sandy beach, on which there is generally some surf rolling. On the eastern side of the bay off the south-west side of Wyadda island, a rocky ledge and shoal water extend for 3 cables, and the holding ground is not so good on the island side.

A good berth will be found in Neeah bay, in 6 fathoms sandy bottom, with the outer point of Wyadda island N.E. by N., and Koikla point

W. by N. ; a short distance within this position kelp grows in large patches all over the bay, and some care is necessary in selecting a berth. Large sailing vessels may anchor in 7 or 8 fathoms a little outside the above bearings, in the centre of the bay, with the outer point of the island N.E. by E.

A vessel should leave this bay on any indication of a north-east wind, and if too late, and unable to weather Wyadda island, she may, with the assistance of the chart, run between it and the main ; the passage is 2 cables in breadth, and the least water 21 feet ; she must, however, be careful to avoid the ledge off the south-west end of Wyadda, and in hauling out should give the eastern side of the island a berth of at least a quarter of a mile. Vessels have ridden out north-west gales close to the south-east end of Wyadda in 6 fathoms, but it is more prudent to get out into the strait at the commencement of the gale. During strong westerly or south-west gales, or after they have been blowing outside, a considerable swell rolls into the bay, which renders it at such times a somewhat disagreeable though not unsafe anchorage ; small vessels may go close in and get smooth water, even among the kelp which grows in 4 and 5 fathoms.

CALLAM BAY.—From Neeah to Callam bay the distance is 15 miles. The intervening coast, which trends in an E. $\frac{1}{2}$ S. direction, is nearly straight, and the shore bold, the only remarkable feature being Klaholoh (Seal rock), 150 feet high, which lies a short distance off the shore, 2 miles eastward of Wyadda island. If a vessel reaches as high as Callam bay, and meets an easterly or south-east wind, she may obtain anchorage and shelter in the centre of the bay in from 8 to 10 fathoms, but this can only be considered as a stopping place ; it is easily recognized by Slip point, its eastern bluff, which is the western termination of a bold coast ridge, about 1,000 feet in elevation.

THE COAST from Callam bay continues in the same direction for 8 miles to Pillar point, so called from its terminating in a bare columnar-shaped rock, a little remarkable where, from the character of the country, generally thickly wooded from summit to water line, few objects present themselves by which vessels may accurately fix their positions. The coast on the east side of this point forms a small bight, in which there is a considerable stream and an Indian village, and then trends E. by N. with a gentle curve to Striped peak ; a small river, the Lyre, emptying itself just eastward of a low point 7 miles westward of the peak.

Striped peak is rather remarkable from a landslip occurring down its face, and from which it received its name ; at $1\frac{1}{2}$ miles westward of the peak, and a third of a mile off the west point of Crescent bay, which is merely an indentation, lies a rock, which breaks at low water : this is the

only danger which occurs on the southern side of the strait. Westward of this, some kelp grows a short distance from the beach on the somewhat sheltered part between Striped peak and Pillar point, and here the depth of water at a mile from the shore varies from 8 to 16 fathoms; westward of Pillar point it deepens to 40 fathoms at that distance.

FRESHWATER BAY, at 3 miles eastward of Striped peak, between Observatory and Angelos points, is nearly a mile deep, and more than 2 miles wide in an east and west direction. The two entrance points are E. by N., and W. by S. of each other, and within this line the depth varies from 6 to 12 fathoms. Observatory point has several rocks lying a short distance off it; the western side of the bay is a high bold shore. Angelos point, the eastern entrance point, is low; the river Elwha emptying itself through it, forms a delta, and has caused a bank with a depth of water on it varying from 2 fathoms close in shore to 10 fathoms at the distance of a mile. Vessels may anchor within the line of the points in from 6 to 9 fathoms.

PORT ANGELOS or False Dungeness is 7 miles eastward of the east point of Freshwater bay, the intervening coast forming rather a deep indentation to the southward, off which as little as 3 fathoms water is found nearly a mile from the shore. The north side of the port is bounded by one of those low narrow sand or shingle spits which are a characteristic feature of the country; this spit, which is named Ediz hook, curves from a high bluff in an E.N.E. direction for nearly 3 miles, and forms a large and good harbour. On the north or spit side the water is deep, varying from 15 to 30 fathoms; but southward of a line drawn through the centre there is excellent anchorage in from 7 to 10 fathoms in any part of the port. The outer part of the spit is steep-to, and may be rounded close to, after which the port extends for $2\frac{1}{2}$ miles in a westerly direction, by more than a mile in breadth. Although open to easterly winds, they do not blow home. A large spar beacon painted *white* has recently been erected on Ediz hook, which is a good guide to the entrance during day time.

Water.—Fresh water is to be obtained from streams on the south side of the port.

DIRECTIONS.—The spit is so low that at times the sea washes over it, and as it is impossible to see it at any distance, vessels would be apt at night to run on it if passing close to the southern shore of the strait; Dungeness light therefore should not be brought to bear to the northward of E. by N. $\frac{1}{2}$ N., which will lead more than 2 miles off, but as the spit is nearly 13 miles from the light, the latter would not in all states of the weather be visible. At a distance of more than 2 miles from the shore

14 fathoms will be found N.N.W. from that part of the spit which joins the mainland ; and at night vessels should not go within this depth.

NEW DUNGENESS BAY.*—The shore from False Dungeness gradually curves to the N.E., and about 8 or 9 miles from Ediz hook, another long low narrow sand spit covered with grass stretches from the bluff shore in a general N.N.E. direction for $3\frac{1}{2}$ miles, forming the north-western side of the roadstead of New Dungeness. A shoal with $2\frac{1}{2}$ fathoms extends N.N.E. for half a mile from the end of the point, and a heavy tide rip runs over it at the change of the currents. On the inside, one mile from the eastern extremity, another narrow sand spit stretches $1\frac{1}{2}$ miles southward towards the main shore, forming a large inner shoal bay with a narrow opening, through which the water passes as over a rapid ; at low tide abreast this point is a small stream, on the western side of which is a bluff 60 feet high, and upon it is a large village of the Clalums. The shore eastward of the stream is low, swampy, and covered with trees and brush ; it forms the southern or main shore of the roadstead, and off it are extensive mud flats, which are bare at low water for five-eighths of a mile, and run as far as Washington or Budds harbour ; shoal water exists for some distance outside these flats. About 20 fathoms are found a quarter of a mile south of the lighthouse point, the depth regularly decreasing across the bay with a soft tenacious muddy bottom.

Water.—Fresh water may be obtained in abundance at the above stream, but boats must obtain their supply at low tide, and come out when the tide has sufficiently risen.

LIGHT.—At about a sixth of a mile within the outer end of the point is a structure consisting of a keeper's dwelling, of stone, with a tower of brick ; the upper half being a dark lead colour, the lower half white. The tower is surmounted by an iron lantern painted red, the entire height being 92 feet, and its elevation above the mean sea level 100 feet. It exhibits every night, from sunset to sunrise, a *fixed* white light of the third order, which should be seen from a distance of 15 miles. Its position, as determined by the United States coast survey, is lat. $48^{\circ} 10' 59''$ N., and long. $123^{\circ} 6' 7''$ W.

A FOG BELL of 1,100 pounds weight has been placed upon the outer extremity of the lighthouse point at New Dungeness, and it will be sounded every *ten seconds* during foggy or thick weather day or night. The striking machinery is in a frame building with the front open to receive the bell, painted black, raised 30 feet above the ground on an open structure, whitewashed.

* Report, United States Coast Survey.

ANCHORAGE.—The usual and best anchorage in New Dungeness bay is to bring the lighthouse to bear about N. by E. $\frac{1}{2}$ E. half a mile distant, where 10 fathoms are found a third of a mile off the beach. With the lighthouse bearing N.W. by N. three-quarters of a mile distant, the same depth and bottom are found, the nearest shore will bear South $1\frac{1}{4}$ miles, and the mud flat three-quarters of a mile in the same direction; from this position a vessel can readily get under weigh and clear the point. A south-east wind drawing out of the strait blows directly into this harbour, but the bottom will hold any vessel with good ground tackle; the only difficulty will be to get the anchors out of the mud after riding a couple of days to a gale.

TIDES.—It is high water, full and change, at New Dungeness, at 3h., and the rise is 5 feet.

The **COAST** from New Dungeness trends to the S.S.E. for nearly 7 miles, and forms a deep indentation, in the western corner of which is Washington harbour, and in the eastern Port Discovery. The entrance of the former is almost closed by a long sand spit extending from the eastern side, leaving a narrow channel with only 2 fathoms water, which deepens within to 13 fathoms; therefore, as a harbour, it is of little importance when there are so many good ones in the neighbourhood.

PORT DISCOVERY, the harbour where Vancouver anchored and refitted his ships, and from whence he commenced his exploration of these regions in May 1792, is an extensive inlet running in a southerly and south-east direction for 6 miles, with an average breadth of $1\frac{1}{2}$ miles; the general depth of water is from 20 to 30 fathoms, but an anchorage may be had on the west side $1\frac{1}{2}$ miles within the entrance in 15 fathoms, close to the shore. At the head of the port there are 10 fathoms, but a mud flat extends for a mile from the shore; this, indeed, is the general feature of all the deep water inlets on these coasts, unless the rivers or streams which empty themselves into them are of sufficient magnitude to cause an adequate scouring power, and more equally distribute the deposit which they bring down with them.

Protection island lies immediately off the entrance of the port, and shelters it from north-west winds. The north side of the island is shoal for half a mile off, and there is a 3 fathom patch bearing N.W. 2 miles from its north point; reefs extend also off the east and west points for half a mile, but there is a clear deep channel in on either side; that to the westward a mile in breadth, and the eastern one $1\frac{1}{2}$ miles. A spit extends a short distance off Clallam point, the western point of entrance; and in working up some of the prominent points should not be closely approached as the soil breaking away from the neighbouring cliffs has formed a bank off most of them.

ADMIRALTY INLET.—At 14 miles E.N.E. from New Dungeness light, is the entrance to Admiralty inlet, between Wilson point on the west and Partridge point on the east, the latter a remarkable sloping cliff of a whitish colour; and here commences that extensive and singular series of inland navigation, which penetrates the continent in a general southerly direction for nearly 90 miles. These waters were first explored by Vancouver, and have since undergone and are still undergoing a more detailed examination by the United States Government.

LIGHT.—On Admiralty head, which forms the inner eastern entrance point of the inlet, and bears N.E. by E. $3\frac{1}{4}$ miles from Wilson point, is a *fixed* white light of the fourth order, elevated 119 feet above the mean level of the sea, and visible in clear weather at a distance of 17 miles. This light is of the greatest benefit to the numerous vessels entering Port Townshend and the inlet, particularly to the United States mail steamers, which run bi-monthly between San Francisco, Olympia at the head of Puget sound, and Esquimalt.

PORT TOWNSHEND lies at the threshold of Admiralty inlet, and is the port of entry for Washington territory. Vessels leaving Fuca strait have frequently, when overtaken by a westerly gale, been compelled to bear up and seek shelter in it. Although a safe harbour, from its great extent it is subject to a disagreeable sea during strong winds, and with a strong south-easter landing is frequently impracticable, and a dangerous sea for boats gets up.

The entrance is between Wilson and Marrowstone points, the latter bearing from the former E.S.E. $3\frac{1}{2}$ mile. At $1\frac{3}{4}$ miles inside Wilson point, and on the same side is Hudson point, the distance between which and Marrowstone point is also $1\frac{3}{4}$ miles; and between these two points is more properly the true entrance of the port, which now runs in a S.S.W. direction for 2 miles, and then S.E. for about the same distance, the average breadth being nearly 2 miles; the general depth of water is from 9 to 15 fathoms good holding ground, soft mud when within Hudson point. Wilson point is low, with sand hillocks on its extreme; a shoal spit extends for nearly half a mile off it, and vessels are recommended to give it a berth of nearly a mile in rounding; the tides are strong, and when blowing fresh a heavy ripple occurs in the neighbourhood. Hudson point should be rounded within half a mile or less.

At half a mile within Hudson point there is good anchorage in the western side of the port, off the houses, in 10 fathoms, half a mile from the shore. During winter S.E. gales are not infrequent, and ships are recommended at this season to anchor at a greater distance; the low sand

hummock on the extreme of Wilson point, just on or shut in by the high part of Hudson point, bearing N. by W. $\frac{1}{2}$ W., is a good berth in 12 or 14 fathoms, about a mile from the shore.

PORT SAN JUAN is the first anchorage on the north shore within the entrance of Fuca strait. The opening, which is remarkable from seaward, is seen for a considerable distance, and makes as a deep gap between two mountain ranges; the centre of the entrance bears N.N.E. $\frac{1}{2}$ E. from Cape Flattery lighthouse, and as the light is visible from the anchorage it is not difficult to enter or leave during night time. Owen point is the western entrance point, and Observatory rocks the eastern; off the former, at something more than a cable's length, is a low flat rock named Owen island, awash at high water.*

Observatory rocks are high pinnacles with two or three trees growing on them, and some smaller rocks off, the outermost of which lies $1\frac{1}{2}$ cables from the shore. At 4 cables within these rocks and $1\frac{1}{2}$ cables from the shore is another reef partly out of water, named Hammond rocks. On the north side of the port some rocks and broken ground extend for a mile within Owen point, and nearly 2 cables from the shore; one rock, awash, lies N.E. $\frac{1}{4}$ E. from Owen island, distant 4 cables, and is $2\frac{3}{4}$ cables from the shore. The entrance points lie E. $\frac{1}{2}$ N. and W. $\frac{1}{2}$ S. of each other, distant nearly $1\frac{1}{2}$ miles; the port runs nearly straight for $3\frac{1}{2}$ miles in a N.E. by N. direction, and carries its breadth almost to the head, which terminates in a round beach composed of muddy sand. Gordon river empties itself through the north end of this beach, and Cooper inlet penetrates its southern; very small coasters may enter them towards high water, and find depth and shelter within.

The port is entirely open to south-west winds, during which a heavy sea rolls in if blowing a moderate gale; and though it is probable that a vessel with good ground tackle would ride out a gale if anchored in the most sheltered part, it is by no means recommended to remain with any indication of such weather, but to weigh immediately, and if outward bound seek shelter in Neeah bay, the entrance of which bears from San Juan S. by W. $10\frac{1}{2}$ miles. There is a convenient depth of water all over Port San Juan, from 6 to 9 fathoms, the bottom fine muddy sand: when within three-quarters of a mile of the head it shoals to 4 fathoms, and here in heavy gales the sea breaks; a flat runs off 3 cables from the head. In the outer part of the port there is generally a swell. Good anchorage will be found about $1\frac{1}{4}$ miles from the head, with Owen island bearing S.W., and Adze head E.S.E., in 7 fathoms.

The hill named Pandora peak does not show as a peak within the port.

* See Plan of Port San Juan, No. 1,910; scale, $m = 4$ inches.

The COAST.—From Port San Juan the shore of Vancouver island trends East to Sherringham point, distant 24 miles, and presents no very remarkable features; the country is thickly wooded, and the land rises to a considerable elevation. Providence cove, fit for boats, lies 3 miles eastward of San Juan; at the distance of 7 miles farther east, in a small bight, is a stream named Sombrio river. The river Jordan, a considerable stream, is $5\frac{1}{2}$ miles westward of Sherringham point; between the latter and Sombrio river, from 7 to 10 fathoms water will be found a mile from the shore, and off the river Jordan the latter depth extends for more than 2 miles.

Eastward of Sherringham point the shore curves a little to the northward, and at the distance of $4\frac{1}{2}$ miles is Otter point; the points on this side the strait are not remarkable nor easily distinguished unless close in shore, some of their extremes are partially bare of trees. Vessels running or working up the strait at night should be careful not to get so near the north shore as to shut in Race island light by Beechey head. From Otter point the entrance to Sooke inlet is E. by N. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles, the intervening coast forming rather a deep indentation named Sooke bay, in which vessels may anchor in fine weather something more than half a mile from the shore in 8 fathoms.

SOOKE INLET is a remarkable sheet of water; its entrance is little over half a mile in breadth, and leads by a narrow and tortuous channel 3 miles in length, and in a general north direction to a beautiful land-locked basin, nearly 2 miles in extent, in an east and west direction, and one mile north and south, with a depth of from 8 to 16 fathoms all over it. It is not likely, however, to become a harbour of much importance, for, independently of strong tides and several sharp turns which vessels would have to make in entering, the breadth of the deep channel seldom exceeds half a cable, and is consequently only adapted for coasting vessels or small steamers, unless at considerable inconvenience and loss of time.

It would be useless to offer any farther description of this beautiful though almost valueless sheet of water to ocean shipping; the chart, or the assistance of a pilot, will alone enable large vessels to enter the basin.*

Vessels may anchor in 10 fathoms half a mile off the entrance, and, if necessary for shelter, may with a fair wind run inside Whiffin island, where there is sufficient space to anchor.

Whiffin island is low, gravelly, and always connected with the western entrance; its eastern point bears N.N.E. three-quarters of a mile from the centre, between the two entrance points; it must be rounded close, leaving it on the port hand, as a reef lies only half a cable eastward of it.

* See Plan of Sooke Inlet, No. 1,907; scale, $m = 4$ inches.

On rounding the point drop the anchor at a cable's length within in 8 fathoms ; here there is a space of deep water 2 cables in extent.

SECRETARY ISLAND, small and wooded, lies $1\frac{3}{4}$ cables off Possession point, a mile south-eastward of Sooke inlet. There is a depth of 16 fathoms between it and the main shore, and from it Beechey head bears E. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles, with a bold steep shore between, and deep water close-to.

BECHER BAY.—Beechey head is a bold wooded cliff forming the west entrance point of Becher bay, Cape Church being the eastern one. The breadth of the entrance is something over a mile, and off the eastern side are several small wooded islands, named Bedford islands. The depth of water at the entrance varies from 20 to 50 fathoms rocky and irregular bottom ; at three quarters of a mile within in a northerly direction are Wolf and Frazer islands, with some small islets off them ; between these two islands, which lie East and West of each other, Frazer being on the eastern side, is the channel 4 cables wide to the anchorage ; it then takes a north-easterly direction for three-quarters of a mile, where anchorage in 10 fathoms may be had, with the centre of Frazer island bearing S.S.W. distant a quarter of a mile.

Becher bay cannot be recommended as a good anchorage ; it affords no great shelter with southerly or westerly winds, and vessels outward bound had far better wait a fair wind in Parry bay to the northward of Race islands.*

Vessels bound up the strait should pass the land about Beechey head at the distance of 2 miles if intending to go outside the Race islands.

Steamers intending to take the Race passage may pass Cape Church about half a mile distant, and keep the land aboard about that distance until up with Bentinck island, when the latter should be closed and kept within a quarter of a mile or just outside the kelp.

The passage between Bentinck island and the Vancouver shore is choked with rocks, and strong tides run both inside and outside.

RACE ISLANDS are a cluster of low bare rocks, the outermost of which lies a mile S.E. of Bentinck island at the south-east point of Vancouver island. They occupy more than half a mile in extent, north and south, and the same east and west. The outermost and largest, or Great Race, is $1\frac{1}{2}$ cables in extent and 25 feet high ; the others are smaller, a few feet above high water or awash. The tides among them run from 3 to 6 knots, and during bad weather heavy and dangerous races occur. The outer rock should be given a berth of a mile, at which distance from 40 to 50 fathoms of water will be found ; it may, if necessary, however be rounded

* See Plan of Becher and Pedder Bays, No. 1,906 ; scale, $m = 4$ inches.

at a less distance, the most off lying danger being the Rosedale rock, with 5 feet on it, lying S.E. by E. from the Great Race distant 4 cables. In light winds a sailing vessel should give these islands a good berth, especially when eastward of them, as the ebb sets strongly towards them. In 1869 a large vessel was drifted on them by the ebb tide in a calm, and became a total loss.

LIGHT.—Race island lighthouse, on Great Race rock, consists of a keeper's dwelling of stone with a tower of the same material, the latter being painted with alternate horizontal black and white bands. It exhibits, at an elevation of 118 feet above the mean level of the sea, a white light of the second order, which shows a *flash* every *ten seconds*, visible in clear weather at a distance of 18 miles.

Its position is lat. $48^{\circ} 17' 45''$ N., long. $123^{\circ} 32' 15''$ W.

RACE PASSAGE is a clear channel 4 cables in breadth between the Race rocks and Bentinck island, with a depth of not less than 14 fathoms. This passage may be taken by a steamer; but it is not recommended for a sailing vessel under ordinary circumstances, on account of the strength of the tides, and races caused by the irregular rocky nature of the bottom. A case may arise, however, either inward or outward bound, when a vessel overtaken by a strong S.E. wind would do better to run through than risk weathering the Great Race, by less than a mile; if so the Bentinck island shore should be kept aboard at a distance of 2 cables, or just outside the kelp, for the northernmost rock, which forms the southern side of the passage, is covered at high water, and the strongest tides and eddies are found in its neighbourhood. The course through is N.N.E. and S.S.W.

RACE ISLANDS to ESQUIMALT HARBOUR.—After rounding Race island lighthouse at the distance of a mile, the course for Esquimalt harbour is N. $\frac{1}{2}$ W. $8\frac{1}{2}$ miles. The lighthouse on Fisgard island, a white tower elevated 70 feet above the sea, at the western entrance point of the harbour is very conspicuous, and will be seen immediately on rounding the Race islands; a course direct for it will clear all dangers, but attention must be paid to the set of the tides. The ebb runs almost directly from the Haro and neighbouring straits towards the Race islands, and a sailing vessel unless with a commanding wind should give them a berth of more than a mile, and steer N.E. by N. for 3 or 4 miles, before she bears up for the harbour; the flood sets in the opposite direction to the N.E., and with light winds vessels are liable to be carried to the eastward, and if near to the Vancouver island shore, up Haro channel, where the water is generally too deep for anchorage; therefore with the flood the coast of Parry bay should be kept aboard if possible, where good anchorage may be had in moderate weather and with all westerly winds, less than a mile from the shore in 10 fathoms.

By night, when Fisgard island light bears N. by W., a vessel may steer boldly for it. The only precaution necessary is to keep the white light in full view; if it becomes dim or shaded, she is getting too near the shore, and should immediately haul out to the eastward until it is again distinctly seen; the two lights by their bearings will immediately show a vessel how she is being affected by the tides.

Entering Esquimalt harbour, the Fisgard island light should be left from one to two cables on the port hand; when it bears N.W. by W. $\frac{1}{3}$ W. the light changes from white to red, and shows the latter colour within the harbour; and when it bears S. by W. at a convenient distance, a vessel may anchor in 7 fathoms, or stand into Constance cove if preferred. The Scroggs rocks on the eastern side of the entrance of the harbour must be avoided; they bear E.S.E. from Fisgard island distant nearly 4 cables. If not desiring to enter the harbour at night, good anchorage may be had in Royal roads in 9 fathoms; Fisgard island light bearing N. by W. from half a mile to a mile.

The entrance of Victoria harbour being only 2 miles eastward of Esquimalt, the same precautions are necessary as regards the tides. The course from a mile off the Race islands is N. $\frac{1}{2}$ E.; during daytime Christ church, a conspicuous white building with a spire, and standing on an eminence, will be seen shortly after rounding these islands, bearing N. by E.; it should be kept just on the starboard bow. At night or during bad weather it is strongly recommended not to run for this harbour, as it can only be entered at certain stages of the tide, and the anchorage outside is at such times exposed and unsafe, while Royal bay or Esquimalt harbour is always available and safe; but if it is decided to run for Victoria, it must be borne in mind that when Fisgard island light changes from white to red, a vessel will be very near the shore.*

BENTINCK ISLAND, lying close off the south-east point of Vancouver island, is little over half a mile in extent, and irregularly shaped, being almost divided in the centre by a narrow neck. It is about 100 feet high, and, like the adjacent land, covered with pine trees; its southern and eastern sides are fringed with kelp, outside which there are no dangers beyond those described in the Race channel. Between it and the main-land is a boat channel, and coasters acquainted with the locality find shelter at its eastern entrance; there are some settlers' houses in the neighbourhood.

Between Bentinck island and Esquimalt harbour, a distance of 8 miles, the coast is indented by several bays, and anchorage may be obtained in

* See Chart of Haro and Rosario Straits, No. 2,689, scale, $m = 0.5$ inch; and Plan of Haro Strait and Middle Channel, No. 2,840, scale, $m = 1$ inch.

8 to 10 fathoms anywhere within a mile of the shore, except immediately off Albert head; the only danger is a reef lying about a cable's length off the head.

PEDDER BAY, the first of these indentations, has its entrance immediately northward of Bentinck island, 2 miles N.N.W. of the Great Race, between Cape Calver and William head, where its breadth is three-quarters of a mile; the inlet runs to the W.N.W. for 2 miles, narrowing rapidly, and when half a mile within is only fit for small craft, which may find good shelter at its head. Vessels of any size may anchor in the entrance in 7 fathoms, with Cape Calver, its southern point, bearing S.E. by S. distant about half a mile, but though the holding ground is good, it is open to all winds from N.N.E. round east to S.S.E., and with a S.E. gale would neither be a desirable nor safe anchorage.*

PARRY BAY, immediately northward of William head, affords good anchorage with all westerly winds. Vessels bound to sea and meeting with a strong wind from this quarter are recommended to return here; the anchorage is in 9 fathoms, from half to three-quarters of a mile off the sandy beach, with William head bearing S.W. by S. about the same distance. With a south-east wind there is ample room to weigh, which a vessel should immediately do, and if not able to round the Race islands and proceed to sea, run for Esquimalt harbour.

Albert head, the north point of the bay, is moderately high, sloping to the sea, bare of trees at its extreme, but wooded immediately behind; a reef lies a cable off it. William head somewhat resembles it, but is lower. The water is too deep for anchorage immediately off these heads.

ROYAL BAY or ROADS, of which Albert head is the southern point, and the entrance of Esquimalt harbour, the northern limit, is a fine sheet of water 3 miles in extent, and affords good anchorage with all winds which would prevent a vessel from entering that harbour; a vessel may anchor anywhere within three-quarters of a mile from the western shore. A good berth is a mile South of Duntze head with the entrance open, or Thetis cottage just open of Inskip rocks (in the harbour), which is the leading mark for clearing the Scroggs rocks running in or out.

LIGHT.—A lighthouse is erected on Fisgard island, a small rocky islet 25 feet high, and almost connected with the shore, forming the western entrance point of Esquimalt harbour; the tower is of brick whitewashed, and is elevated 70 feet above the mean level of the sea, with a red brick dwelling-house adjoining. The light is *fixed* and of the 4th order; it shows *white* when bearing from N. $\frac{1}{4}$ W. to N.W. by W. $\frac{1}{2}$ W.; *red* from N.W. by W. $\frac{1}{2}$ W. to S. $\frac{1}{2}$ E., and *green* from N. $\frac{1}{4}$ W. to N. by E. $\frac{2}{3}$ E.

* See Plan of Pedder Bay, No. 1,906; scale, $m = 4' 0$ inches.

The white light is intended to guide a vessel in from seaward, and while visible clears alike the western coast between Race island and Esquimalt, and the southern shore with its off-lying dangers, Scroggs rocks and Brotchy ledge, between Duntze head and Trial island. The red light will be found useful by vessels bound to Victoria or Esquimalt from the eastward, after rounding Trial island it will indicate a vessel's distance from the shore, and if bound to Esquimalt, a W.S.W. course will lead a safe distance outside Brotchy ledge, until the light changes from red to white, when it may be steered for, and not before. A green ray of light is thrown up the harbour between the Whale rock and the western shore, and leads westward or inside the line of that rock.

ESQUIMALT HARBOUR is a safe and excellent anchorage for ships of any size, and with the aid of the light on Figgard island may be entered at all times with great facility. The entrance, which bears North $8\frac{1}{2}$ miles from the lighthouse on Great Race island, is between Figgard island and Duntze head, and is 3 cables in breadth, opening out immediately within.*

The only dangers are the Scroggs rocks which lie on the eastern side, S.S.E. 3 cables from Duntze head, and cover at three-quarters flood. Inskip islands kept well open of the head leads clear to the westward of them, but the best mark for entering with a leading wind is Thetis cottage, a conspicuous white building on Dyke point, just open or on with the western Inskip rock, bearing N. by W. $\frac{1}{4}$ W., which leads in mid channel.

Figgard island should not be passed within less than a cable's length, keeping just without the kelp, which extends about half a cable eastward of it, for a rock with 7 feet water over it lies three quarters of a cable north-east of the lighthouse.

Vessels entering the harbour at night with a strong wind after them should take care to shorten sail in time, as the space for rounding to is somewhat limited; and it is desirable to moor if any stay is intended, as the winds are changeable.

The best time to leave the harbour is early in the morning, when either a calm or light land wind may be expected; there is little strength of tide in the harbour, or for some distance without, and it sets fairly in and out.

The strongest and most frequent gales blow from S.W. and S.E. which are leading winds in, but rarely from N.W. The S.W. is a summer wind, generally fresh, and brings fine weather, unless it blows a gale. S.E. winds may be looked for during the winter months, or between November and March, and generally a strong gale once in a month

* See Plan of Esquimalt Harbour, No. 1,897^a; scale, $m = 10$ inches.

with rain and thick weather. The N.E. wind rarely blows with much strength, and always brings fine clear weather; a direct South wind, to which some parts of the harbour are open, seldom blows, and there is never sufficient swell to render the anchorage inconvenient.

The Whale Rock, with only 7 feet on it at low water, lies W. $\frac{1}{2}$ N. 2 cables from Inskip islands; or nearly midway between them and the western shore of the harbour. This rock is of small extent, and not marked by kelp; it has a clear passage on either side, that to the eastward being the widest. Yew and Rodd points, just touching, point to the rock; Yew point, just touching the lighthouse on Figgard island, S. by E. $\frac{3}{4}$ E., leads nearly a cable's length westward; and when Ashe head is well shut in by Inskip islands, a vessel will be clear to the northward.

Anchorage.—The most convenient anchorage is in Constance cove, on the eastern side of the harbour, immediately round Duntze head, the general depth being 6 fathoms, and the holding ground good; there is, however, safe anchorage in any part of the harbour, in not less than $4\frac{1}{2}$ fathoms, as far northward as Dyke point. A cable's length above this point the water shoals to 3 fathoms, and from thence to the head of the harbour is a flat with only a few feet on it at low water.

Thetis cove in Plumper bay, on the eastern side, immediately north of Constance cove, is a snug anchorage, with the harbour entrance just shut in by Inskip rocks in $4\frac{1}{2}$ fathoms; but vessels proceeding above these rocks must take care to avoid the Whale rock.

Water may be obtained during the winter months without difficulty from the many streams that empty themselves into the different bays, caused by the great quantity of rain which usually falls at that season; but in summer watering is a tedious process, and boats must be sent either to Rowe stream, at the head of the harbour, or to the salt lagoon just outside the entrance. Both offer difficulties, unless at or near high water.

Water, however, might be conveyed at all seasons, and at a trifling expense, from the chain of lakes just over the western side of the harbour, near Colwood farm.

VICTORIA HARBOUR is a little more than 2 miles eastward of Esquimalt, with its entrance between Ogden and MacLaughlin points. Macaulay or Sailor point, a remarkable projection nearly midway between the two harbours, is a bare flat point about 30 feet high, showing as a yellow clay cliff, worn by the action of the sea and weather into a rounded nob at the extreme. The coast on either side of this point for a mile is fringed with sunken rocks, and is dangerous for boats in bad weather, many fatal accidents having occurred.

The entrance to this harbour is shoal, narrow, and intricate, and with S.W. or S.E. gales a heavy rolling swell sets on the coast, which renders the anchorage outside unsafe, while vessels of burthen cannot run in for shelter unless at or near high water. Vessels drawing 14 or 15 feet water may, under ordinary circumstances, enter at such times of tide, and ships drawing 17 feet have entered, though only at the top of spring tides. *

The channel is buoyed, but it is necessary to take a pilot, and the space is so confined and tortuous that a long ship has considerable difficulty in making the necessary turn; a large per-centage of vessels entering the port, small as well as large, constantly run aground from these causes, or from trying to enter at an improper time of tide, or neglecting to take a pilot. Such accidents, however, are seldom attended with more than delay and inconvenience, as the shoalest and most intricate part of the passage is sheltered; when within, the port is perfectly land-locked, and vessels may lie in from 14 to 18 feet at low water, but the harbour accommodation is limited.

Doubtless Victoria harbour is susceptible of improvement by artificial means, though it is improbable that it can ever be made a safe and convenient port of entry for vessels of even moderate tonnage, at all times of tide and weather, and it appears not a little remarkable that with the excellent harbour of Esquimalt within 2 miles, Victoria should have been continued as the commercial port of a rising colony, whose interests cannot but suffer materially from the risks and delays which shipping must encounter in approaching the commercial capital.

Victoria was selected by the Hudson's bay company as the depôt of their establishments in consequence of the quantity of clear good land in the immediate neighbourhood, and the harbour being sufficiently spacious for the few small vessels in their employ, and as a site in these respects was admirably chosen, but it has been a fatal mistake at a later date not to have adopted Esquimalt as the commercial port.

Victoria is a free port, the government site, and the largest and most important town in these colonies. It enjoys a considerable foreign and coasting trade, which is annually increasing. The resident population is upwards of 4,000, and the town has made great progress since 1858, when it may be said to have first sprung into existence; it now covers a large extent of ground, substantial and handsome stone and brick buildings everywhere replacing the wooden structures first erected.

Along the eastern side of the harbour in front of the town there are about 400 yards of fair wharfage, with a depth of from 10 to 16 feet at low water spring tides. Between Songhies and Limit points on the

* See Plan of Victoria Harbour, No. 1,897^b; scale, $m = 10$ inches.

opposite side of the harbour is a small slip capable of receiving vessels of about 200 tons burthen ; larger vessels, however, may heave down alongside the wharves.

Supplies.—Provisions of all kinds, and of an excellent quality, may be procured at nearly the same prices as in England, and water is to be had from a floating tank capable of going outside the harbour, the charge for it being about 4s. 2d. per ton. Supplies for refitting and repairing vessels, except timber, are scarce and expensive, but of fair quality. Coals are plentiful, varying in price from 25 to 40 shillings per ton.

Anchorage.—Vessels anchoring outside the harbour to wait for the tide, or from other causes, should not come within a line between Ogden and Mac Laughlin points, the former bearing W. $\frac{1}{2}$ N., the latter E. $\frac{1}{2}$ S., midway between, or a quarter of a mile from either ; this is a good stopping place with off-shore winds or fine weather, but is by no means recommended as a safe anchorage for sailing vessels during the winter months, when bad weather may be looked for with little warning.

PILOTS.—There are three or four pilots attached to the port, who keep a good look out for vessels off the entrance. Pilotage is compulsory to all merchant vessels, except coasters, but the charges are moderate.

BROTCHY LEDGE.—About 4 cables from Holland point, and right in the fairway of vessels entering Victoria harbour from the eastward, lies the Brotchy ledge with 5 feet on its shoalest part ; it is covered with kelp, and about a cable in extent within the 5 fathom line. There are 9 fathoms between the ledge and the shore.

A spar buoy, painted *white*, marks this ledge. It lies in 12 feet water with the beacons on Beacon hill in line, bearing N.E. by E. ; Ogden point N. $\frac{1}{2}$ W. distant 5 cables ; and Holland point N.E. 4 cables. The buoy is occasionally washed away during the heavy winter gales.

Fisgard island lighthouse, north part of Brothers island, and Macaulay point in line W. $\frac{3}{4}$ N., leads a cable north of the ledge in 9 fathoms, between it and the shore ; and the lighthouse, just open southward of Brothers island W. by N. $\frac{1}{4}$ N., leads 2 cables south of the ledge in 21 fathoms.

In entering or leaving Victoria harbour keep either of the above marks on, till past the line of the beacons on Beacon hill in line, when a vessel will be clear of the ledge. Coasters, and those acquainted with the place, usually go north of it.

The COAST from Victoria harbour trends in an easterly direction for 2 miles to Clover point, and is for the most part faced by white sandy cliffs, varying in height from 10 to 80 feet ; a sandy beach extends along the whole way, and at a cable's distance off in many places are rocks and foul ground. Two cables east of Holland point, and a cable off shore, are the

Glimpse reefs, which cover at three-quarters flood, and have 7 fathoms just outside them.

Beacon hill, a gentle rise of the land, 2 cables from the water's edge and a mile east of the harbour, is grassy and bare of trees; its height is 140 feet, and there is a staff or beacon on the summit.

Clover point, at 2 miles eastward of the entrance to Victoria harbour, is low, bare of trees, and projecting; it is steep-to, and off it are some strong tide rips, dangerous to boats in heavy weather. Ross bay to the eastward of it is open, but sometimes used by small craft if waiting for the tide; there being from 4 to 5 fathoms at 2 cables distance off shore.

Foul bay, nearly a mile north-east of Clover point, is of small extent and filled with rocks. Off its entrance are the Templar rocks, about 4 feet under water, and marked by kelp.

Foul point on the east side of the bay is rocky, but has not less than 4 fathoms at a cable's distance; the land at the back of the point rises to a height of 230 feet, forming a rocky ridge or summit, known as Gonzales hill.

TRIAL ISLANDS, nearly $1\frac{3}{4}$ miles eastward from Clover point on the south side of Enterprize channel, are two in number, bare and rocky, but generally appear as one. The south or largest island is 80 feet high, and steep-to at its outer end; the northern one is low, and from it foul ground exists some distance. Strong tide ripples prevail off the southern island especially during the flood, which runs nearly 6 knots at springs just outside it.

ENTERPRIZE CHANNEL, between Trial islands and the Vancouver shore, is a narrow, tortuous, but deep channel, much used by steamers and coasters trading to Victoria harbour, as a slight saving of distance is effected, and less tide experienced than by going south of the Trial islands; its length is about a mile, its width in the narrowest place half a cable, and there are not less than 24 feet in the shoalest part.

McNeil Bay, on the north side of the channel to the eastward of Foul point, is upwards of 3 cables in extent, with from 2 to 6 fathoms water; it is open to the southward, and foul ground exists in its east part, but the bay is much used by small vessels waiting for the tide.

Mouatt Reef, in the eastern part of the channel, 3 cables from Trial island and nearly 2 cables off shore, is about a cable in extent, and covers at a quarter flood; this rock is dangerous for vessels using the Enterprize channel, as it lies just north of the fairway.

McNeil farm, just open west of Kitty islet, a bare yellow rock 4 feet high on the east side of McNeil bay, bearing W. $\frac{1}{2}$ N., leads half a cable south of Mouatt reef; and Channel point in line with the west side of the Great Chain islet N. by E. $\frac{1}{2}$ E., leads nearly 2 cables east of it.

DIRECTIONS.—Bound through the Enterprize channel to the eastward, when past Foul bay, give Foul point a berth of 2 or 3 cables, and steer for the west side of McNeil bay on a northerly course; approach it close to, after which steer direct for Kitty islet, and when within half a cable of the latter, haul quickly to the eastward, keeping McNeil farm just open west of Kitty islet, bearing W. $\frac{1}{2}$ N.; this will lead safe through the narrowest part of the channel and south of Mouatt reef. When Channel point and the west side of Big Chain islet come in line N. by E. $\frac{1}{2}$ E. the vessel will be well east of the reef, and may round Gonzales point close to, proceeding up through any of the inner channels.

GONZALES POINT forms the south-east extremity of Vancouver island. It is a low salient point, rocky, bare of trees, and steep-to on the east side.

OAK BAY.—From Gonzales point, the Vancouver shore trends to the northward, and at a mile from the point forms a sandy bay which is somewhat less than a mile in extent, and affords fair anchorage near its north part in from 3 to 4 fathoms.

The best anchorage is to the northward of Mary Todd islet in the south part of the bay. This islet is bare, and about 30 feet high; at 2 cables east of it is Emily rock, 4 feet above high water, and the same distance south from it the Robson reef, which uncovers at low water.

CADBORO BAY, $2\frac{1}{2}$ miles to the northward of Gonzales point, is about half a mile in extent, and open to the south-east; no sea, however, rises within it, and there is good anchorage in from 3 to 4 fathoms near the entrance.

The Vancouver shore from Gonzales point to this bay is low and lightly timbered with dwarf oak and pine trees; to the northward of Oak bay it is clear of danger at a cable's distance.

MAYOR CHANNEL, to the northward of Gonzales point, and west of Chain islets, is about 2 miles long in a winding direction to the northward, its breadth in the narrowest part is 3 cables, and the soundings in it vary from 9 to 13 fathoms. The channel is bounded on the west side by Thames shoal and Fiddle reef, and abreast the latter on its opposite side lies the Lewis reef. The tide seldom runs more than 3 knots through this channel, and it is the one generally used.*

Thames Shoal, of 2 fathoms water, is of small extent, and marked by kelp; it lies nearly half a mile N. by E. from Gonzales point, at the south-west part of the Mayor channel. Channel point in line with the west side of Great Chain islet, N. by E. $\frac{1}{2}$ E., leads a cable east of this shoal, and the highest part of Trial island in line with Gonzales point S. $\frac{3}{4}$ W. leads half a cable west.

* See Plan of Inner Channels, No. 577; scale, $m = 6$ inches.

Lee Rock, which only uncovers at low water springs, lies $1\frac{1}{2}$ cables westward of Thames shoal ; it is marked by kelp and steep-to on the east side. Between this rock and Thames shoal is Mouatt channel, a cable wide, with from 7 to 9 fathoms.

The highest part of Trial island in line with Gonzales point, S. $\frac{3}{4}$ W., leads midway between Thames shoal and Lee rock ; also through the fairway of the north part of Mayor channel between Fiddle and Lewis reefs.

Fiddle Reef, at the north-west extreme of Mayor channel, and upwards of a mile from Gonzales point, is of small extent, and awash at high water spring tides ; it may be approached close to on the east side.

Todd Rock, at 2 cables west of Fiddle reef, in the entrance to Oak bay ; covers at two-thirds flood, and is marked by kelp.

Lewis Reef, at the north-east part of Mayor channel, nearly 3 cables south-east of Fiddle reef, and 2 cables west of the Chain islets, covers at high water, and may be approached close to on the west side. The passage between it and Chain islets is filled with kelp, but has not less than 2 fathoms.

CHAIN ISLETS, midway between Discovery island and the Vancouver shore, are a bare rocky group, three quarters of a mile long in a westerly direction, and half a mile wide. The largest, called Great Chain islet, is about a cable in extent and 30 feet above high water ; it lies at the south-west side of the group, and its south part may be approached to a cable's distance.

Spencer ledge, off their east side, at a distance of 2 cables from the easternmost high-water rock, is marked by kelp, and has 9 feet on its shoalest part ; if going through Hecate passage it requires to be guarded against. Cadboro point, open west of Channel point N.N.W. $\frac{1}{2}$ W., leads a cable east of this ledge through Hecate passage.

Caroline reef, at the north part of the group, and connected to it by a rocky ledge, is of small extent, and covers at a quarter flood, but is well out of the track of vessels using any of the channels. Foul ground with from 3 to 4 fathoms, and marked by kelp, exists upwards of a cable west of it.

DISCOVERY and CHATHAM ISLANDS.—Discovery island is 2 miles north-east of Gonzales point, at the junction of the Haro and Fuca straits. It is wooded, about three-quarters of a mile in extent, and its shores on all sides are bordered by rocks, extending in some places more than 2 cables off. Rudlin bay on its south-east side is filled with rocks, and should not be used by any vessel.

Chatham islands, to the north-west of Discovery island, and separated from it by a narrow boat pass, are of small extent, forming an irregular

group, low, wooded, and almost connected with each other at low water, the tide rushing with great strength through the passages between them; their west side is steep-to.

Leading point, at the south extreme, is a bare rocky islet at high water; to the eastward of it is a small boat cove. Channel point, their west extreme, is also bare and steep-to; the tide runs strong past it.

Strong Tide islet, the north-west of these islands, is rocky, about 50 feet high, and wooded; its west side forms the eastern boundary of Baynes channel, and is steep-to; the ebb tide runs very strongly past it, nearly 6 knots at springs.

Refuge cove, on the east side of the Chatham islands, is small, and has $1\frac{1}{2}$ fathoms in the centre: coasters or small craft entangled among these islets may find shelter in it. Alpha islet, the easternmost of the group, is bare, and 10 feet above high water; it is steep-to on the east side, but only a boat ought to go westward, or inside it.

FULFORD REEF, 3 cables north of the Chatham islands, is about a cable in extent, and covers at three-quarters flood. Vessels using the Baynes channel should keep well to the westward to avoid this reef, as the tide sets irregularly in its vicinity.

HECATE and PLUMPER PASSAGES.—Discovery island is separated from the Chain islets by a passage half a mile wide in the narrowest part, forming an apparently clear and wide channel, but near the middle of the south part lies Centre rock, which has only 3 feet over it, and though marked by kelp, this, from the strength of the tides, is often run under, and seldom seen. There is deep passage on either side of this danger, the one to the westward being called Hecate, and the eastern one Plumper passage; the latter is wider and best adapted for large steamers, but the tide sets very strongly through both of them.

Cadboro point, open west of Channel point N.N.W. $\frac{1}{2}$ W., leads through Hecate passage in mid-channel, west of Centre rock.

Cadboro point, well shut in north of Leading point N.W. $\frac{2}{3}$ N., leads through Plumper passage in mid-channel, east of Centre rock.

BAYNES CHANNEL, between Cadboro point and the Chatham islands, connecting these inner channels with Haro strait, is upwards of a mile long and half a mile wide; the soundings in it are irregular, varying from $4\frac{1}{2}$ to 30 fathoms, and the tide at springs rushes through it with great velocity, strongest along the eastern side.

The Five fathom shoal lying in the centre of the channel, is not marked by kelp; if wishing to avoid it a vessel has only to keep a little over on either side of mid-channel.

CADBORO POINT, on the Vancouver shore, at the termination of the inner channels, is nearly 3 miles north of Gonzales point, and three-

quarters of a mile west of the Chatham islands. It is about 50 feet high, rocky and bare of trees. A small islet lies just off it, also a reef which covers ; in passing do not approach the islet within 2 cables.

The coast west of Cadboro point to Cadboro bay, is low, very much broken, and there are some off-lying rocks. Jemmy Jones islet, which is bare and 15 feet above high water, lies 3 cables off shore, midway between the two points ; foul ground exists around it for upwards of a cable in some parts, and though there is deep water between it and the shore, none except small craft should go through that passage.

DIRECTIONS.—None of these inner channels, though deep, should be used except by steamers of moderate size or small craft, unless in cases of necessity. Coasters and small steamers, when taking advantage of them, generally proceed through the Mayor channel. If using this channel, after passing Gonzales point keep the west side of Great Chain islet in line with Channel point N. by E. $\frac{1}{2}$ E. till within 2 cables of the islet, when the vessel will be clear of the Thames shoal, after which haul to the north-west bringing the highest part of Trial island in line with Gonzales point S. $\frac{3}{4}$ W., and with that mark on astern steer N. $\frac{3}{4}$ E., which will lead between the Fiddle and Lewis reefs, and on through Baynes channel, to Haro strait. When past Lewis and Fiddle reefs, a vessel may, if necessary, haul a little to the eastward for the fairway towards Strong Tide islet.

Going through Mouatt channel, which is very narrow and seldom used, after rounding Gonzales point at a cable's distance, bring the highest part of Trial island in line with the point, S. $\frac{3}{4}$ W., and keeping this mark on astern, and steering N. $\frac{3}{4}$ E., will lead through clear of danger.

The Hecate and Plumper passages are nearly straight, and better adapted for large steamers than those west of the Chain islets. If using either of them, after passing half a mile south of the islets on a north-easterly course, bring the leading marks (page 28) on, and keep them so till northward of the Centre rock, when steer up in mid-channel towards Cadboro point and through Baynes channel into Haro strait.

TIDES.—The high water at full and change is irregular and much influenced by prevailing winds ; the greatest rise and fall of tide at Discovery island is 12 feet. During summer months in these channels, the flood stream commences at 11. 15. a.m., running with great strength till nearly 3 p.m. after which but little tide is felt till 4 a.m. on the following day, when the ebb commences and runs strong till nearly 11 a.m. the time of low water by the shore.

CONSTANCE BANK, lying in the Fuca strait, nearly 6 miles S.E. b.E. $\frac{1}{2}$ E. from Fisgard island lighthouse, 3 miles S. by W. from Trial island, and 7 miles N.E. from Race island lighthouse, is upwards of a mile in extent

with 9 to 14 fathoms, but a vessel should not anchor on it, as the bottom is rocky.

FONTÉ BANK, about a mile in extent, with from $3\frac{1}{2}$ to 5 fathoms and marked by kelp, lies nearly in the middle of Fuca strait, 6 miles S. $\frac{1}{2}$ W. from Cattle point San Juan island, 8 miles E. by S. from Discovery island, and 8 miles W. $\frac{1}{2}$ S. from Smith or Blunt island light-house.

This bank ought to be avoided, as there may be less water on it than shown in the chart.

HARO STRAIT, the westernmost of the three channels leading from the strait of Fuca into the strait of Georgia, is bounded on the western side by Vancouver island, and its off-lying smaller islands and reefs, and on the eastern side by the islands of San Juan and Stuart, and runs in a N.W. by N. direction for 18 miles; it then turns sharply to the N.E. round Turn point of Stuart island, for a farther distance of 12 miles, leaving the Saturna island to the westward, and Waldron and Patos islands to the eastward, when it enters the strait of Georgia between Saturna and Patos islands.

It is for the most part a broad, and for its whole extent a deep navigable ship channel; but on account of the reefs which exist in certain parts, the general absence of steady winds, the scarcity of anchorages, and, above all, the strength and varying direction of the tides, much care and vigilance is necessary in its navigation, and it is far more adapted to steam than to sailing vessels.

Besides the main stream of the Haro strait thus described, there are several smaller channels and passages branching from it by which vessels may enter the strait of Georgia; thus the Swanson channel leads into the strait by the Active pass,* and the Trincomalie and Stuart channels by the Portier pass, or the Dodd narrows.

These channels may be again entered by smaller ones; thus Sidney and Cordova channels, on the western side of Haro strait, lead by Moresby and Shute passages into the Swanson and Stuart channels, and finally into the strait of Georgia. These channels are essentially adapted to steam navigation, or to coasting vessels; they afford smooth water, and many of them anchorages. They will be described in their proper order.

MIDDLE BANK, lying in the southern entrance of Haro strait, E. by N. 4 miles from Discovery island, and almost in mid-channel, is a rocky patch about 2 miles in extent each way, and the least water found on it is 10 fathoms. In bad weather there are heavy tide rippings on and in the vicinity of this bank, which are dangerous to boats or small craft.

* Formerly the Plumper pass, by which name it is more generally known.

ZERO ROCK.—The principal dangers in the southern part of Haro strait are the Zero rock and the Kelp reefs; the former lies on the west side of the strait, is about half a cable in extent, covers at three-quarters flood, and its vicinity is marked by kelp; it bears from the east point of Discovery island N.W. $6\frac{1}{2}$ miles, and from the high white cliff of Cowitchin head E. by S. $3\frac{1}{2}$ miles.

The **KELP REEFS** lie almost in the centre of Haro strait, N.N.W. $\frac{1}{4}$ W., $7\frac{1}{2}$ miles from the east point of Discovery island, E. by N. $\frac{1}{2}$ N. 5 miles from Cowitchin head, and East 2 miles from the south end of Darcy island. They uncover at low springs, and are well marked by kelp, which extends in detached patches to Darcy island.

The Unit rock lies E. by N. $\frac{1}{2}$ N. three-quarters of a mile from the south-east point of Darcy island, and uncovers 2 feet at low tides.

Bare island well open north of the south-east point of Sidney island, N.W. $\frac{1}{4}$ W. leads a third of a mile east of these reefs.

DIRECTIONS.—Vessels passing up Haro strait to avoid the above dangers, after rounding Discovery island at the distance of a mile, should steer N.N.W., or for Kellett bluff of Henry island, a remarkable steep rocky headland. This course will clear the Kelp reefs by a mile. In working up, when standing westward, a vessel should tack when Low island is shut in with the south-east point of Sidney island, which will give the Zero rock a good berth; but when approaching the Kelp reefs, Bare island must be kept well open to the eastward of the same point to avoid them. The eastern or San Juan shore is steep close to.

When abreast Kellett bluff from half a mile to a mile, a N.W. by N. course will pass the same distance from Turn point of Stuart island. There are no dangers off this point; but whirling eddies and tide rippings, caused by the meetings of the streams from so many channels, are generally met with, particularly with the ebb. A vessel may reach this point with a fresh southerly wind, but will almost invariably lose it here, until having opened out the middle channel eastward of San Juan.

After rounding Turn point, a N.E. $\frac{1}{2}$ N. course for 10 miles will lead to the northern entrance of Haro strait, between the East point of Saturna and Patos islands. This passage is $2\frac{1}{2}$ miles in breadth, but is subject to heavy tide rippings and eddies; it is recommended when possible to pass through the centre of it. The flood from the Rosario strait, which is met with as soon as the passage between Orcas and Sucia islands is open, is apt to set a vessel towards the East point of Saturna, off which and Tumbo island there is much uneven and broken ground with heavy races. This point should be given a berth of a mile.

The ebb sets to the eastward even before the strait of Georgia is well open, and a vessel finding herself not likely to weather Patos should pass between it and Sucia; where there is a good clear passage of above a mile

in breadth ; if this passage is taken, the Patos island shore should be kept rather aboard. Beware of the Plumper and Clements reefs ; the former lies S.W. by S. $1\frac{1}{4}$ miles from the north-west bluff of Sucia island, and has 10 feet water on it ; the latter N.E. $\frac{1}{2}$ N. the same distance from the same bluff, and has 9 feet over it.

When in the strait of Georgia from W. by N. to W.N.W. is a fair mid-channel course. If bound for Fraser river a N.W. by W. course from the centre of the channel between Patos island and East point will lead to the sand heads, the distance nearly 20 miles. Entering the strait and having passed to the northward of Patos island, if the ebb is running a vessel is extremely liable, unless with a commanding breeze, to be set to the eastward and down the Rosario channel.

The northern shore of Sucia island should by all means be avoided ; if Alden bank can be fetched it offers a good anchorage while waiting for a tide. Alden point, the west point of Patos island, in one with Monarch head, a bold cliffy bluff bearing S.W. $\frac{1}{2}$ W., leads over the northern edge of this bank in from 6 to 9 fathoms.* When Mount Constitution is in one with the centre of Matia island 9 fathoms may be expected, and a ship should not anchor in much less than this depth, as in the shoaler parts rocky ground is found ; the least water on the bank is $2\frac{1}{4}$ fathoms.

With a foul wind and ebb tide a vessel should always work up on the eastern shore ; there are no dangers, little tide when eastward of a line between Roberts point and Alden bank, and anchorage may always be had within a mile of the shore if necessary. Birch and Semiahmoo bays offer good anchorage, and are easy of access. In working up the Strait of Georgia the western shore should never be approached within a mile ; the tides sweep strongly along this shore, and there are several outlying reefs between East point and Active pass.

As soon as the strait is entered from the southward, Roberts point will show its eastern part as a bold white faced cliff, its western as a low shingle point ; its summit is covered with trees, and it would at first sight be taken for an island in consequence of the land on its northern side falling rapidly in elevation. After passing northward of this point, its low water extreme, or the trees just within it, must not be brought to bear southward of E. $\frac{1}{2}$ S. to avoid Roberts bank, which extends 5 miles off the Fraser river entrance, is steep-to, and shoals suddenly from 25 to 2 fathoms.

CORMORANT BAY.—Between Gordon and Cowitchin heads, on the western side of Haro strait, is a good stopping place and easy of access under most circumstances. It may be entered either to the southward or

* See Views on Chart, No. 2,689.

northward of Zero rock; the passage to the southward is $1\frac{1}{2}$ miles in breadth, with a depth of 20 fathoms.

Mount Douglas, a remarkable hill 700 feet high, with its summit bare of trees, rises immediately over the coast at the head of the bay.

Johnstone reef lies three-quarters of a mile from the shore, midway between Cadboro point and Gordon head, is marked by kelp, and of small extent.

Three shoal patches, with from 6 to 12 feet on them, lie W. $\frac{1}{2}$ S. one to $1\frac{1}{2}$ miles distant from Zero rock, but there is a clear passage of nearly a mile with 20 fathoms water between the rock and the nearest shoal.

There is but little stream of tide in Cormorant bay when within the Zero rock, and the holding ground is good.

DIRECTIONS.—To enter Cormorant bay, bring Mount Douglas to bear S.W. $\frac{1}{2}$ S., and steer for it; when the western points of Discovery and Chatham islands are well shut in by Cadboro point, a vessel will be westward of Zero rock, and can take up a berth a mile off shore, with Mount Douglas bearing S. by W., and Gordon head just touching the outer extremes of Chatham and Discovery islands S.E. by E. $\frac{1}{2}$ E. in 9 or 10 fathoms.

To enter this bay northward of Zero rock, the Kelp reefs, which lie N.E. by N. distant $1\frac{3}{4}$ miles from the rock, must be avoided; the positions of both rock and reefs will generally be easily distinguished from a vessel's deck a mile off, and either may be approached to a cable's length. By steering for Cowitchin head, a very remarkable high white cliff at the northern end of Cormorant bay, on a W. $\frac{1}{2}$ S. bearing, will lead in mid-channel, and good anchorage will be found from one to 2 miles off shore with the head on that bearing, in 8 to 10 fathoms.

This anchorage will be more exposed to S.E. winds than the one last mentioned, but a vessel with good ground tackle will always be perfectly safe.

ANCHORAGES.—Although there are many harbours among the archipelago of islands which form the Haro strait and its tributary channels, yet the number eligible for sailing vessels overtaken by darkness or an adverse tide is comparatively small.

Between Cormorant bay and the northern entrance of Haro strait, Plumper sound and Cowlitz bay are the only eligible stopping places for a sailing vessel seeking shelter.

Stuart island indeed affords two fair harbours, and Roche harbour at the north-west end of San Juan island is a suitable anchorage for steamers or small coasters, but no sailing vessel of moderate tonnage could enter either under ordinary circumstances without great loss of time as well as risk.

TIDES.—The stream of tide runs fairly through the main channel of Haro strait, outside the Kelp reefs, and inside them through the Cordova and Sidney channels, passing outside the Kelp reefs, and eastward of Sidney island a part of the flood stream will be found to branch off to the eastward, between San Juan and Stuart islands, and there meeting the flood from the Middle channel, cause heavy races and eddies, so that although there are deep water channels between these islands, they are not recommended for sailing vessels; in like manner the flood runs to the N.W. between the group of islands, northward of Sidney island, and through Shute and Moresby passages, though the main stream will be found to run fairly between Stuart and Moresby islands.

PLUMPER SOUND.—If from any cause it should be found necessary to anchor in that bend of the Haro strait between Stuart island and the East point of Saturna island, this sound is recommended as a safe and convenient harbour, easy of access with the wind from any quarter. It is formed between Pender and Saturna islands, and the entrance lies N.N.E. $\frac{1}{2}$ E. 5 miles from Turn point of Stuart island, and an equal distance from the East point of Saturna. Blunden island, about 2 cables in length, and close to the shore, forms the western entrance point; Monarch head, a high bold rocky headland, the eastern. The sound runs in a W.N.W. direction for 6 miles, with an average breadth of $1\frac{1}{2}$ miles; there is anchorage in a moderate depth of water in most parts of it, as well as several bays or harbours if preferred.

There are no dangers at the entrance, either shore may be approached close, in working up, and but little tide is felt; for the first 2 miles the sound is a mile in breadth, and for this distance the water is too deep for convenient anchorage, being generally from 25 to 50 fathoms, except on the south side, where if necessary an anchor may be dropped a quarter of a mile from the shore, in from 10 to 12 fathoms.

When 2 miles within the entrance the depth decreases rather suddenly to 10 fathoms, and excellent anchorage may be had in almost any part; the most convenient is off the entrance of Browning harbour on the south side of the sound in 8 fathoms, half a mile from the shore, with the east point of Blunden island just open of the land to the westward of it, bearing E. $\frac{1}{2}$ S. Above Browning harbour, the only danger to be avoided in working up the sound is Perry rock, with 6 feet on it, marked by kelp; it is 2 cables from the shore and N.W. by N., three-quarters of a mile from Razor point, the north point of the harbour.

BROWNING HARBOUR is on the south side of Plumper sound, 3 miles within the entrance; it runs in a west direction for $1\frac{1}{2}$ miles, and is a third of a mile wide, but rather less at the entrance. The depth of water decreases gradually from 10 fathoms at the entrance to 4 fathoms at its head, with

good holding ground. The best anchorage is in the centre just above Shark cove, which is a convenient creek, with 4 fathoms in it, on the south side of the harbour, three quarters of a mile within the entrance; here a ship might beach and repair on a sandy spit. The cove is separated by a narrow neck of land of 150 yards from Bedwell harbour, on the south coast of Pender island, across into which the natives launch their canoes.

LYALL HARBOUR and **WINTER COVE** lie in the south-east corner of Plumper sound, and are indentations in the north-west end of Saturna island.

Lyall harbour is the southernmost, and its southern entrance point, a cliffy bluff, bears N. $\frac{1}{2}$ E., 2 miles from the entrance of Browning harbour. King islets, 2 low rugged islets, with a reef extending nearly a cable off their western end, form the northern entrance, which is half a mile in breadth. The harbour runs east for $1\frac{1}{4}$ miles, gradually narrowing and terminating in a sandy beach with a good stream of fresh water at its head; the soundings decrease regularly from 8 to 4 fathoms, but the Crispin rock, with 6 feet on it at low water, decreases its value as a harbour for sailing vessels. This rock is a mere pinnacle, nearly half a mile within the entrance; there is no kelp to give warning of its position, and it lies exactly in the middle of the harbour, bearing from the centre of the outer King islet E. by S. $\frac{1}{4}$ S. half a mile, and from the south entrance point of the harbour N.E. three-quarters of a mile; there is, however, a clear passage on either side of it of $1\frac{1}{2}$ cables, and a vessel anchoring within it should drop her anchor in 5 fathoms, half a mile from the beach at the head of the harbour. The anchorage outside the rock is with outer King islet N.W. by N., and the south entrance point S.S.W. $\frac{1}{2}$ W., about a third of a mile from the former in 7 fathoms, muddy bottom.

Boot cove on the south side of the harbour, a third of a mile within the south point, has 3 fathoms water, and is a convenient spot for repairing a vessel; a small islet lies off its western entrance point.

SAMUEL ISLAND, between Saturna and Mayne islands, is almost connected with either, but leaving two passages by which boats or even small coasters may pass into the strait of Georgia at proper times of tide. This island is indented on its southern side by several bays, among them Winter cove, which is formed between its south-eastern side and the north-west point of Saturna, and is only half a mile northward of Lyall harbour. The depth of water in the cove being only from 2 to 3 fathoms, it is only fit for small vessels, which must pass to the westward of King islets, and on either side of the Minx reef. The outlet to the strait of Georgia from its north-east corner is not above 90 feet in breadth, and the

tides rush through with great fury ; coasting vessels might pass into the strait by taking the passage at slack water, or boats overtaken in the strait by bad weather might take shelter under the lee of Belle chain, and enter Plumper sound by this pass with the flood ; the south-easternmost island of Belle chain is only two-thirds of a mile north of the pass.

WATER is easily obtainable during the winter or rainy months from streams in almost any part of Plumper sound. At the head of Lyall or Browning harbours, constantly in the former, a certain quantity may be procured during the driest months of summer from June to August.

NAVY CHANNEL is a continuation of the western part of Plumper sound, and leads between Pender and Mayne islands into the Trincomalie channel.

Independently therefore of its value as an anchorage, Plumper sound becomes a high road for vessels bound into the strait of Georgia or Fraser river by the Active pass, or to Nanaimo, or any of the north-western ports of Vancouver island. From the north-western end of the sound abreast Fane island the channel runs west for 3 miles, when it enters Trincomalie channel between Mayne and Prevost islands ; its average breadth is half a mile.

Conconi and Enterprize reefs.—Conconi reef lies about midway through Navy channel, $1\frac{3}{4}$ miles from Fane island, and nearly 2 cables off the northern shore, and narrows the strait at that part to a third of a mile. It is a ledge of rocks extending in the direction of the channel for more than a cable's length, and covering at half tide ; its vicinity is marked by kelp, and a patch of 2 fathoms extends nearly 2 cables westward of it. The general depth of water in the channel is from 20 to 30 fathoms.

The Enterprize reefs are two rocky patches, the westernmost of which dries at low water, and both are marked by kelp. The outermost of these reefs lies W.N.W. one mile from Dinner point, the north-west entrance point of Navy channel, and S. by E. two-thirds of a mile from Helen point, the south point of Active pass.

DIRECTIONS.—Vessels using Navy channel should keep rather southward of mid-channel. The shores of Pender island are bold. In passing out of the western entrance, if bound through Trincomalie channel or Active pass, steer over towards Prevost island until Pelorus point, the east point of Moresby island, is open of Mouatt point, the west point of Pender island S.E. $\frac{1}{2}$ S., then haul up N.W. $\frac{1}{2}$ N. keeping the marks just open, which will lead clear to the westward of Enterprize reefs.*

* See View C, on Chart of Haro Strait and Middle Channel, No. 2,840.

When Helen point, which is a low bare yellow point, bears N. by E., a vessel may steer for the entrance of Active pass, or shape her course up the Trincomalie channel.

The flood tide from the Swanson channel runs through Navy channel to the eastward, and meets the flood in Plumper sound, causing a slight ripple at the east entrance ; its strength is upwards of 3 knots.

BEDWELL HARBOUR, the entrance to which bears North 3 miles from Turn point of Stuart island, and is the same distance westward of the southern entrance of Plumper sound, is, on account of its narrower entrance, not so eligible a stopping place for vessels waiting the tide as the latter ; but for steamers it is a good harbour. Its narrowest part, which is at the entrance, is a quarter of a mile in breadth, but it soon opens out to half a mile, and runs in a W.N.W. direction for 2 miles, the depth of water being from 5 to 10 fathoms, mud bottom. The only danger which does not show is the Drew rock, with 10 feet on it, in the centre of the harbour a third of a mile from its head ; there is, however, no necessity for a vessel to go as high as this, the most convenient anchorage being in a bay on the north shore, two-thirds of a mile within the entrance in 8 fathoms, midway between Hay point and the Skull reef, which always shows some feet above high water.

CAMP BAY, between Bedwell harbour and Plumper sound, and half a mile westward of Blunden island, offers shelter as a stopping place to small craft, when not convenient to work into either of these ports.

STUART ISLAND, lying 3 miles north-westward of the northern part of the island of San Juan, is 3 miles long in an east and west direction, of an irregular shape and about 650 feet high, the summits of the hills partially bare of trees ; Turn point, its north-west extreme, a bold cliffy bluff, forms the salient angle of the Haro strait, where it changes its direction suddenly from N.W. by N. to N.E. before entering the strait of Georgia. There are two anchorages in Stuart island, Reid harbour on its southern side, and Provost harbour on its northern, but both are small and intricate for sailing vessels above the size of coasters.

To enter Reid harbour from the southward, beware of being drawn by the flood into the channel between San Juan and Stuart islands, where there are several dangers, and the tides most irregular in their direction. The south-west side of Stuart island should therefore be first closed ; it is bold and free from danger.

The harbour bears N.W. one mile from Spieden bluff, a remarkable bare grassy point, generally of a yellow colour, the western extreme of the island of the same name. Gossip island lies in the entrance : leave it on the right hand in entering. The breadth of the channel is $1\frac{1}{2}$ cables,

the depth from 4 to 5 fathoms, and no dangers but what are visible. When a short distance within, the harbour increases to a quarter of a mile in breadth, and runs in a westerly direction for above a mile, the general depth of water being 4 fathoms; the best anchorage is off an Indian village on the south side, about half a mile within the entrance.

Prevost harbour, on the northern side of the island, $1\frac{1}{2}$ miles eastward of Turn point, has James island lying in the centre of it. The entrance is to the westward of this island, between it and Charles point, and is about 2 cables in breadth. The harbour runs south for a short distance, and then takes an easterly direction; anchor in 6 fathoms as soon as the eastern arm opens out, or if desired, run up the arm into $4\frac{1}{2}$ fathoms; here it is narrow, but perfectly sheltered. The passage to the eastward of James island is a blind one, but a vessel may anchor, if necessary, in its entrance in 10 or 12 fathoms.

JOHNS ISLAND, with its numerous off-lying reefs, lies to the eastward of Stuart island, and is separated from it by a navigable channel of 10 fathoms, but it is narrow and not recommended but for coasters acquainted with the locality.

SPIEDEN ISLAND, lying between San Juan and Stuart islands, is $2\frac{1}{4}$ miles long in an east and west direction, and very narrow; its southern side grassy and bare of trees, its summit and northern side thickly wooded; Green point, its eastern extreme, is a sloping grassy point.

There is a channel on either side of Spieden island; New channel to the northward, and Spieden channel to the southward. It may sometimes be convenient to take either of these channels in passing from the Middle channel to Haro strait, or vice versa, as the distance round Stuart island will be saved; but from the strength and irregularity of the tides, and the number of hidden dangers which exist in certain parts of them, they cannot be recommended for sailing vessels, nor indeed to any vessel without a pilot, or being thoroughly acquainted with the locality.

SPIEDEN CHANNEL, between the island of that name and San Juan, has a general W. by S. direction. Its eastern entrance, between Green point and the north-east point of San Juan, is two-thirds of a mile wide, and for 2 miles the water is deep and clear of positive dangers; the meeting of the flood-tide, however, from Haro strait with that from the Middle channel, causes heavy rippings and irregular eddies, and these, together with the general absence of steady winds, render the navigation always tedious and dangerous for sailing vessels; its western entrance is encumbered with numerous reefs and shoals with irregular soundings.

Sentinel island stands in the western entrance of this channel. It is small, bare on its southern side, about 150 feet high, bears E.S.E. two-thirds of a mile from Spieden bluff, and the passage between it and Spieden island is more than a cable wide, with a depth of 25 fathoms. A vessel using the Spieden channel is recommended to keep the Spieden island shore abroad, and to pass between it and Sentinel island. There is much less tide here than in the centre of the channel, or on the San Juan shore.

Centre reef is a dangerous patch, awash at low water, and almost in the centre of the channel. It bears from Sentinel island S.W. by S. nearly half a mile; from Spieden bluff, the western extreme of that island, S.E. by S. more than two-thirds of a mile; and from Morse island, off the north point of Henry island, N.N.E. $\frac{1}{2}$ E. one mile; the kelp will generally be seen round the reef, but it is sometimes run under. There is a passage 2 cables wide between the reef and Sentinel island, with a depth of 17 fathoms. Both the flood from Haro strait, and the ebb through Spieden channel set on to the reef; therefore, when nearing it, the San Juan shore should be kept aboard, avoiding the shoal 2 cables off Bare islet.

Danger shoal is also at the western entrance; it has 2 fathoms on it, and is marked by kelp, though not always to be distinguished. It bears from Spieden bluff S.S.W. $\frac{3}{4}$ W. three-quarters of a mile; from Morse island N. by W. two-thirds of a mile; and from Sentinel island W.S.W., a little more than a mile.

Bare islet is a rock about 15 feet high lying in the southern part of the channel, E. by N. $\frac{1}{2}$ N. one mile from Morse island. There is a shoal patch of 15 feet nearly 2 cables N.W. by N. from it; this patch is always covered with kelp, and is the last danger known in the channel.

DIRECTIONS.—Vessels bound from Haro strait to the eastward through the Spieden channel should pass about a quarter of a mile or less northward of Morse island, and then steer for Green point, the east extreme of Spieden island, until Sentinel island bears N.W.; the dangers in the western entrance will then be passed, and a straight course may be steered through, bearing in mind that the Spieden island shore is the best to keep abroad, being free from danger, with but little tide.

If bound westward through this channel, if the passage between Spieden and Sentinel islands is not taken, the shore of Spieden island should still be kept aboard within a quarter of a mile to avoid the tide races. If Centre reef is awash, or the kelp on it is seen, pass a quarter of a mile South of it, and steer to pass the same distance northward of Morse island. If Centre reef is not made out, take care not to bring

Morse island to bear to the southward of S.W., until Bare islet bears S.E. by E.

NEW CHANNEL to the northward of Spieden island, though narrower than the one just described, is deep, more free from danger, and the navigation of it more simple. The northern shore of Spieden island is bold and steep, and should be kept aboard; the narrowest part of the channel is a quarter of a mile between Spieden and the Cactus islands. By no means get entangled among the reefs to the northward of the latter; the flood tide sets to the north-eastward among them; but it also runs fairly through New Channel, and by keeping the Spieden shore aboard, there will be no danger of being set to the northward; the ebb tide runs to the south-westward between Spieden and Johns islands.

SAN JUAN ISLAND, the western coast of which forms for some distance the eastern boundary of Haro strait, is of considerable size, being 13 miles in length in a N.W. and S.E. direction, with an average breadth of about 4 miles. Its western shores are steep and rocky, and afford no anchorage, soundings from 100 to 150 fathoms being found within half a mile of the coast. Mount Dallas rises abruptly to a height of 1,086 feet, but the eastern side of the island falls in a more gentle slope, and affords a considerable extent of good land available for agricultural or grazing purposes. Towards the southern end, and visible from seaward, are some white buildings, the farming establishment of the Hudson bay company; the south-eastern extreme, which forms one of the entrance points of the Middle channel, terminates in a white clay cliff, over which rises Mount Finlayson to a height of 550 feet, remarkable as being entirely clear of trees on its southern side, while it is thickly wooded on the northern. There is a clean gravel beach under Mount Finlayson, where boats can generally land.

Off the north-west end of San Juan lies Henry island, being only separated from it by a narrow channel called Mosquito passage. Henry island would be taken as a part of San Juan, the passage appearing merely as an indentation in the latter. Kellett bluff, the south-west point of the island, makes as the most prominent headland on the eastern side of Haro strait, when seen from the southward. Immediately eastward of it is Open bay, which has more the appearance of a channel than the true one, Mosquito passage. There is no shelter either in the bay, or anchorage in the passage, for anything beyond coasters.

MOSQUITO PASSAGE runs in a northerly and N.N.W. direction for 3 miles, is something over half a mile in breadth, and is studded with numerous reefs, which are marked by kelp. When a mile within the passage, Westcott creek, an indentation in San Juan, branches off to the N.E.,

and affords a haven for coasters. There is a 2-fathom channel through the passage, and into this creek; the only directions necessary are to avoid the kelp patches; the tide runs strongly through it.

ROCHE HARBOUR.—At the northern entrance of Mosquito passage, the space between San Juan and Henry islands opens out considerably, and the depth of water increases. This space forms Roche harbour, which must be entered from the northward by vessels of burthen; its entrance is somewhat confined, but not uneasy of access, and it affords good shelter when within.

Morse island, a small flat cliffy island, about 30 feet high, lies a quarter of a mile westward of the north point of Henry island; and the entrance of Roche harbour is half a mile eastward of the former. To enter, pass as near as convenient northward of Morse island, as there are no dangers outside it, steering E. by S. for a little more than half a mile; the entrance will then open out between Henry island and the west point of Pearl island, wooded, and lying in the centre of the passage; off the north side of Pearl is a small island connected to it at low water. The breadth of the entrance is 2 cables; the depth 7 fathoms in mid-channel; the shores on either side may be approached tolerably close; and immediately within Pearl island, the harbour opens out to a considerable breadth.

A good anchorage is in 6 fathoms, with the west end of Pearl island bearing N.W., distant about a quarter of a mile, and the north part of Henry island just open of it. If working in, remember that a shoal of 15 feet lies 2 cables northward of Bare islet, and that fair anchorage may be had in 9 fathoms at the entrance, if it should be found too narrow for beating. But a vessel should get in far enough to be out of the tides of Spieden channel. Small vessels leaving Roche harbour, and bound southward, may take the Mosquito passage.

WALDRON ISLAND lies in the northern entrance of the Middle channel, but as its anchorages are frequently available for vessels passing to or from Haro strait, it seems desirable that it should be described while treating of that neighbourhood.

The island is thickly wooded, moderately high, and cliffy on its southern and eastern sides, but falling to the northward, where it terminates in low sandy points. Disney point, its southern extreme, is a remarkable high stratified bluff.

COWLITZ BAY, on the western side of Waldron, between Disney and Sandy points, affords good anchorage with all winds, the depth of water from 5 to 8 fathoms, and the holding ground stiff mud; it may be sometimes more desirable to anchor here than to work 2 or 3 miles up into

Plumper sound, particularly for vessels coming up Middle channel. If entering from the northward or westward, Sandy point may be passed at a third of a mile, and standing into the bay, anchor on the line between it and Disney point in 5 or 6 fathoms; the latter point bearing S.E. by E., and the centre of White rock S. $\frac{1}{2}$ W. If a south-easter is blowing, a vessel may stand far enough in to get smooth water under shelter of Disney point; no sea, however, to affect a vessel's safety gets up in this bay with any wind. The only danger in the bay is Mouatt reef, with 3 feet on it; it bears from Disney point N.W. $\frac{1}{2}$ N. half a mile, with deep water between it and the shore.

If entering from the southward, Disney point should be kept aboard within less than half a mile, particularly with the ebb, for as soon as Douglas channel is opened out, which is the continuation of Middle channel, and through which the tide runs sometimes 5 knots, a vessel is apt to be set down on Danger rock.

NORTH BAY, on the north-west side of the island, affords anchorage in 8 to 10 fathoms about a quarter of a mile off shore, but is not by any means such a desirable place as Cowlitz bay, the bank being rather steep, and the tide felt more strongly.

DANGER ROCK.—This dangerous reef, with only 5 feet on it, and on which the kelp is rarely seen, lies S.E. by E. $\frac{1}{2}$ E., a third of a mile from White rock, which is 25 feet above high water, and has also a covering rock extending 2 cables to the north-west of it.

It is particularly recommended to give these rocks a wide berth, as with the strong tides the water is too deep for anchorage in case of getting entangled among them in light winds.

CHAPTER II.

THE WESTERN CHANNELS AND ISLANDS TO GABRIOLA PASS.

VARIATION $22^{\circ} 0'$ to $22^{\circ} 10'$ East, in 1864.

The **WESTERN CHANNELS** of **HARO STRAIT** may be used with advantage by steamers or coasters bound from the southern ports of Vancouver island to the strait of Georgia, or to the districts of Saanich, Cowitchin, Nanaimo, and the numerous intermediate harbours; their advantages over the Haro strait consist in a less strength of tide with sheltered anchorage in almost all parts, while in the latter strait the depth of water is so great that it is impossible to anchor, and sailing vessels may frequently be set back into Fuca strait, thus entailing great delay as well as risk; on the other hand, the western channels are not free from danger, yet, with the assistance of the chart, and a good look out from aloft for kelp, a precaution which should never be neglected, they may be navigated during daylight with ease and safety.

DIRECTIONS.—To vessels passing from the southward, and intending to take the western channels, the first danger to be avoided is the Johnstone reef (page 33), lying nearly a mile from the shore, midway between Cadboro point and Gordon head; if the Plumper passage has been taken, steer when at its northern entrance, and abreast Cadboro point, N.N.W., or keep the passage between that point and Chatham island just open until Gordon head is in one with Mount Douglas, bearing W. by S. $\frac{1}{2}$ S.

If passing outside Discovery and Chatham islands, steer from a berth about a mile off shore, N.W. by W., or keep the remarkable white cliff of Cowitchin head half a point on the port bow until the same marks are on, the Zero rock will then be distant $2\frac{1}{4}$ miles, and in one with the southwest point of James island; as this rock does not cover until three-quarters flood, and is marked by kelp, it will generally be seen, and may be passed on either side at a cable's length of the kelp.

If Zero rock is not seen, and it is intended to pass inside it, when in the position before described, steer up the channel with the eastern point

of Discovery island in one with the easternmost hill of the range on the south side of Fuca strait over Port Townshend, bearing S.E. $\frac{1}{2}$ E. until the south end of Darcy island is on with the small island of Morse, or with the north end of Henry island bearing N.N.E., when the rock will be well cleared.

If passing outside Zero rock, and it is not seen, when about a mile outside Discovery island, steer N.W. $\frac{1}{4}$ W., or for the centre of Sidney channel between James and Sidney islands until the same marks are on, viz., the south end of Darcy and north end of Henry islands in one; from this position, having passed either inside or outside Zero rock, and intending to take the Sidney channel, which is the best, the following directions should be observed.

The southern face of James island is a moderately high and steep white clay cliff, its summit covered with trees; towards the eastern part of this cliff are two remarkable notches on its summit. Steer to the N.N.W. to bring Mount Tuam (on the southern point of Admiral island) over the centre between these two notches bearing N.W. by W., and this mark will lead westward of the 3 fathom patch off Darcy island, and between it and the shoal of 9 feet extending south-eastward of James island.*

When Morse island is just shut in by the south-east point of Sidney island, the latter bearing N.E. $\frac{3}{4}$ N., the 3 fathom patch is passed, and a mid-channel course should be steered between James and Sidney islands. The breadth of the channel is nearly a mile, with from 14 to 20 fathoms, until near its northern end, where a patch with 3 fathoms, marked by kelp, lies 3 cables' lengths off the western point of Sidney island; this is avoided by not shutting in the passage between Darcy and Sidney islands, until the north-west end of Sidney spit, a long sandy tongue with a few trees on its extreme, bears North. There is good anchorage off this spit in 8 fathoms.

CORDOVA CHANNEL, westward of James island, between it and the main island of Vancouver, is a fair passage with anchorage along the shore of the main island and little tide; it is not, however, to be preferred to the Sidney channel, as a sand-bank with 15 feet on it lies in the centre of the southern entrance; neither is any saving in distance gained by taking it. From a little northward of Cowitchin head a low flat of swampy land extends for 3 miles to the northward, and about half a mile off the high land; between this flat and the south-west bluff of James island is the southern entrance of the channel, and here it is two-thirds of a mile wide. The above sand-bank lies S.W. by W. from the bluff distant

* See View D, on Chart of Haro Strait and Middle Channel, No. 2,840.

half a mile ; shoal water extends also for some distance both from the bluff and the flat land, which forms the western side of the passage.

Vessels drawing under 15 feet may pass through mid-channel, otherwise the south-west bluff of James island should be given a berth of a quarter of a mile ; when it bears E.N.E. the bank is cleared and there are no other dangers ; tack on either side immediately a 4 fathoms cast is obtained.

MINERS CHANNEL.—Low and Bare islands are two small islands lying off the eastern side of Sidney island, and between them and the latter there is a good passage, three-quarters of a mile in breadth, with 10 fathoms the least water. This channel may often prove convenient for vessels having passed up Haro strait eastward of the Kelp reefs, and desiring to take the inner channels to Saanich, Cowitchin, or through Stuart channel ; the eastern side of Sidney island is bold, and affords good anchorage in 8 fathoms out of the tide in a bay S.S.W. from the north end of Bare island.

Midway between Low and Bare islands, and on the line between their north-west points, is a reef which uncovers. There is a rock above high water N. by W. $\frac{1}{2}$ W., distant a third of a mile from the north-west end of Bare island. After passing this island a course should be steered between Sidney spit and Jones island.

Having passed to the northward of Sidney island, either by Cordova, Sidney, or Miners channels, the Shute or Moresby passages may be taken as convenient ; if bound for Saanich, Cowitchin, or through Stuart channel, the former is preferable, while the latter offers a more direct course through the Swanson or Trincomalie channels, or to Fraser river by Active pass.

SHUTE PASSAGE.—To enter this passage, after leaving Sidney spit, pass between Jones island and the Little group, then eastward of Coal island, Knapp and Pym islands, and between Piers and Portland islands, when the Satellite channel will be entered, which leads directly to Saanich, Cowitchin, and the western ports of Vancouver island. This is a good clear channel, and with the assistance of the chart may be used with much facility.

Jones Island lies north from Sidney spit two-thirds of a mile, with a clear passage between, carrying from 15 to 20 fathoms ; shoal rocky ground extends a cable's length westward of the north-west point of Jones island, and the tides set with considerable strength, from 2 to 5 knots round this point.

The Little Group lie W. by N. two-thirds of a mile from Jones island. They consist of four rocky islets, bare of trees, and connected by

reefs; there is a good passage of 12 fathoms between them and Jones island, and their eastern side may be passed at a cable's length.

Bird Islet, lying on the eastern side of Shute passage, and N.N.W. two-thirds of a mile from the north point of Jones island, is about 6 feet above high water, and has a cluster of reefs round it almost a cable's length in extent, marked by kelp; between it and Coal island there is a clear passage one mile wide, with from 20 to 30 fathoms water.

Coal Island, which helps to form the western side of Shute passage, lies close off the north-east extreme of the Saanich peninsula, and immediately at the entrance of Shoal harbour; it is a mile in extent and thickly wooded, and its eastern and northern shores are free from danger.

In working up the passage between Bird islet and Coal island, a vessel should not stand to the westward of a line joining the east end of Little group to the east point of Coal island, as a rock which covers at quarter flood lies W.N.W. 4 cables from the east end of the group, and S.S.E. nearly two-thirds of a mile from the east point of the island.

A small patch with 4 fathoms over it, and marked by kelp, lies N.E. one mile from the east point of Coal island, N.N.W. $\frac{1}{2}$ W., more than three-quarters of a mile from Bird islet, and one-third of a mile S.W. from Yellow islet. When abreast the east point of Coal island, and distant one-third of mile, a W.N.W. course will lead through Shute passage in mid-channel, passing eastward of Pym island, off the eastern side of which a reef which uncovers extends a little more than a cable.

Celia Reef must also be avoided. The least water found on it is 9 feet; it is marked by kelp, and lies North two-thirds of a mile from the north point of Pym island.

Knapp and Pym Islands are small and wooded, lying between Piers and Coal islands. The passage between Piers and Portland islands is above a mile in breadth, with a depth of 10 to 20 fathoms, and no dangers which are not visible; off the eastern side of the former, about a cable's length, is a rock always uncovered. Having passed westward between these islands a vessel is fairly in Satellite channel.

MORESBY PASSAGE.—After leaving the northern end of Sidney island, the directions for Moresby passage are the same as those already given for Shute passage, until abreast the east point of Coal island. From a berth about one-third of a mile off this point, the direct course through the passage is N. by W. for 2 miles, or until near its northern entrance, which lies between Portland and Moresby islands. This space is wide, and free from danger; it then becomes somewhat intricate, from the Turnbull reef and Canoe rocks, which extend off both these islands,

narrowing the channel at its northern entrance to little over one-third of a mile.

Turnbull Reef.—Off the eastern point of Portland island are three rocky islets, the Sisters, which extend to a distance of nearly 2 cables. They are about 25 feet high, have a few stunted cedar trees on their summits, are joined by reefs, and will be immediately recognized either from the northward or southward.

Eastward from the Sisters, at a distance of more than one-third of a mile, extends the Turnbull reef in a semicircular direction towards the north-west point of Portland island, and almost joining it; 2 fathoms is the least water found on its outer edge, and it is marked by a heavy bank of kelp, which, however, is not always visible until close to it on account of the tide.

Canoe Rocks is a dangerous ledge, extending W. $\frac{1}{4}$ N., nearly half a mile from Reef point, the north-west point of Moresby island; the outer rock of this ledge covers a little after half flood, and is not marked by kelp, though kelp grows between the point and the rock.

When both or either of these dangers are visible, the passage is very easy, as they may be passed as close as convenient, and there are 11 fathoms in mid-channel; but when neither are seen, which may sometimes happen, then it is desirable in coming from the southward to borrow on the Moresby island shore, passing Seymour point, the western cliffy point of the island, at the distance of 2 cables.

From this point the Canoe rock bears N.W. nearly a mile, and from a berth 2 cables off it a N.W. $\frac{1}{2}$ N. course, or direct for Beaver point, the sloping bare south-east point of Admiral island, will lead almost in mid-channel, or nearly 2 cables from Canoe rock. When Chads island, just off the north-west point of Portland island, comes open of that point, then a vessel will be well to the northward of both rock and reef.

If coming from the northward, and intending to take Moresby passage, by steering S.E. $\frac{1}{2}$ S., and keeping Beaver point astern with the easternmost Channel island in Ganges harbour touching it, or just shut in by it, bearing N.W. $\frac{1}{2}$ N., the Canoe rock will be cleared; the western channel island just touching Beaver point, leads on to the rock.

PREVOST PASSAGE lies between Moresby island and the group of smaller islands to the southward of it, and leads by the Shute or Moresby passages into Satellite channel.

To a vessel passing up the main stream of Haro strait and bound for the Swanson channel, the easiest and most direct route is between Stuart and Moresby islands; but circumstances of wind or tide may render it convenient to take the Prevost passage; for instance, with light winds she

may be set into the passage by the flood, or, if near to Moresby island, the ebb tide from the upper part of Haro strait, which runs here as it does in all other parts of the channel, from $2\frac{1}{2}$ to 3 hours after low water by the shore, sets to the westward among the small islands, and down the Miners and Sidney channels.

Arachne Reef.—The dangers to be avoided in Prevost passage are the Arachne and Cooper reefs. The Arachne lies nearly in the centre of the passage, in a direct line between Fairfax point, the south-east point of Moresby island, and Tom point, the east point of Gooch island; from the latter N.W. nearly $1\frac{1}{2}$ miles, from the former S.E., nearly one mile, and from Turn point of Stuart island, S.W. by W. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles. This reef covers at quarter flood, and has a good deal of kelp on its north-west edge, which, however, is frequently hidden by the tide.

Cooper Reef, lying half a mile N. by W. of Tom point of Gooch island, is marked by kelp, and uncovers at half ebb; there is a passage of a mile between it and Arachne reef, and almost the same distance between the latter and Moresby island, with deep water channels. There are no dangers off the south or west sides of Moresby island.

Tom point, in line with the south-east point of Sidney island, S.S.E. $\frac{1}{4}$ E., leads clear to the eastward of Cooper and Arachne reefs.

Yellow Island, a small bare island S.W. by W. nearly one mile from Fairfax point, may be passed on either side. The north side is recommended; if passing on its south side, take care to avoid the small patch of 4 fathoms marked with kelp, mentioned in page 46 as lying S.W., a third of a mile from it; having passed westward of this island, either the Shute or Moresby passages may be taken as convenient.

SATELLITE CHANNEL is formed by Admiral island on the north, and Moresby, Portland, and Piers islands, and the northern shore of Saanitch peninsula on the south. It leads to Saanitch inlet, Cowitchin harbour, and by the Sansum narrows to Stuart channel. It is a fair deep passage with but few dangers, which are not always visible; among these are Shute reef and Patey rock. The general breadth of the channel is a mile, with a depth of from 30 to 40 fathoms, the strength of tide from one to 2 knots, and sometimes 3 knots.

Shute Reef is a ledge less than half a cable in extent, with two rocks, one of which dries 8 feet at low water, its vicinity being marked by kelp. It lies W.S.W. two-thirds of a mile from Harry point, the north point of Piers island, and N. $\frac{3}{4}$ E. nearly 3 cables from Arbutus, a small islet with two or three of the red stemmed arbutus growing on it, and lying half a mile westward of Piers island.

Patey Rock, at the western end of Satellite channel, is a single rock, uncovering at half tide with kelp round it, and is in the way of vessels working into Saanich inlet or Cowitchin harbour. It bears from Hatch point, the westernmost point of Saanich inlet, N.E. by N., two-thirds of a mile, from Coal point, a remarkable nob point the south extreme of Deep cove, N.W. by W. $\frac{1}{2}$ W. nearly 2 miles, and from Arbutus island S.W. by W. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles. In standing to the westward, when working for Saanich or Cowitchin, Harry point, the north extreme of Piers island just open northward of Arbutus islet leads nearly half a mile southward of the rock, and Arbutus island in one with the high round summit of Moresby island barely clears it to the northward.

Cecil Rock, lying S.E. $\frac{1}{2}$ S. a quarter of a mile from the south-west point of Russell island at the entrance of Fulford harbour, must also be avoided in working up Satellite channel. In standing to the northward, when the west end of Russell island is near the bearing of N.W., a vessel should tack before the north point of Moresby island comes open of the north end of Portland or Chads island.

Boatswain Bank, on the western side of the channel, affords good anchorage in from 4 to 9 fathoms, sandy bottom. It extends three-quarters of a mile from the Vancouver shore, between Cherry and Hatch points; 7 fathoms will be found with the former point bearing W. by N. two-thirds of a mile, and the latter S.E. by S. one mile, or steer with Cape Keppel astern, bearing N.E. by E. $\frac{1}{2}$ E. until 8 fathoms is struck, when anchor immediately; the edge of the bank is steep.

SAANICH INLET is a deep indentation running in a nearly S.S.E. direction for 14 miles, carrying deep water to its head, which terminates in a narrow creek within 4 miles of Esquimalt harbour. The inlet forms a peninsula of the south-east portion of Vancouver island of about 20 miles in a N.N.W. and S.S.E. direction, and varying in breadth from 8 miles at its southern part to 3 at its northern.

On the southern coast of this peninsula are the harbours of Esquimalt and Victoria, in the neighbourhood of which for some 5 miles the country is pretty thickly wooded, its prevailing features lake and mountain, with, however, some considerable tracts of clear and fertile land; the northern portion for about 10 miles contains some of the best agricultural land in Vancouver island, the coast line is fringed with pine forests, but in the centre it is clear prairie or oak land, and much of it under cultivation; seams of coal have also been found.

Off the eastern or peninsula side of the inlet there are some good anchorages, the centre being for the most part deep. Immediately southward of James point, the north-western point of the peninsula, is Deep cove, but no convenient anchorage.

Norris rock, awash at half tide, lies S.W. by S. 2 cables from James point, with 12 fathoms between it and the point. Vessels rounding this point should give it a berth of half a mile.

At 2 miles southward of James point is Union bay, which affords good anchorage in 8 or 9 fathoms half a mile from the beach; there are no dangers, and a vessel has only to take up her berth as convenient. There is a stream of fresh water in the south-east corner of the bay.

Cole bay is $1\frac{1}{2}$ miles southward of Union bay, and immediately under Mount Newton; it is smaller, but capable of affording shelter to a few vessels of moderate size; off its north point are two small bare islets, the White rocks. Anchor in the centre of the bay in 8 fathoms, with White rocks bearing W.S.W. These bays are somewhat open to S.W. winds, but a gale rarely blows from this quarter, nor from the proximity of the opposite shore, distant scarcely 3 miles, could much sea get up.

Tod creek is 2 miles southward of Cole bay. Senanus island, a small wooded islet, 150 feet high, lies off its entrance with deep water on either side of it. There is anchorage in the outer part of the creek in 15 fathoms; short distance within it narrows rapidly and winds to the southward and south-east for three-quarters of a mile, with a breadth of less than a cable, carrying 6 fathoms nearly to its head.

From Willis point, the western point of Tod creek, Squally reach trends to the southward and south-west for $2\frac{1}{2}$ miles, the breadth of the arm here being three-quarters of a mile, with no bottom at 100 fathoms. Finlayson arm then runs S. by E. $\frac{1}{2}$ E. for 3 miles, and terminates Saanich inlet. A small islet named Dinner, with deep water on either side, lies near the head of this arm, southward of which there is good anchorage in 9 fathoms. At $3\frac{1}{2}$ cables above the islet a flat extends off dry at low water. Immediately over the head of the inlet, on the eastern side, Leading peak rises to an elevation of 1,346 feet; it is the same mountain which is seen approaching Esquimalt from the southward, and given as a leading mark for clearing Brotchy ledge, off Victoria harbour.

The western side of Saanich inlet has only one anchorage, which is Mill creek, immediately opposite or westward of Union bay; a large stream empties itself into this creek, which has been used to turn a mill. There is good anchorage in the centre, but it is open to S.E. winds.

COWITCHIN HARBOUR is 4 miles westward of Cape Keppel, the southern extreme of Admiral island; Separation point, the western point of entrance of Sansum narrows, forms its northern entrance point, and is somewhat remarkable, being the termination of a high stony ridge dropping suddenly, and running off as a low sharp point to the southward. Cowitchin runs to the westward of this point for $2\frac{1}{2}$ miles, and the general depth of water in it is 30 fathoms, which shoals suddenly as the flat,

which dries off for more than half a mile from the head of the harbour, is approached. But for the large tract of good land contained in the valley of Cowitchin, the port would scarcely be deserving of notice, and certainly the term of bay is more applicable to it than that of harbour. In its north-west end is a considerable stream or river, the Quamitchan, which runs through the fertile valley, and is navigable for small boats or canoes for several miles.

The only convenient anchorage to be obtained is in Snug creek, on the north side of the harbour, or off the outer village on the south side, a mile within the entrance; in the latter case a vessel must approach the shore within little more than a cable's length, and anchor cautiously, when 12 fathoms are obtained.

Snug creek is a convenient anchorage for small craft or coasters, and one or two vessels of moderate size might obtain anchorage and shelter in it; it runs in a northerly direction for nearly a mile, and is a quarter of a mile in breadth. Nearly in the middle of the entrance is a rock * which uncovers at low water in the centre of the kelp; it is about 20 feet in extent, and has $1\frac{1}{2}$ fathoms around it. The western point of entrance should be passed close; it is bold, and has 10 fathoms within half a cable of it; when a quarter of a mile or less within the point, anchor in the centre of the creek in 6 fathoms.

SANSUM NARROWS run in a general northerly direction between Vancouver and Admiral islands for a distance of 6 miles, when they lead into Stuart channel; their average breadth is about half a mile, but at their narrowest part abreast Bold bluff on the Admiral island shore, $2\frac{1}{2}$ miles above Separation point, they are contracted to a third of a mile. The high land on either side renders the wind generally very unsteady; from this cause as well as the somewhat confined nature of the channel, and the depth of water which prevents anchoring, they cannot be recommended except for steamers or coasting vessels. There are but few dangers to be avoided, and the strength of the tides has seldom been found to exceed 3 knots, generally much less.

In the lower part of the Narrows southward of Bold bluff, the depth of water varies from 20 to 30 fathoms; to the northward of this point it increases immediately to 70 and 90 fathoms. Maple bay, on the Vancouver shore near the northern entrance, affords fair anchorage.

Entering Sansum narrows from the southward a kelp patch, with 9 feet on it, must be avoided on the Admiral island shore. It lies 2 cables S.S.W. from a small islet close to the coast, nearly a mile E. by N. from Sepa-

* Jno. H. Tully, Master, R.N., H.M.S. *Camelion*, March 1863.

ration point, and S.E. $\frac{1}{2}$ S. half a mile from Entrance point ; there are 20 fathoms between it and the small islet.

Another rocky patch extends nearly a cable off shore from the eastern side of the Narrows, three-quarters of a mile north-westward of Entrance point. Burial islet, a small spot used as an Indian burying-place, lies on the eastern side of the Narrows, $1\frac{1}{2}$ miles above Separation point ; pass outside it as close as convenient to the kelp.

Burgoyne Bay.—Bold bluff, a smooth headland of bare rock, is steep-to ; the channel here is scarcely a third of a mile across. Rocky ground marked by kelp extends a cable off Kelp point on the western side almost opposite to Bold bluff ; northward of these points the narrows increase in breadth to nearly a mile.

Burgoyne bay, the entrance to which is half a mile eastward of Bold bluff, is a narrow and rather deep indentation terminating in a sandy head ; there is no bottom in the bay under 30 fathoms, until within 2 cables of its head, when the water shoals suddenly from 10 to 4 fathoms. Anchorage may be had if necessary.

Maple Bay.—From Grave point the Narrows take a north-westerly direction, and at a distance of a little more than a mile on the Vancouver island shore is Maple bay. Boulder, the southern entrance point, is remarkable from a large boulder stone standing at its low water extreme. Although an inviting looking bay, the water is too deep for comfortable anchorage, being generally 40 fathoms, and 16 fathoms within a cable's length of a smooth sandy beach at its western end.

Birds-eye cove, which runs in a southerly direction for nearly a mile from Boulder point, affords fair anchorage in 8 to 10 fathoms, with the boulder bearing N.E. by N. in about the centre of the cove, which at this part is not above a quarter of a mile across ; coasters may go up into 4 or 5 fathoms near the head. A shoal patch with 2 fathoms extends nearly a cable off the west side of the cove.

STUART CHANNEL.—Sansum Narrows extend $1\frac{1}{2}$ miles northward of Maple bay, when they lead into Stuart channel, the westernmost of the ship passages which wash the eastern side of Vancouver island. The western side of this channel is formed by the shores of that island ; its eastern by the coasts of Admiral and Thetis islands ; it runs in a general N.W. direction for nearly 20 miles, when it joins the Dodd narrows below Nanaimo. The general breadth of the channel is about 2 miles ; the depth varies in the southern part from 60 to 100 fathoms, in some parts more, in the northern portion from 20 to 40 fathoms ; the principal dangers are the North and Escape reefs, White rock, and Danger reef.

On the western or Vancouver island shore there are some good harbours, viz., Osborn bay, Horse-shoe bay, Oyster harbour, and Chemainos bay ; on the eastern side there are also some anchorages, Telegraph and Preedy

harbours on the western, and Clam bay on the eastern side of Thetis island.

OSBORN BAY, the southernmost anchorage on the western side of Stuart channel, may be known by the Shoal islands, a low wooded group, connected at low water by reefs and mud banks, and which form the northern side of the bay ; these islands lie N.W. by W., a little over 2 miles from the north-west entrance point of Sansum narrows. The bay affords good anchorage, sheltered from the prevailing winds, from the westward and S.E. The best anchorage is with the south-easternmost Shoal island, in one with Southey point, bearing North, and the southern trend of the coast E. by S. $\frac{1}{2}$ S. ; this will be in 10 fathoms mud bottom, and half a mile from the southern head of the bay.*

The coast north-westward of Osborn bay, between it and Horse-shoe bay, is shoal for some distance off, deepening suddenly when half a mile from the shore, and vessels should by no means approach it within that distance. The northern point of the North Shoal island has a remarkable flat sandy spit, on which is built an Indian village ; there are no passages between the small islands northward of this, and the bank dries off 2 cables at low water.

HORSE-SHOE BAY, 4 miles north-westward of Osborn bay, will be known by a rather remarkable sharp point (Bare point) bare at its extreme, which forms its eastern entrance. The bay runs in a southerly direction for two-thirds of a mile, and is a third of a mile in breadth ; there is convenient anchorage for small vessels within a quarter of a mile of its head in 8 fathoms ; the water is deep outside this, and within it shoals suddenly from 5 to 2 fathoms. The Bird reef, a rocky ledge uncovering at half tide, extends a cable's length from the shore, north-westward of the western point of entrance, and bears from Bare point W. by S. half a mile.

OYSTER HARBOUR is 4 miles W.N.W. from Horse-shoe bay, the intervening coast being free from danger ; the harbour runs in the same direction for 4 miles, is nearly a mile wide at the entrance, narrowing gradually within. Entering from the northward, Coffin islet should be given a berth of 2 cables ; there are no other dangers which are not visible ; at low water the Oyster beds dry for 2 cables off the south shore. A good anchorage for a large vessel is a mile within the entrance, with the centre of Twins island in one with an Indian village, which will be seen in the first bay on the north shore : here there are 8 fathoms, mud bottom. A reef which covers extends a cable southward of the Twins ; half a mile above this the harbour narrows to a quarter of a mile ; the northern shore is steep, and on the south side are oyster beds ; small

* See Chart, Strait of Georgia, Sheet 1, No. 579; scale, *m* = half an inch.

vessels may go as high up as the west end of Long island, where 3 fathoms will be found at low water.

TIDES.—It is high water at full and change in Oyster harbour, at 6h. 30m. p.m., and the rise is 10 feet.

CHEMAINOS BAY is $2\frac{1}{2}$ miles northward of the entrance of Oyster harbour, and W. by S. the same distance from Reef point, the north-west point of Thetis island. Anchorage may be had in 8 fathoms half a mile from its head, but it is open and cannot be recommended, unless in fine weather, or with off-shore winds. There are no dangers in working into it.

Yellow point, bare and grassy at its extreme, is the north point of Chemainos bay; from thence to Round island, at the southern entrance of Dodd narrows, and bearing N.W. 5 miles, the coast is bold and free from danger. In working for the narrows, White rock and Danger reef must be avoided. At $1\frac{1}{2}$ miles southward of Round island is a boat harbour, at the entrance of which a vessel may drop an anchor in 8 to 10 fathoms if waiting for the tide, though there is equally good anchorage nearer to the narrows.

NORTH REEF.—From the northern entrance of Sansum narrows to North reef, a distance of 4 miles, there are no dangers, and both shores may be approached boldly in working up, except, as before observed, the coast of Vancouver island from the Shoal islands to Bare point of Horse-shoe bay, which should be given a berth of half a mile.

North reef is a sandstone ledge running in a north-westerly and south-easterly direction, as all the reefs in this channel do. It bears from the south-east point of Tent island S. $\frac{1}{2}$ E. half a mile, with a clear channel between of 26 fathoms. Its summit is just awash at high water, and therefore easily avoided; its shoal part extends in a W.N.W. direction for one-third of a mile, steep on its north and south sides.

TENT ISLAND, narrow and two-thirds of a mile long, lies off the south extreme of Kuper island, and a cable's length off its south-east end are two remarkable worn sandstone rocks 8 or 10 feet above water; the breadth of the passage between them and North reef is one-third of a mile. N.E. $\frac{1}{2}$ E. nearly 2 cables from the south-east end of Tent, is a rock which uncovers 2 feet. In passing eastward of Tent its eastern shore should be given a berth of a quarter of a mile, as some rocky ledges extend off it. There is no ship passage between Tent and Kuper islands, being only one fathom deep at low water.

ESCAPE REEF, at 2 miles N.W. by W. $\frac{1}{2}$ W. from North reef, is a dangerous patch, nearly one-third of a mile in extent, in a W.N.W. and E.S.E. direction, which covers at quarter flood, and has no kelp to mark its position. It lies nearly half a mile from the west shore of Kuper

island, with Josling point, its south rounding point, bearing E. $\frac{1}{4}$ N. $1\frac{1}{4}$ miles, and a remarkable high cliff on the west side of the same island North, a little more than half a mile; there is a deep channel a third of a mile wide between it and Kuper island. The two entrance points of Sansum narrows, kept just touching, lead to the westward of the reef; if at all open they will lead on to it. The Sandstone rocks off the south-east point of Tent island kept open of that point also lead to the westward of it.

ALARM ROCK is scarcely in the track of vessels working up Stuart channel. It lies nearly 2 cables S. by W. from the south-east point of Hudson island, the south-easternmost of the group of islands, which lie off the western sides of Kuper and Thetis islands, facing Preedy and Telegraph harbours. It just covers at high water, and is connected by a ledge with Hudson island.

FALSE ROCK lies N.W. by W. $\frac{1}{2}$ W. 4 cables from Scott island, the north-westward of the group just mentioned, and S.E., a long half mile from Crescent point, the north-east point of Preedy harbour, and covers at half flood.

WHITE ROCK, about 30 yards long, and 15 feet above high water, lies N.N.W., one mile from Reef point, the north-west extreme of Thetis island. This rock has a whitish appearance, and is readily distinguished from a vessel's deck at 2 or 3 miles. It may be passed within 2 cables' lengths, and there is a good passage between it and Thetis island, giving Reef point a berth of more than a quarter of a mile to avoid a rocky ledge extending a quarter of a mile north-westward of it.

RAGGED ISLAND, a low rocky islet, with a few trees on it, lies a third of a mile northward of the north end of Thetis island, with a passage of 12 fathoms between them. There are no dangers within a cable's length of the islet.

DANGER REEF covers a space of 3 cables almost in the centre of the channel. A small portion of it is generally awash at high water, at which time it is difficult to make out until within a short distance of it. White rock bears from it S.E. by S. distant one mile; Yellow point, the north point of Chemainos bay, S.W. by S. $1\frac{1}{2}$ miles; and Tree islet N.E. $\frac{1}{2}$ N., two-thirds of a mile.

In passing through Stuart channel, there is a clear passage of $1\frac{1}{4}$ miles between Danger reef and the Vancouver island shore, and going either up or down the channel, White rock kept on with the low neck (a gap between the two summits of Thetis island) leads well to the westward of the reef. Bound southward through Stuart channel from Dodd narrows, pass a convenient distance, from 1 to 2 cables, eastward of Round island, and

steer for the westernmost ragged tree summit of Thetis island, or S.E. $\frac{1}{2}$ E. until White rock is seen a little on the port bow, when a course may be shaped down the channel.

There is a clear passage of three-quarters of a mile between White rock and Danger reef, and of more than half a mile between the reef and Tree island, with a depth of over 30 fathoms. As White rock and Tree island are always visible, and may be passed, if necessary, at a cable's length, and Danger reef is generally above water, there can be no difficulty in either of these passages to vessels coming up Trincomalie channel.

VESUVIUS BAY, on the western side of Admiral island, immediately opposite Osborn bay, has deep water, but shoals suddenly at its head, when, if necessary, a vessel might anchor in 9 fathoms within $1\frac{1}{2}$ cables of the shore ; but it is not recommended.

There is also anchorage inside Idol islet in Houston passage. This islet is E. by N. one-third of a mile from the south end of Tent island, and is 3 cables from Admiral island ; with the islet bearing W. by N. midway between it and the shore, there is anchorage in 6 fathoms.

GRAPPLER REEF, on the eastern side of Houston passage, is a cable in extent and uncovers at very low water. It lies a quarter of a mile off the north-west end of Admiral island, with Southey point bearing N.N.E. half a mile ; there are 5 fathoms between it and the shore of the island. Passing through Houston passage, the eastern point of Sansum narrows kept open of the points of Admiral island to the northward of it, leads westward of the reef, and when the southern point of Secretary island is open of Southey point, it is cleared to the northward.

TELEGRAPH HARBOUR, on the west side of Kuper island, is a snug anchorage, and its entrance is between Hudson island and Active point, which are half a mile apart. Entering from the southward, Escape reef, (page 54,) must be avoided. If passing inside the reef, the shore of the island should be kept aboard within a quarter of a mile ; if outside or westward, then the Sandstone rocks should be kept open of the south-east point of Tent island, until Upright cliff of Kuper island bears N.E. ; when a vessel will be well to the northward of it, and may steer for the entrance of the harbour, which is free from danger, with the exception of Alarm reef, extending from the south-east point of Hudson island ; 20 fathoms will be found until half a mile within the entrance, when it shoals to 12 and 8 fathoms.

There is good anchorage in the latter depth, with the centre of Minx reef bearing W.S.W., Active point S.S.E. $\frac{1}{2}$ E., the Escape reef, if above water, just open of the latter. Above this, the harbour runs in a narrow creek to the N.W. for a mile, where coasters may find anchorage in 2 and

3 fathoms : the continuation of this creek easterly separates Kuper from Thetis island, which at low water are connected.

FREEDY HARBOUR is separated from the one just described by a group of small islands and reefs ; its entrance is to the northward of them between Scott island and Crescent point of Thetis island, and is a third of a mile in breadth ; in entering the Thetis island shore should be kept aboard to avoid False rock, a patch which covers at half tide, and lies W.N.W. nearly 4 cables from the west end of Scott island, and S.W. $\frac{1}{2}$ S. half a mile from Crescent point. Anchorage will be found in 7 fathoms, with Crescent point bearing W.N.W., distant half a mile ; shoal water extends for $1\frac{1}{2}$ cables off the northern sides of Scott and Dayman islands.

SWANSON CHANNEL leads from the Haro strait to the north-westward between Admiral island on the west and Pender island on the east ; passing eastward of Prevost island it enters the Active pass between Galiano and Mayne islands, thence into the strait of Georgia ; northward of Active pass it connects with Trincomalie channel.

ADMIRAL ISLAND, separating the Stuart from the Trincomalie and Swanson channels, is of considerable extent, being nearly 15 miles in length N.W. and S.E., and varying in breadth from 2 miles at its northern end to 6 at its southern. It has two good ports, Fulford harbour on its south-east, and Ganges harbour on its eastern side. The southern portion of the island (which is a peninsula formed by the indentations of Fulford harbour and Burgoyne bay, a valley separating the heads of these ports) is composed of a lofty ridge of mountains over 2,000 feet in height, rising abruptly from all sides.

Immediately northward of the valley and over Burgoyne bay on its western side Mount Baynes rises to an elevation of nearly 2,000 feet, and is very remarkable ; its southern face being a perpendicular precipice visible a long distance from the southward or eastward. The Otter range of somewhat less elevation rises northward of Mount Baynes, from whence the island slopes away in a wedge shape, its northern termination, Southey point, being a sharp extreme. The island is for the most part thickly wooded, but there is a considerable extent of partially clear land both at the northern end and in the valley at the head of Fulford harbour, which is now becoming peopled by settlers under the name of Salt spring district, from the fact of several salt springs having been discovered.

FULFORD HARBOUR penetrates the south-east side of Admiral island in a W.N.W. direction for $2\frac{1}{2}$ miles. At its entrance is Russell island, between which and Isabella point, the western point of the harbour, is the best passage in.

Cecil rock with 2 fathoms on it lies S.E. $\frac{1}{2}$ S. a quarter of a mile from the south-west point of the island. The breadth of the southern entrance is two-thirds of a mile, with a depth of 20 fathoms until abreast North rock ; here the harbour narrows, and carries a general breadth almost to its head of something less than half a mile.

North rock is a small rocky islet lying close off the north point of the harbour ; a rock which covers at quarter flood lies west of it 2 cables length, and more than $1\frac{1}{2}$ cables from the shore, so that strangers entering should keep rather to the southward of mid-channel until past it. Mount Baynes appears very remarkable from the harbour, rising immediately over its head almost as a perpendicular cliff. Immediately over the north side of the harbour is Reginald hill, a stony elevation between 700 and 800 feet ; with this hill bearing N.E. there is good anchorage in 10 fathoms in the centre of the harbour ; at the head of the harbour is a considerable fresh-water stream, from which shoal water extends for 3 cables.

The northern passage into the harbour between Russell island and Eleanor point, though in places not more than one-third of a mile in breadth, is a safe channel of 14 to 18 fathoms water. Louisa rock, with only one fathom on it, is the only danger ; it lies 2 cables from the northern or Admiral island shore, with the west end of Russell island bearing S.E. $\frac{1}{2}$ S. 4 cables, and North rock W.S.W. the same distance ; with a leading wind the Russell island shore should be kept rather aboard.

GANGES HARBOUR is a safe and commodious port for vessels of any description or size. Its southern entrance, which is in the Swanson channel, lies between Admiral and Prevost islands, and has no dangers which are not visible. In entering, the Channel islets may be passed on either side, to the northward of them is by far the widest passage ; they are two small wooded islands, $1\frac{1}{2}$ miles within Beaver point, and 2 cables from the shore of Admiral island.

Liddell point, the south-west extreme of Prevost island, and the northern entrance point of the harbour, has an uncovering reef extending $1\frac{1}{2}$ cables eastward of it. The Acland islands, two in number, lie to the westward of the point along the shore of Prevost island, between which and them there is no ship channel. The fair channel into the harbour is between the Channel and Acland islands, the breadth between them is half a mile, the depth 30 fathoms ; having passed these islands the harbour is nearly $1\frac{1}{2}$ miles wide, and the general depth for 2 miles, 20 fathoms.

There are but few dangers in working into the harbour, and they are easily avoided. A rocky patch with one fathom on it lies W. $\frac{1}{4}$ N. 2 cables from the west point of the westernmost Acland island, and nearly

the same distance off shore. The one fathom patch is more in the track of vessels; it lies with the southernmost Channel islet bearing E. by S. $\frac{1}{2}$ S. nearly 2 miles, and Peile point, the north-west extreme of Prevost island, North 2 miles, and is half a mile from the southern or Admiral island side of the harbour; there is a clear passage of half a mile southward of the patch in 14 fathoms: to the northward of it the passage is a mile wide.

A vessel may anchor as soon as 10 or 12 fathoms is found; a good berth is with Peile point, and the two entrance points of Long harbour nearly in one, bearing N.E. by N. and the easternmost Chain island W.N.W., in 11 fathoms. If desirable she may anchor between the Chain islands and the south shore, the easternmost island bearing N.E. by N., midway between it and Admiral island in 6 fathoms, or a still snugger berth a mile above off the sandy spit on Admiral island in 4 or 5 fathoms. This latter is recommended for vessels of moderate size intending to make any stay.

The Chain islands are a group of 6 or 7 low narrow islets connected by reefs, extending from the head of the harbour in an E.S.E. direction for $1\frac{1}{2}$ miles. To the southward of these islands the ground is clear, but to the northward of them are scattered reefs, and a vessel is not recommended to anchor on that side within the outermost island.

CAPTAIN PASSAGE also leads into Ganges harbour, to the northward of Prevost island. It is a clear deep passage, nearly half a mile wide, with depths from 30 to 40 fathoms, and vessels from the northward intending to enter should always use it. There is only one danger, which is well inside Ganges harbour, and is almost equally in the track of vessels working up by the southern passage; it is a small patch of 2 fathoms lying $3\frac{1}{2}$ cables S.W. by W. from the western entrance point of Long harbour. Entering by Captain passage, Peile point should not be shut in by the entrance points of Long harbour until the opening between Prevost and Acland is shut in, when this reef will be well cleared; if working up by the southern channel, a vessel should not stand so far to the eastward, when in the neighbourhood of this patch, as to open out the passage between Acland and Prevost islands.

LONG HARBOUR may be almost considered as part of Ganges harbour. It is a long, narrow creek, its general breadth being 2 to 3 cables, running parallel with and eastward of the latter for 3 miles. Its entrance is between two sloping, rocky points, similar to each other on the north side of Captain passage. At a quarter of a mile within the entrance is a high, bare islet, which must be passed on its south side; one mile within is another island, somewhat similar, which may be passed on either side. Outside these islets the depth is from 14 to 16 fathoms; within them, 4 and

5 fathoms. At the head of the creek is a snug place for a ship to repair, &c., but as a harbour it is only adapted to steamers or coasters, and, with the good and easy anchorage of Ganges harbour so close, there would appear to be no reason to recommend this contracted and inconvenient one.

PREVOST ISLAND, lying in the centre of Swanson channel, is moderately high, thickly wooded, and of an irregular shape. It is 3 miles long, in a N.W. and S.E. direction, $1\frac{1}{2}$ miles in breadth, and on its southern and western sides it is indented by several bays and creeks; its northern side is almost a straight cliffy shore.

Ellen Bay, on the south-east side of Prevost, between Liddell and Red islet points, is three-quarters of a mile deep, by one-third in breadth, and affords fair anchorage with all but south-easterly winds in 10 fathoms mud. The head of this bay is a grassy, swampy flat, the distance between which and the creeks on the western shore is only a cable's length.

Annette and Glenthorne Creeks, on the western or Ganges harbour side, are curious, narrow indentations, running into the island for a mile in an E. by S. direction, and only separated from each other by a narrow, stony ridge. In the western one, Glenthorne, there are 3 fathoms, the other has $1\frac{1}{2}$ fathoms; they are snug places for small craft, or for a vessel to repair.

James Bay, in the north-west side of the island, and on south side of Captain passage, offers anchorage in 10 fathoms for one or two vessels of moderate size with southerly winds, but they must get well in, as there are 18 to 20 fathoms in the outer part of the bay.

There are two bays northward of Ellen bay, but too small to afford any shelter.

Hawkins Island is a small, rocky islet with a few bushes on it, lying close off a remarkable white shell-beach, on the north-east side of Prevost island. From 2 to $3\frac{1}{2}$ cables W. $\frac{1}{2}$ N. of its north-western point are the Charles rocks, three smooth-topped rocks, not marked by kelp, and uncovering towards low water.

ACTIVE PASS.—From Discovery island in the southern entrance of Haro channel, to the sand heads of Fraser river, by the Active pass, is just 40 miles, and the line is almost a straight one. By adopting this route, not only the most dangerous and inconvenient part of the Haro strait is avoided, viz., its northern entrance abreast the East point of Saturna island and Patos island, where the tides are strong and apt to set a vessel down Rosario strait, or over on the eastern shore, but a distance of nearly 10 miles is saved.

After entering Swanson channel (page 57) between Admiral and Pender islands, steer to the eastward of Prevost island. From Portlock

point, the south-eastern bluff of Prevost, the entrance of the pass bears N. by W. $\frac{1}{2}$ W. $1\frac{3}{4}$ miles. The southern point of entrance, Helen point, is low, bare, and of a yellowish colour; over its northern side rise the high, stony hills, on the southern side of Galiano island; the entrance itself does not become very apparent until it is approached within a mile. If overtaken by night, or waiting for tide, Otter bay, on the west side of Pender island, is a good stopping-place; it is a mile north of Mouatt point, and $2\frac{1}{2}$ miles E.N.E. of the Channel islands in Ganges harbour; a very fair anchorage is to be had in the centre of the bay, in 8 fathoms, and no dangers. Ellen bay in Prevost island might also be used, but the former is preferred. There are few dangers to be avoided in passing from Swanson channel through the pass; the principal of them is the Enterprise reef, two dangerous patches which lie off the west side of Mayne island (p. 36).

In passing up Swanson channel, keep Pelorus point, the eastern extreme of Moresby island, open of Mouatt point, the western extreme of Pender island; these two points, just touching, lead very close on to the reef, but open they clear it $1\frac{1}{2}$ cables.* If coming out of Navy channel, a vessel should keep over for Prevost island until these marks are open. When Helen point bears N. by E., the reef is cleared, and the entrance may be steered for. There is a passage inside Enterprise reef which may be taken when both the kelp patches can be seen.

On the western side of Swanson channel, the uncovering rock, $1\frac{1}{2}$ cables eastward of Liddell point, must be avoided, and the points northward of it, Red and Bright islands, should be given a berth of a cable.

Active pass runs in an E.N.E. direction for $1\frac{1}{2}$ miles, and then turns north for the same distance, fairly into the strait of Georgia. The average breadth of the channel is about one-third of a mile, and its general depth about 20 fathoms; there are no hidden dangers, but the great strength of the tides, together with the absence of steady winds, renders it unfit for sailing vessels, unless, indeed, small coasters; for steamers it is an excellent channel, and a vessel commanding a speed of 8 knots may take it at any time without fear.†

A quarter of a mile within the southern entrance, and very close off the

* See View C on Chart of Haro Strait, No. 2,840.

† H.M.S. *Termagant* passing through Active pass in July 1860, ran on to Laura point, on the south side, from refusing to answer her helm in making the turn to the northward, the tide at the time favourable, and running about 4 knots; H.M.S. *Plumper* and *Alert* were ahead and astern of her at the time. The *Termagant's* draught was 18 feet, and she sat 5 feet by the stern; an under-current striking her heel was probably the cause. H.M. steam ships of equal size and greater length had passed through previously on several occasions.

northern shore, is a rock which uncovers at half tide. This is the only danger, and cannot be said to be in the track of vessels; in passing to the westward, however, against the flood, a vessel should keep rather on the southern side, as the tides set over towards this rock.

Miners bay, on the south side of Active pass, where it takes the sharp turn to the northward, affords anchorage, if necessary; but a vessel must go close in to get 12 fathoms, and then she is barely out of the whirl of the tide.

In entering or passing out of the northern entrance, the point of Gossip island, on the west, and also Georgina point, on the east, should be given a good berth; indeed, the best directions which can be given are to pass through in mid-channel. From thence the sand heads of Fraser river bear N. by W. $\frac{3}{4}$ W. distant 11 miles. The sand head buoys are visible at 2 or 3 miles.

TIDES.—The flood-tide in Active pass sets from west to east, or from the Swanson channel into the strait of Georgia; and the ebb, in the contrary direction.

The velocity during springs is sometimes 7 knots; at ordinary tides, from 3 to 5. In the northern entrance there is sometimes a heavy tide ripple, caused by a patch of 7 and 9 fathoms, and by the meeting of the tide through the pass with that in the strait; it is recommended to pass through in mid-channel; no favourable eddy, or less strength of tide, will be found on either side, unless within the kelp which lines the shores.

TRINCOMALIE CHANNEL commences at Active pass, from the southern entrance of which its general direction is W.N.W. for 24 miles, when it enters the Dodd narrows.

Like all the inner channels already described, this one must be classed as essentially a channel for steamers or coasters; it can only be used with advantage by vessels bound to the eastern ports of Vancouver island below Nanaimo, or by such as choose to enter Nanaimo itself by that contracted pass the Dodd narrows.

The eastern side of the channel is formed by the long narrow islands of Galiano and Valdes, and the western by Admiral, Kuper, and Thetis islands; some smaller islands are scattered over it, and there are also several rocks which require to be known and avoided, nevertheless, with the assistance of the chart, and these directions, it is a desirable and safe channel for the class of vessels before mentioned; the general depth of water is not inconvenient for anchorage if necessary, as it rarely exceeds 30 fathoms, and from 12 to 18 fathoms can generally be found at a convenient distance from the shore. Montague harbour on the western side of

Galiano island is a good stopping place, also Clam bay on the east side of Thetis island.

Trincomalie channel contracts in breadth when abreast Narrow island to something less than a mile, but the shores are bold on either side. On the shore of Galiano island, N.E. one mile from the south-east point of Narrow island, is Retreat cove, offering shelter for boats or anchorage for coasters; an island lies in the centre of it.

There are two passes leading into the strait of Georgia, viz., the Portier and Gabriola; both are intricate and dangerous unless to those perfectly acquainted with them, and the tides are so strong, and varying in their set, that they cannot be said to be applicable to the general purposes of navigation, and few vessels would be justified in using them unless in cases of emergency.

MONTAGUE HARBOUR, is formed between the south-west side of Galiano island, and Parker island, and its entrance, between Phillimore point and the small island of Julia, is $1\frac{3}{4}$ miles W.N.W. from the west entrance of Active pass. The entrance is but little over a cable in breadth, but has deep water, and is free from danger; immediately within the points it widens out to a quarter of a mile, and anchorage may be obtained in 8 to 10 fathoms in the arm which leads to the harbour. This arm runs in a W.N.W. direction for nearly a mile, with an average breadth of 2 cables and a depth of 12 fathoms, when it turns to the eastward and enters the harbour, which though small is a snug and secure anchorage, with a general depth of 6 fathoms, good holding ground; several Indian lodges are built on the shores of the bay. There is a narrow passage to the north-westward from this harbour into the Trincomalie channel, and the least depth in it at low water is 3 fathoms.

Several smaller islands extend W.N.W. of Parker island, viz. Sphinx, Charles, Wise, and Twin islands, the latter two, rather remarkable rocky islets about 30 feet high; between this group and the shore of Galiano island is a passage of over half a mile in breadth with good anchorage in 10 fathoms.

ATRINS REEF lies on the western side of Trincomalie channel, one-third of a mile from the shore of Admiral island, and in the track of vessels working up or down. It is a cable in extent, and covers at 4 feet flood, its neighbourhood being marked by kelp, which, however, is rarely seen when there is any ripple on the water. The reef bears from Peile point the north-west end of Prevost island W. by N. $\frac{1}{2}$ N. $3\frac{1}{8}$ miles; from the Twin islands S. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles; and from the south-east end of the peninsula which forms Walker hook, E. by S. one mile. There is a passage of 16 fathoms between the reef and Admiral island, and it may be passed at a cable's length on the outside. The south-west abrupt tangent

of Galiano island in one with Mount Parke, a remarkable bare-topped conical hill on the south side of Active pass, bearing E. $\frac{1}{4}$ S., leads well outside Atkins reef.*

WALKER HOOK is formed by a peninsula or tongue of land projecting from Admiral island, 4 miles westward of the Captain passage. On its south-east side is fair anchorage for small vessels in 6 fathoms, but a shoal patch marked by kelp lies 2 cables eastward of the south-east point of the peninsula; small vessels may pass between it and the point in 5 fathoms, or between it and Atkins reef, which is better, and anchor in 6 fathoms, 2 cables southward of the neck of the peninsula. There is also anchorage in 10 fathoms northward of the peninsula, but a vessel must not go within the north point of the tongue of land forming the hook as it dries a long way out.

GOVERNOR ROCK is a dangerous rocky patch lying almost in the centre of Trincomalie channel. It has 4 feet on it at low water, is about half a cable in extent, and though kelp grows on it, yet it is very difficult to make out until quite close to. From Twin island it bears W. $\frac{3}{4}$ S. $1\frac{2}{3}$ miles; from the south-east point of Walker hook N.W. by N. $1\frac{1}{4}$ miles; from the south-east point of Narrow island E. by S. $\frac{3}{4}$ S. $1\frac{2}{3}$ miles; and from Quadra hill S.S.W. This hill cannot be mistaken; it rises from the centre of Galiano island to the height of 750 feet, and a remarkable white basaltic cliff will be seen on the coast immediately southward of it.

WALKER ROCK lies North two-thirds of a mile from Governor rock, and is scarcely less dangerous, except that it uncovers at half ebb. From Twin island it bears W. by N. $\frac{1}{2}$ N. $1\frac{2}{3}$ miles, from Quadra hill S.W. by S., and is distant two-thirds of a mile from the shore of Galiano island.

These two rocks are the principal dangers to be avoided in the Trincomalie channel; they are both steep-to, and may be passed if necessary at half a cable's length.

DIRECTIONS.—In passing up or down Trincomalie channel, vessels may either take the passage southward of Governor rock, or that between it and Walker rock, or northward of the latter. If taking the southern passage, after having cleared Atkins reef, Walker hook and the shore of Admiral island, which is bold, should be kept aboard within half a mile, until Quadra hill bears N.E., when they will be to the westward of both rocks, and may steer over towards the south-east end of Narrow island, giving it a berth of at least a quarter of a mile, as a reef extends off it.

* See View C, on Chart No. 2,689.

If passing between the two rocks, which are two-thirds of a mile apart, the marks for a mid-channel course are, the north-east point of Thetis island kept well open of the east side of Narrow island, the latter bearing W. by N. $\frac{3}{4}$ N.; steer up with these marks on until Quadra hill bears N.E., taking care not to open the north-east point of Thetis island so much of Narrow island as to bring the former on with Hall island, as this would lead right on to the Walker rock. The north-east point of Thetis island should be kept just halfway between the east side of Narrow and Hall islands; * these marks are very clear and well defined, and are generally seen from a long distance; by keeping them on as shown in the sketch, a vessel may steer boldly between the rocks, whether visible or not. In passing to the eastward when the south-east point of Walker hook bears S.S.W., a vessel will be well east of them.

If passing northward of Walker rock when bound westward up the channel, keep Parker and Wise islands aboard within half a mile; there are no dangers off them. When abreast Twin island, which may be passed within 2 cables, haul in to the northward until Mount Sutil on the southern end of Galiano island is well open northward of Twin, or until the mountain is on with Charles island; run up with these marks on astern (which will lead well inside Walker rock) until Quadra hill bears N.E. by E.

Coming down Trincomalie channel, and desiring to pass northward of Walker rock, keep over on the Galiano island shore until the north-east point of Thetis island is shut in by the south point of Hall island; as long as these points are not opened a vessel will be northward of the rock, and when Quadra hill bears North, she will be well eastward of both it and the Governor rock.

HOUSTON PASSAGE leads from the Trincomalie into Stuart channel. Vessels intending to take it had better pass up southward or inside the Governor rock. The entrance is between the north-east point of Admiral island, and Narrow and Secretary islands; there are no dangers, the general depth of water is 20 fathoms, and anchorage within a moderate distance of the shore of Admiral island may be obtained in 10 or 12 fathoms.

Southey point is the sharp northern extreme of Admiral island, and may be approached to a cable's length to the northward. At half a mile S.S.W. of it is the Grappler reef described in page 56; round it Houston passage turns abruptly to the southward, and Stuart channel may be entered either by the main passage between North reef and Admiral island, or if necessary, between North reef and Tent island. Give North

* See View D. on Chart 2,689.

reef a moderate berth, as a shoal ridge of rocks extends one-third of a mile off its north-west and south-west ends (page 54).

PORTIER PASS separates Galiano from Valdes island, and is the first outlet into the strait of Georgia, northward of Active pass, from which it is distant 14 miles; the pass, though short (not exceeding a mile from its southern entrance until fairly in the strait) is narrow, and is rendered still more so by sunken rocks on its western side; the tides are very strong, running from 4 to 7 knots, and overfalls and whirling eddies are always to be met in the northern entrance. No vessel but a steamer commanding a speed of 8 knots is recommended to take it unless in a case of emergency. The first danger in the southern entrance is Black rock, just awash at high water; it is on the western side of the pass E.S.E. $1\frac{1}{2}$ cables from Native point, the north-west entrance point, and is easily avoided.

The second and principal danger is the Virago rock, almost in the centre of the channel, but rather on the western side; it only uncovers at low tides, and bears from Native point E. by N. $\frac{1}{2}$ N. 2 cables, and from Race point, the centre projecting point on the east side of the pass S.W. by W. a little over 2 cables, which is the least breadth of the passage. The third danger is a 2-fathom rocky patch, extending from one of the outer east points of the pass, bearing from Race point N.N.E. $\frac{1}{4}$ E., a third of a mile, and from Tongue point, the outer east point, W. by N. $\frac{3}{4}$ N. 3 cables' lengths; this patch is covered with kelp, which is generally visible.

DIRECTIONS.—At any stage of the flood stream a steam vessel acquainted with the channel might pass out into the strait of Georgia with facility; the eastern shore should be always kept aboard within a cable's length until beyond Race point, which should be passed close, after which a vessel with the flood stream should make for Canoe islet, a bare yellow rock about 20 feet high N.N.W. two-thirds of a mile distant, in order to clear the 2-fathom patch; Canoe islet is clear of danger on its western side, but its eastern should not be approached within 3 cables' lengths.

In passing out of the channel with the ebb-tide, the great danger to be avoided is the violence of the stream setting against and round Race point, which, if a vessel have not sufficient power to stem, will either take her on the port bow and set her on the point, or, which is still more probable, on the starboard, and set her on Virago rock, as was the case on one occasion with H.M. steam vessel of that name.

Entering Trincomalie channel from the strait of Georgia by this pass, a vessel should keep a third of a mile eastward of Canoe islet, and then steer for Race point, due allowance being made with the flood for the

2-fathom patch; if with the ebb, Race point should be kept close aboard to avoid being set on Virago rock, and having passed the point, hug the eastern shore, which is clear of danger; the rule on all occasions should be to avoid the western shore; the great strength of the tide ceases immediately on clearing the entrance points either way. From the strait of Georgia the pass is always easily recognized at the distance of several miles, by the gap formed by its sloping wooded entrance points terminating in two low extremes from most points of view overlapping each other; steer for the entrance on a bearing about S. by W.

TIDES.—The flood tide runs from Trincomalie channel to the northward into the strait of Georgia and the ebb in the contrary direction. The ebb stream commences from one hour to one hour and a half before it is high water by the shore, and runs for one hour after low water, or from 7 to 8 hours; the high water at the full and change of the moon occurs about 6 p.m., but is not very regular.

CLAM BAY is on the eastern sides of Thetis and Kuper islands, opposite to Portier pass. The continuation of the bay separates these two islands at high water, when there is a boat channel into Telegraph harbour (page 56) on their western side. A remarkable White spit point of broken clam shells seen from a long distance forms the southern entrance point of the bay; immediately southward of it is a considerable native lodge; Leech island off the northern point is a small wooded islet. Centre reef, with 7 feet on it, and marked by kelp, lies almost in the centre of the entrance, nearly 3 cables N.W. from White spit, and E. by S. a third of a mile from Leech island.

The best passage into Clam bay from the eastward is northward of Narrow, Secretary, and Indian islands, between them and Hall island; after passing Indian island steer in for White spit, giving it a berth of a cable, and anchor in 6 fathoms in the centre of the bay, the spit bearing East, and Leech island N.N.W.

If desired, vessels may enter southward of Narrow and Secretary islands, between them and Kuper island, and there is fair anchorage in a moderate depth of water anywhere in this passage. There are, however, two rocks marked by kelp to be avoided with less than a fathom on them; the southern one bears from the south end of Indian island S.W. $\frac{1}{2}$ W. 4 cables, and the northern one from the north end of the same island S.W. $1\frac{1}{2}$ cables; therefore the west side of Indian island should be kept aboard, and a vessel should not bear up round White spit until its extreme bears S.W., as rocks extends off more than a cable to the eastward of it. This channel is not recommended unless for small vessels.

Entering from the northward there is a clear deep passage of two-thirds of a mile between Thetis and Reid islands; a vessel should pass westward

of the Rose islets, three small rocky islets, the northernmost one about 20 feet high with a few bushes on it, lying half a mile westward of the north end of Reid island.

ANCHORAGE.—There is fair anchorage on the western side of Valdes island, 2 miles above Portier pass, immediately off a yellow cliff; 8 fathoms, sandy bottom, will be found with the cliff bearing N.W. by N. distant a quarter of a mile.

It will also be known by Shingle point, a low projection with a native village on its extreme, one-third of a mile north-westward of the yellow cliff.

DODD NARROWS may be said to commence above Round island, (page 55) although the narrowest part is a mile distant from it. To small vessels or steamers of sufficient power that obey their helm quickly, this narrow pass offers no dangers. The strength of the tide at its greatest rush is above 8 knots, the least depth of water 7 fathoms, and the narrowest part of the channel is 80 yards wide; but this is for a short distance, and the pass being nearly straight, a vessel is carried through in a few moments.

ANCHORAGE.—If bound through Dodd narrows, and having to wait for tide, there is fair anchorage with but little tide, westward of Round island in 6 fathoms, midway between it and the shore.

Percy anchorage is a good stopping place for the tide, immediately on the north side of the Narrows between Gabriola and Mudge islands; the latter separates the False from Dodd narrows.

DIRECTIONS.—In proceeding for Dodd narrows from abreast Portier pass, the mid-channel course is W.N.W. for about 3 miles, or until Ragged island and Reef point of Thetis island are in one bearing S.W. by S.

The most direct course is northward of Danger reef, between it and Tree island; the latter is a small round wooded islet lying off the south end of De Courcy islands; this passage is two-thirds of a mile wide, with a depth of 25 to 30 fathoms.

Danger reef, page 55, consists of two rocky patches a cable's length apart, the eastern one generally awash, and should not be approached within a cable where there are 9 fathoms; if the reef should not be seen it is recommended to pass Tree island at the distance of a quarter of a mile; there is deep water between it and De Courcy islands.

The passage between White rock and Danger reef is likewise a very good one; it is three-quarters of a mile wide, with a depth of 20 to 30 fathoms. White rock is 15 feet high, and may be passed if necessary on either side at the distance of a cable. The southern side of Danger reef should be given a berth of at least 2 cables; when the passage between

Tree island and the south point of De Courcy islands is open, the former bearing E.N.E., a vessel will be northward of Danger reef, when a mid-channel course for Dodd narrows is N.W. by W. and the distance 5 miles; Round island at their entrance will be shortly seen ahead.

In passing up, keep on the starboard or eastern side of Round island at a convenient distance; the only directions necessary after this are to keep in mid-channel, and to attend the steerage quickly and carefully. Immediately through the Narrows the tide ceases, and a vessel will be in Northumberland channel, a fine wide passage leading to, and only 5 miles from, the anchorage at Nanaimo.

In taking the Narrows from the northward, be careful not to mistake the False Narrows, which are on the port or northern side of Northumberland channel (page 117), and are much wider than the real pass, but nearly dry at low water. The Dodd narrows are not so easy to pass from the north as from the south, as in the former case the slight bend that has to be made must be made immediately on entering the narrow part. The tides should be studied in passing either way. It is not recommended to attempt it with the full rush of the stream; an hour before or after low water there is no difficulty to a steam vessel.

TIDES.—It is high water in the Narrows on full and change days at 3h. 30m. p.m., and low water at 9h. 30m. a.m., and on those days the flood stream commences at low water and runs about 7 hours. The first of the flood is the best time to pass the Narrows. Vessels leaving Nanaimo and intending to pass down, should be at the Narrows an hour before high or low water, as the tides are nearly an hour earlier at the Narrows.

PYLADES CHANNEL.—The De Courcy islands are a group extending $4\frac{1}{2}$ miles in an E.S.E. direction from Mudge island, which separates the False from Dodd narrows, and on their northern side, between them and Valdes island, is Pylades channel, which leads by the Gabriola pass into the strait of Georgia, as well as to the entrance of the False narrows. The average breadth of the channel is a mile, with a depth of 35 fathoms, and at its head near the entrance to the False narrows is good anchorage in 9 fathoms, convenient for vessels intending to take the Gabriola pass and waiting for tide.

False narrows are full of kelp, and shoal at low water, affording only a boat passage into Northumberland channel. The passages between the De Courcy islands are deep and navigable; that between the north and middle island is half a mile wide, and free from danger; the narrow pass between the middle and south island is scarcely a cable wide, but has a depth of 5 fathoms.

GABRIOLA PASS, between the south end of Gabriola island and the north end of Valdes island, is not recommended, unless for coasting vessels knowing the locality, or steamers, if necessary, for it is a narrow and intricate channel, something of the same character as Dodd narrows, except that it is a much longer reach. Its direction is E.N.E. for little over a mile, its narrowest part is not over 250 yards in breadth, and the shoalest water is 6 fathoms; half a mile E.N.E. from this narrow, the course changes to S.E. by E., leaving a narrow ridge of low wooded islands on the starboard hand, off which a chain of covering rocks marked by kelp extend for nearly 2 cables; two-thirds of a mile on this course leads into the strait of Georgia, when the Gabriola reefs must be avoided. These latter are an extensive group of rocks, uncovering at low water, at $1\frac{1}{2}$ miles eastward of the Flat Top islands; much broken ground exists in their neighbourhood, and it is desirable to give them a good berth.

CHAPTER III.

MIDDLE CHANNEL.—LOPEZ SOUND.—ORCAS WEST AND EAST SOUNDS.

VARIATION from 21° 50' to 22° 0' East, in 1864.

The **MIDDLE CHANNEL** is the centre of the three passages leading from the strait of Fuca into that of Georgia, and is bounded by San Juan island on the west, and the islands of Lopez, Shaw, and Orcas on the east. Although a deep navigable ship channel, and eligible for steamers of the largest size, the southern entrance is somewhat confined, and subject to strong tides, with a general absence of steady winds; the wide straits of Rosario and Haro, on either side of it, are therefore far to be preferred for sailing vessels above the size of coasters.

The general direction of the channel is N.N.W. for 5 miles, when it trends to the W.N.W. for 7 miles to its junction with Douglas channel. The southern entrance lies between the south-east point of San Juan and the south-west point of Lopez island; for $1\frac{1}{2}$ miles its direction is N.N.W., and the breadth of the passage for this distance varies from two-thirds of a mile to 4 cables' lengths; abreast Goose island on the western side, it does not exceed the latter breadth. In entering, the danger to be avoided on the western side is the Salmon bank, extending southerly from San Juan; and on the eastern the Whale rocks, always out of water. The tides in this entrance run from 3 to 7 knots, with eddies and confused rippings; when within the entrance, there is far less tide, and Griffin bay, offering good anchorage, is easily reached.

SALMON BANK extends $1\frac{1}{2}$ miles south from Cattle point, a bare point about 50 feet high, the sloping termination of Mount Finlayson, and the south-east extreme of San Juan island; the least depth of water found on it is 10 feet, with rocky patches, marked in summer by kelp.

WHALE ROCKS, on the eastern side of the entrance, are two black rocks a cable's length apart, and 3 or 4 feet above high water; a patch, on which kelp grows, with one fathom on it, extends 2 cables S.E. of them, otherwise they are steep-to, but it is not recommended to pass them nearer than a quarter of a mile, as the tides set strongly over them.

DIRECTIONS.—In entering Middle channel from the westward or southward, Cattle point should be given a berth of at least $1\frac{1}{2}$ miles.

Mount Erie a remarkable summit on Fidalgo island 1,250 feet high in line with Jennis point N.E. by E. $\frac{1}{4}$ E. leads $1\frac{1}{4}$ miles south of Salmon bank in 13 fathoms; when the entrance of the channel is open, bearing N.N.W., or when Goose island, a small islet on the western side of the entrance, is in one with Turn island, and Orcas Nob bearing N.N.W. $\frac{1}{2}$ W., a vessel will be well to the eastward of the bank, and may steer in for the passage.* Orcas Nob is a remarkable conical hill, with a bare stony summit, 1,100 feet above the sea, rising over the west side of Orcas island.

The bottom in the channel is rocky and irregular, varying in depth from 18 to 60 fathoms, causing overfalls and eddies which are apt to turn a ship off her course unless the helm be given quickly to meet them; but there are no positive dangers after passing the Salmon bank: between this bank and Cattle point there is a passage carrying $3\frac{1}{2}$ fathoms, one-third of a mile in breadth; 5 fathoms will be found within a cable of the point. The westernmost Whale rock in one with the centre of the channel between Charles island and the north side of McKaye harbour leads through the middle of this narrow channel.

GRIFFIN BAY is an extensive indentation on the eastern side of San Juan, immediately within the southern entrance of Middle channel. Although so spacious, yet from the great depth of water there is but a limited portion of the bay available for anchorage, and this is in the southern angle, immediately off the remarkable prairie land between two forests of pine trees. Half-tide rock, just awash at high water, lies W. $\frac{1}{4}$ N., distant $1\frac{1}{2}$ miles from Harbour rock, and 4 cables' lengths from the western shore of the bay. There is another rock which only uncovers at or near low water, lying S.E. $\frac{1}{2}$ S. $4\frac{1}{2}$ cables from Half-tide rock, and N. $\frac{1}{2}$ W. a third of a mile from the pier on the beach.

With all westerly or southerly winds Griffin bay affords good shelter; but with those from North or N.E. it is considerably exposed, and landing difficult in consequence of the long flat which extends off the beach. These winds, however, are not of frequent occurrence.

In entering by the southern passage, Harbour rock on the western side, nearly a mile within Goose island, may be passed at a cable's length, keeping outside the kelp, which extends some distance off it; from a cable's length off Harbour rock to the anchorage is W.S.W., two-thirds of a mile. The best marks for the anchorage are the southernmost of the white cliffs on Lopez island on the eastern side of the channel, kept well open of Harbour rock, bearing E. by N. $\frac{1}{2}$ N. and the black rocky extreme

* See Views A. and B. on Chart No. 2,840.

of Low point just open northward of Half-tide rock, bearing W.N.W., the rock distant half a mile, in 9 fathoms, mud bottom; from this the water shoals rapidly, and $1\frac{1}{2}$ cables within there are 3 fathoms; indeed, a stranger should drop an anchor directly 12 fathoms is struck.

NORTH BAY, in the north-west angle of Griffin bay, immediately under Park hill, a bare grassy eminence about 180 feet high, affords good anchorage in 4 to 10 fathoms, with all winds but those from S.E., to which it is somewhat exposed. The bottom here is more regular than in Griffin bay, and altogether it is perhaps a snugger anchorage, though less convenient to shipping, being 3 miles from the settlement; with the eastern point of Dinner island bearing S.S.E., distant one-third of a mile, there are 9 fathoms.

TIDES.—The greatest rise and fall at the southern entrance of Middle channel on full and change is 12 feet; but little stream is felt at the anchorages. With the flood an eddy, of about one knot an hour, sets to the southward in Griffin bay, and with the ebb in the opposite direction.

TURN ISLAND and ROCK.—Turn island lies N.W. by N., nearly 5 miles from the south entrance of the Middle channel. Its eastern point, a clifty bluff, makes as the extreme of the peninsula which forms the north side of Griffin bay, Park hill rising immediately over its narrow neck. The island should be passed at a long half mile, particularly going northward with the flood; there is a channel for boats or small craft between it and the peninsula.

Turn rock lies nearly a quarter of a mile N.E. of the island, and covers at three-quarters flood. The tide runs with great strength over this rock, and vessels passing up or down the channel are recommended to give it a good berth.

FRIDAY HARBOUR is on the north side of the peninsula, immediately opposite to North bay; it is rather confined, but offers good anchorage and is easily accessible to steamers or small vessels. Brown island lies in the entrance, and there is a passage on either side of it; that to the eastward is narrow, less than a cable's length, but with a depth of 14 fathoms. Vessels entering by this passage will find anchorage in 7 fathoms in the bight immediately south of it, and distant a quarter of a mile. There is a clear channel through inside the island of more than a cable in breadth, and a depth of 6 or 7 fathoms.

The passage in, westward of Brown island, is the widest and best, being 3 cables across. In the centre of the entrance there is a rocky patch, with $3\frac{1}{2}$ fathoms at low water, which bears from the clifty point

of the island W.S.W., distant $1\frac{1}{2}$ cables. Vessels desiring to avoid it had better pass between it and Brown island; the latter is steep-to.

Anchor with the passage between the island and main open, and the west cliffy point of the former bearing N.E. in 9 fathoms.

REID ROCK.—After rounding Turn island, the Middle channel trends to the westward, and Reid rock lies right in the fairway, the least water on it is 12 feet, and it is surrounded by thick kelp, which, however, is sometimes run under by the tide. The rock bears from the north point of Turn island W.N.W. $1\frac{1}{10}$ miles, and from the north-west cliff point of Brown island N.N.E. $\frac{3}{4}$ E. three-quarters of a mile; there is a clear deep channel on either side of it. It is 4 cables from the nearest part of Shaw island, with a depth of 50 fathoms between; and this passage on the north side of the rock is recommended for vessels bound up or down Middle channel, because having to give the Turn rock a good berth it is the more direct one.

After passing Reid rock, there are no dangers which are not visible. From Caution point, a mile above the rock, on the western side, the channel gradually increases in breadth, and varies but little from a W.N.W. direction, the depth of water increasing to 60 and 70 fathoms.

On its eastern side are the group known as the Wasp islands, between and among which are several passages leading between Shaw and Orcas islands, and communicating with the magnificent harbours and sounds which deeply indent the southern coasts of the latter.

ROCKY BAY.—On the western side of Middle channel, 4 miles from Caution point, is Rocky bay, with the small island of O'Neal lying in the centre of it. There is a depth of 14 fathoms between the island and San Juan, but the bottom is rocky, and as the bay does not afford much shelter vessels are not recommended to use it unless in case of necessity. A reef of rocks, on which the sea generally breaks, extends $1\frac{1}{2}$ cables off the shore of San Juan, S.W. by S. from O'Neal island.

JONES ISLAND lies in the northern entrance of the channel, on the eastern side nearly half a mile from Orcas, being separated from the latter island by Spring passage. The island is generally wooded, but its western points are bare and grassy.

SPRING PASSAGE, between Jones island and the west side of Orcas, is a safe deep water channel, and saves some distance to a steamer passing up or down Middle channel, by the Douglas channel. It is a mile in length, 4 cables in breadth at its narrowest part, and the general depth in it is 15 fathoms.

Some rocky patches extend a cable off the south-eastern side of Jones island; and a rock which covers at 2 feet flood lies the same distance

north of a small cove on the north-east side of the island; so it is desirable to pass through in mid-channel; the western side of Orcas has, however, no dangers off it.

In passing up or down Middle channel, the north-east end of San Juan should be avoided, as the tides are strong, and a sailing vessel is apt to be drawn into the strong ripples and overfalls in the eastern entrance of Spieden channel.

FLATTOP ISLAND is in the northern entrance of Middle channel, N.W. by W. 2 miles from Jones island; it is a third of a mile in length, wooded, and about 100 feet high. Off its western side, distant 2 cables, is a rock nearly a cable in extent and 15 feet above high water. Between it and the island is a deep passage.

DOUGLAS CHANNEL may be said to be the continuation of Middle channel, and leads into Haro strait, between Orcas and Waldron islands. There are other passages leading into the Haro, viz., westward of Flattop island, between it and Spieden and Stuart islands; and eastward of Flattop, between it and Waldron island. In the former, the confused tides and eddies are liable to entangle a sailing vessel among Spieden and the neighbouring groups of small islands and rocks; in the latter, the White rock with its off-lying dangers offers serious impediments to the safe navigation of the same class of vessels.

Douglas channel commences to the southward between Jones and Flattop islands, runs in a N. by E. $\frac{1}{2}$ E. direction for $4\frac{1}{2}$ miles, and then turns N.N.W., crosses Haro strait, and at the distance of 6 miles enters the strait of Georgia, between East point of Saturna and Patos island, or between the latter and Sucia island. The least breadth of the channel between Waldron and Orcas is $1\frac{1}{2}$ miles; the depth varies from 90 to 108 fathoms, and both shores are free from danger. If necessary, vessels will find a stopping place in the bay southward of the Bill of Orcas in 12 fathoms.

The channel westward of Flattop island is less than a mile in breadth at its narrowest part. Flattop island has no dangers, nor the Flattop rock, 25 feet high, which lies off its north-west side. Green point of Spieden island is also steep-to; a tide rippling is generally met with off it. After passing Flattop island, the channel course is N.W. by N. until Skipjack island opens of Sandy point of Waldron island, when a course may be shaped either up or down Haro strait; with the ebb, be careful not to get set into the channel between Spieden and Stuart islands.

The channel eastward of Flattop island, between it and White rock, is about the same breadth as the one just described, but the Danger rock, with 5 feet on it, which lies a quarter of a mile S.E. by E. from the centre of White rock, must be carefully avoided.

After passing Flattop island, keep its eastern side just touching the western point of Jones island, and it will lead nearly three-quarters of a mile westward of Danger rock ; when Skipjack island opens out northward of Sandy point, all the dangers are cleared.

If passing between White rock and Disney point (the high stratified cliff of Waldron island), the latter should be kept well aboard if the ebb is running, or a stranger is liable to be set on the rock. The west bluff of Sucia should by no means be shut in by the southern part of Waldron ; these two points touching lead three-quarters of a mile eastward of Danger rock, but it must be remembered the ebb sets strongly down on it. When the White rock is in one with the high summit of Stuart island, or when Disney and Sandy points are nearly on with each other, a vessel may steer for the entrance of Plumper sound, giving Sandy point a berth of a quarter of a mile.

TIDES.—Sailing vessels working through Douglas channel should beware of getting too close over on the Waldron island shore, near Disney point, as with calm or light winds they would run the risk of being set by the ebb on to the Danger rock, on which the kelp is seldom seen. Both flood and ebb set fairly through Middle and Douglas channels, and run from 3 to 5 knots.

The ebb tide, coming down between East point and Patos island, strikes the north point of Waldron island, and one part of it, together with the stream between Patos and Sucia islands, passes down Douglas and Middle channels. The other part sweeps between the Skipjack islands and Waldron ; thence southerly through the groups in the neighbourhood of Stuart island into Haro strait, as well as down Middle channel. It should be observed that the ebb stream continues to run down through the whole of the passages in the Archipelago, for 2 hours after it is low water by the shore, and the water has begun to rise.

PATOS ISLAND lies $2\frac{3}{4}$ miles E.N.E. from East point of Saturna ; the passage between them being the widest, and at present most frequented, though not always the best channel from Haro or Middle channels into the strait of Georgia. Patos is $1\frac{1}{2}$ miles in an east and west direction, narrow, wedge shaped, sloping towards its western end, and covered with trees. Active cove at its western end is formed by a small islet connected at low water, and affords anchorage for one or two small vessels in 11 fathoms, but a strong tide ripple at the point renders it difficult for a sailing vessel to enter.

The passage into the strait of Georgia between Patos and Sucia islands, although considerably narrower than the one just mentioned is for several reasons at times to be preferred, especially for vessels passing through Middle channel, or for sailing vessels with a N.W. wind. The

tides are not so strong, more regular, and set more fairly through ; the passage is $1\frac{1}{4}$ miles wide, and is almost free from tide rippings.

DIRECTIONS.—If intending to take the passage between Patos and Sucia, either up or down, an excellent mark for clearing the Plumper and Clements reefs, which are dangerous patches lying southward and northward of Sucia, is to keep the remarkable round summit of Stuart island, 650 feet high, just open westward of Skipjack island, the westernmost wooded island north of Waldron ; this leads well clear of both the reefs, and the same course, N.E. $\frac{3}{4}$ N., continued would cross Alden bank in 5 fathoms.

If taking the passage from the Middle or Douglas channels, keep the white faced cliffs of Roberts point well open westward of Patos island, or keep the west end of Patos island on the starboard bow until the marks before described are on, when steer through the passage. If the ebb stream is running, it is better to keep the Patos island shore aboard ; 16 fathoms will be found on the Sucia shore, but it is not recommended to anchor unless positively necessary.

In standing to the north-eastward, when Clark island is open of the east end of Matia, or Puffin islet, a vessel will be eastward of Clements reef.

SUCIA ISLAND is of a horse-shoe shape, remarkably indented on its eastern side by bays and fissures, running in an east and west direction ; the largest of these, Sucia harbour, affords fair anchorage. The island is from 200 to 300 feet high, thickly covered with pines, and its western side a series of steep wooded bluffs. The dangers lying off it are Plumper and Clements reefs ; the former has 10 feet water on it, and lies S.W. by S. $1\frac{1}{4}$ miles from Lawson bluff, the highest north-west point of the island ; N.N.W. $2\frac{1}{2}$ miles from the Bill of Orcas, a remarkable bare knob point on the island of that name ; and S. by E. nearly 2 miles from the east point of Patos island. There is a deep passage between Plumper reef and Sucia, but it is not recommended.

Clements reef has 9 feet on it, and lies N.E. $\frac{1}{4}$ N. $1\frac{1}{2}$ miles from Lawson bluff ; N.W. $\frac{1}{2}$ W. one mile from Ewing island, the north-east point of Sucia ; and E. $\frac{1}{2}$ N., 2 miles from the east end of Patos. Some rocky patches covering at high water, and marked by kelp, lie between Clements reef and Ewing island, and it is not safe to pass between them. There is a deep channel of more than a mile in breadth between Sucia and Matia, the island to the eastward of it.

DIRECTIONS.—In entering Sucia harbour from the northward, run down with the west point of Clark island in one with Puffin islet, about S.E. by E., which leads between Alden bank and Clements reef ; when Ewing island bears S.W. by S., steer about South, giving the point of the

island a berth of at least 3 cables, to avoid some rocky patches which extend 2 cables S.E. of it. When the harbour is well open steer up the centre W. $\frac{1}{2}$ S. ; it is better to keep the southern or Wall island shore rather aboard, as it is quite steep, and there are some reefs extending a cable's length off the north shore. When the west point of Ewing is just shut in by the east point of Sucia bearing N.E. by N. anchor in the centre in 7 or 8 fathoms, mud bottom. If intending to make any stay it is desirable to moor, as the harbour is small for a large vessel ; it affords good shelter with all westerly winds ; with those from S.E. some swell sets in, but never sufficient to render the anchorage unsafe.

If entering from Douglas channel, keep Orcas bill just touching the south bluff of Waldron island, bearing S.W. by S. ; this leads well clear westward of Parker reef. The south-east points of Sucia may be passed at a cable's length ; they are a series of wall-shaped islands, with narrow deep passages between them ; steer in, keeping the northernmost of these islands aboard, to avoid the reefs on the north side of the harbour. For a steamer it is recommended to pass in between the north and middle Wall islands, as it gives more room to pick up a berth ; this passage, though less than a cable, has 12 and 15 fathoms, and the wall sides of the islands are steep.

If bound to Sucia harbour from Rosario strait, pass on either side of Barnes, Clark, and Matia islands as convenient ; if northward of the latter, as soon as the harbour is open, steer for it, keeping the southern side aboard as before directed, or passing between north and middle Wall islands ; if southward of Matia island, then do not stand so far to the westward as to shut in the north part of Sinclair island with Lawrence point, in order to avoid Parker reef.

PARKER REEF is a considerable patch lying in the passage between Sucia and Orcas islands, and at low water uncovers a quarter of a mile of rock and sand ; its eastern end always shows its rocky summit above water, and bears from Nob point or Orcas bill N.E. $\frac{1}{4}$ E. $2\frac{1}{2}$ miles, and from the east point of Sucia S. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles. There is a passage on either side of the reef ; that to the northward between it and Sucia is a mile wide, with a depth of from 35 to 55 fathoms ; that to the southward, between it and Orcas, is half a mile wide, with a depth of 6 and 8 fathoms, but a stranger is recommended not to use it, as the points of Orcas at this part run off shoal. If the northern passage is used, the north part of Skipjack island kept in one with the south extreme of Pender island, leads well clear of Parker reef. A part of the ebb stream setting down between Sucia and Matia islands, runs to the westward strongly over Parker reef, and through the channels on either side of it, and the flood in the contrary direction.

MATIA ISLAND, a little more than a mile eastward of Sucia, has no dangers off it; on its southern side are several boat coves. Immediately off its eastern extreme is Puffin islet, off which, a flat rock extends $1\frac{1}{2}$ cables.

SKIPJACK and PENGUIN ISLANDS lie immediately off the north side of Waldron island; the former is considerably the largest, and is wooded; the latter is small, grassy, and bare of trees. A reef which covers, and is marked by kelp, lies between the two; between this reef and Skipjack island there is a narrow passage of 8 fathoms, but as the tides set strongly between the islands it is not recommended, neither is the passage between them and Waldron island for the same reason, unless to those acquainted with the navigation.

LOPEZ ISLAND.—We now return to the islands and passages on the eastern side of Middle channel. Lopez is the southernmost of the islands, and helps to form the western side of Rosario strait, as it does the eastern of the Middle channel. It is long, 9 miles north and south, 3 miles east and west, and thickly wooded, but differs from all the other islands of the Archipelago in being much lower and almost flat, except at its northern and southern extremes, where elevations occur of a few hundred feet. Its southern side is a good deal indented by bays and creeks, which, however, from their exposed position and rocky nature, cannot be reckoned on as anchorages; on its western side, in Middle channel, is a creek terminating in an extensive lagoon, the former offering great facilities for beaching and repairing ships. On the north shore is Shoal bay affording anchorage; and on the east is the spacious and excellent sound of Lopez, which has an entrance from Middle channel, as well as three distinct passages from Rosario strait.

MCKAYE HARBOUR is on the south coast of Lopez island, 2 miles eastward of the entrance to Middle channel. It is entered between Jennis point on the south, and Long and Charles islands on the north; from the latter it runs easterly for a mile, and then trends to the southward for a short distance, terminating in a low sandy beach. In the entrance there are from 8 to 12 fathoms, muddy bottom, but with the prevailing south-westerly winds the anchorage is a good deal exposed. Coasters or small vessels drawing 12 feet may get shelter in the south bight; with northerly or easterly winds there would be fair anchorage; Jennis point should be passed at a convenient distance, about 3 cables; the anchorage is $1\frac{1}{2}$ miles from it.

With south-westerly winds the coast and islands on the eastern side of Middle channel entrance, between Whale rocks and Jennis point, should be avoided, as a considerable sea sets in at these times; and in passing

the coast between Jennis point and Cape Colville, it is desirable to keep a mile off shore, as some straggling rocks exist, which will be treated of under the head of Rosario strait.

SHARK REEF on the western side of Lopez island, immediately within Middle channel, and half a mile northward of White cliff, consists of two rocks generally awash, extending something more than a cable off shore, and which must be avoided by vessels working up the channel. There are no dangers on the coast of the island above this reef, but large vessels working up are not recommended, to approach nearer than a quarter of a mile.

GREEN CREEK, on the west side of Lopez island, is 4 miles within the entrance of Middle channel, and its entrance bears from Turn island E. $\frac{1}{2}$ N. 2 miles. The western entrance point is a low sandy spit, close round which there are 3 fathoms, and on it a vessel might be beached and repaired with much facility, and perfectly sheltered; the creek terminates in a large salt lagoon.

UPRIGHT CHANNEL, separating Lopez from Shaw islands, is a deep steep passage leading from the Middle channel to the sounds of Orcas and Lopez, and by several passages into Rosario strait. The narrowest part of the entrance is between Flat point and Canoe island; here for a short distance it is scarcely 2 cables in breadth; the depth from 20 to 28 fathoms. Flat point is a low shingle or sandy point, with grass and small bushes on it; it is steep-to, and may be passed at less than a cable's length. The shore of Canoe island is fringed by kelp, close outside of which a vessel may pass; a rock lies a cable South of its south point, marked by kelp. The tides are not considerable in the channel, seldom over 3 knots, and it is in all respects a safe passage.

Anchorage may be had in 6 or 7 fathoms in Indian cove, westward of Canoe island; the only precaution necessary is to avoid the kelp off the south point of the island; with Flat point in one with the south point of Canoe island, 6 fathoms will be found.

After passing Flat point, the channel opens out to three-quarters of a mile, in a N.N.E. direction, with a depth of from 20 to 30 fathoms. At $1\frac{3}{4}$ miles from Flat point on the south side of the channel is Upright hill, the steep cliffy north extreme of Lopez island; it is covered with timber, and from 200 to 300 feet high.

SHOAL BAY lies immediately eastward of Upright hill, and runs in a S.S.E. direction for a mile to its head, which is separated from False bay in Lopez sound, by a low neck a cable's length across. Although apparently a considerable sheet of water, the anchorage for large vessels is much limited by a shoal which extends from just within the point of Upright hill towards the eastern point of the bay, and more than half way across;

the shoal then runs up the bay to its head, leaving the greater half on the western side, with no more than from 2 to 3 fathoms at low water.

The best anchorage for large vessels is Upright point, the west point of the bay, in one with the east point of Shaw island, bearing W. $\frac{3}{4}$ N., and the east point of Shoal bay S.E. by E., in 8 fathoms; a cable inside this there are 4 fathoms; the holding ground is good. Vessels desiring to proceed up the bay after rounding Upright point, which may be passed close, must steer for the east point of the bay until within a cable's length of it, and then keep along the eastern cliffy shore at the same distance, when not less than 5 fathoms will be found until a quarter of a mile from the head, where there is anchorage in 4 fathoms; the space between the eastern side of the shoal and the eastern shore of the bay is nearly 2 cables.

LOPEZ SOUND, on the eastern side of the island of that name, runs in a S.S.E. direction for $7\frac{1}{2}$ miles, or nearly the whole length of the island, its head reaching within half a mile of the waters of Fuca strait. Its eastern side is formed partly by Lopez and partly by Decatur and Blakely islands, lying parallel with it; and between these islands, as well as northward of the latter, are passages leading into Rosario strait. The average breadth of the sound is nearly $1\frac{1}{2}$ miles, and there is a convenient depth of water for anchorage in almost every part of it.

The sound may be entered from the westward through Middle and Upright channels, and from the eastward by the Obstruction passage, or by Thatcher and Maury passages.

To enter from the westward, directions have been already given as far as Upright point, the western point of Shoal bay; from this point to the shore of Blakely island opposite, the breadth of the entrance is 2 miles. Until as far south as Frost island, which is nearly 2 miles within the entrance of the sound, the general depth of water is from 20 to 30 fathoms. Thatcher passage leading into Rosario strait, between Blakely and Decatur islands, now opens out, and in proceeding up the sound the depth soon decreases to 9 fathoms, varying between that and 5 fathoms for a distance of $2\frac{1}{2}$ miles, or as high as Houston island, the breadth being about $1\frac{1}{4}$ miles.

The only impediment between Frost and Houston islands is the Middle bank, on which, however, there are not less than 3 fathoms at low water. It is half a mile in extent north and south, 2 cables east and west, and lies almost in the centre of the sound, its north end bearing S.S.E. a quarter of a mile from the south end of Frost island, and S.W. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles from the north entrance point of Thatcher passage, or south point of Blakely island. Between Frost island and the bank there are from 9 to 14 fathoms, and between the south end of the bank and the

west shore of Decatur island there is a channel a third of a mile wide, with a depth from 6 to 20 fathoms; close off this part of Blakely island is a ledge of rocks always awash at high water. Between Middle bank and Houston island there is anchorage in any part of the sound in from 5 to 7 fathoms, mud bottom.

Just above Houston island, and abreast the Maury passage, which is between the south end of Decatur and the north-east point of Lopez, the water deepens to 13 and 15 fathoms, and this depth is carried for $1\frac{1}{2}$ miles, or as high as Crown islet, a small steep rocky islet on the eastern side, and within a mile of the head of the sound.

There is but little stream of tide felt in Lopez sound, unless in the immediate neighbourhood of the narrow passages from Rosario strait.

ENTRANCE SHOAL, with 2 fathoms on it, and marked by kelp, must be avoided by vessels working in; it lies E. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles from Upright point, and half a mile from the shore of Blakely island; there is deep water on either side of it.

FALSE BAY is on the west side of the sound, a mile from Shoal bay, their heads being only separated by a low narrow neck, a cable's length across, the cliffy extreme of the peninsula being Separation point. A shoal extending from the centre of False bay, and connecting with the small island of Arbutus, lying in its entrance, renders it unfit for anchorage except for small vessels; the least water on the shoal is 2 fathoms, but vessels may anchor in 8 fathoms southward of Arbutus, between it and Frost island.

HALF TIDE ROCK, covering at half flood, and not marked by kelp, is in the track of vessels entering. It lies S.E. by E. $\frac{1}{2}$ E. three-quarters of a mile from Separation point, and N.N.W. $\frac{1}{4}$ W. 4 cables from Arbutus island. It is better to pass eastward of it, and when not visible, by keeping the point of Upright hill just open of Separation point, until the clay cliff of Gravel spit is in one with the east point of Arbutus island, will lead clear of it. The end of the gravel spit in line with Arbutus island leads on to the rock.

FROST ISLAND lies close off Gravel spit on the west side of the sound; it is wooded, and its western side a steep cliff, between which and the spit end there is a narrow channel of 5 fathoms.

BLACK and CROWN ISLETS.—The Black islets are a ridge of steep rocky islets, lying within and across the entrance of Maury passage; at 2 cables S. by W. from the southernmost of these islets is a rock which covers at quarter flood. There is a passage of 8 and 9 fathoms on either side of Crown islet, and anchorage above it in 5 or 6 fathoms, but vessels should not proceed far above, as at the distance of a third of a mile it

shoals to one and 2 fathoms, and dries for a considerable distance from the head of the sound; there is also good anchorage in 5 fathoms in the bight, westward of Crown islet.

In passing up the sound between Crown islet and the western shore a rocky patch of 2 fathoms must be avoided; it lies W. by N. $\frac{1}{4}$ N. a quarter of a mile from Crown islet, and 4 cables from the western shore of the sound; there are 12 fathoms close to it, and deep water in the passage on either side of it.

THATCHER PASSAGE, between Blakely and Decatur islands, is the widest and most convenient passage into Lopez sound from Rosario strait; it is $1\frac{1}{2}$ miles in length, and its narrowest part 4 cables wide, with a general depth of from 20 to 25 fathoms.

Lawson Rock, lying almost in the centre of the eastern entrance, is the only danger, and covers at 2 feet flood. From it Fauntleroy point, the south-eastern entrance point, in one with Round head, half a mile to the southward, bears S.E. by S. 4 cables; and the White rock, N. by E. $\frac{1}{2}$ E., a little more than half a mile. There is a good passage on either side of the rock, that to the southward is the best.

DIRECTIONS.—Entering Thatcher passage from the southward, if the flood is running, the south shore should be kept pretty close aboard, as until well within the passage it sets up towards Lawson rock.

When the passage between Decatur and James islands is shut in by Fauntleroy point, a vessel will be just westward or inside the rock.*

Vessels entering by Thatcher passage, and drawing over 18 feet should avoid the Middle bank by keeping the south shore aboard within 2 cables; White rock in one with the south point of Blakely island leads over the tail of the shoal in 20 feet.

The flood tide sets from the Rosario strait through Thatcher passage and runs both up and down the sound; a slight stream or flood also enters the sound from the northward.

MAURY PASSAGE, between Decatur island and the north-east point of Lopez, is the southernmost entrance to the sound from Rosario strait. It is scarcely 2 cables wide at the entrance, with a depth of 12 fathoms; the Black islets lie across the western entrance, and it is necessary to keep to the southward, between them and Lopez.

OBSTRUCTION PASSAGES.—Obstruction island lies in the centre of the channel, between the north point of Blakely and the south-east point of Orcas island, and forms a safe and convenient communication on either side of it, between the Middle channel and Rosario strait by Upright

* A small iron beacon placed on this rock would render the passage quite safe for any class of vessel.

channel ; they likewise lead from Rosario strait to the sounds of Orcas and Lopez. The passes are more adapted to steam than sailing navigation, although there would be no difficulty to a sailing vessel with a leading wind and fair tides. Small vessels would never find any difficulty by studying the tides.

North Obstruction pass is about $1\frac{1}{4}$ miles long, and its average breadth 2 cables. Entering from the eastward the direction is first West for two-thirds of a mile, then S.S.W. for nearly the same distance, the narrowest part occurring just after making the bend, and being something less than 2 cables ; the general depth of water is from 8 to 14 fathoms, and there are no dangers which are not visible. In consequence of the bend in this channel it has more the appearance of a deep bay, when seen from either entrance. The east end of Obstruction island should not be approached nearer than a cable, as some shelving rocks extend a short distance off it ; the best course for a steamer is to keep in mid-channel. The eastern entrance bears from Cypress cone, a remarkable bare peak on the north end of Cypress island, W.S.W.

South Obstruction pass, though narrower than the North, is perhaps the better channel of the two ; it is not above three-quarters of a mile in length, and is perfectly straight ; its direction N.E. and S.W. In its narrowest part it is not much over a cable wide ; the depth of water much the same as in the northern pass. On the south side of the eastern entrance two rocks extend off Blakely island, the inner one always above high water ; the outer, a long black rock, is nearly a quarter of a mile off shore, and just awash at high water.

Entering from Rosario strait the pass should be brought well open bearing S.W. before approaching it nearer than half a mile ; in like manner when passing into Rosario strait, if the black rock is not seen, the N.E. course should be maintained until that distance from the eastern entrance. When the west point of Burrows island opens out eastward of the east point of Blakely island, a vessel will be half a mile eastward of any dangers. The south side of the pass makes like a round wooded island, in consequence of the land falling abruptly behind it, where there are two lagoons.

TIDES.—The flood tide in both passes runs to the westward from Rosario strait, and the ebb to the eastward ; the latter runs for nearly two hours after it is low water by the shore ; the strength varies from 2 to 5 knots.

SHAW ISLAND is much of the same character as Lopez, though considerably smaller, being about 3 miles in extent, measured in any direction. It is the continuation of the eastern side of the Middle channel, and be-

tween it and Orcas island lie the Wasp group, among which are several passages leading to the harbours of Orcas and Lopez, and into Rosario strait.

WASP ISLANDS and PASSAGES.—The Wasp islands, five in number, besides some smaller islets and rocks, lie on the eastern side of Middle channel, between Shaw and Orcas islands. Yellow island, the westernmost of the group, is rather remarkable from its colour, grassy and nearly bare of trees, the remainder of the group being wooded; from its west end a sandy spit extends for a cable's length, with a rock on the extreme, bare at low water, and round which kelp grows; therefore, this point should be given a berth in passing up or down Middle channel. Northward of Yellow island are Brown and Reef islands; off the west side of the latter a reef extends for more than a cable's length. Wasp passage leads through this group to the sound of Orcas and to Rosario strait. With the assistance of the chart a steamer would find but little difficulty in passing through it, though the passage by Upright channel is to be preferred.

In passing between Brown and Reef islands, where the channel is nearly a quarter of a mile wide, with 9 fathoms, Bird rock awash at high water may be kept on either hand; the widest passage is to the eastward of it, between it and Crane island, where the channel is a quarter of a mile across, with 15 fathoms. Crane island is wooded, and much larger than either of the Wasp group. The passage northward of it is so narrow that it appears joined to Orcas. After passing Bird rock steer to the southward of Crane island, between it and Cliff island, the south-easternmost of the Wasps, thence between Crane island and the north end of Shaw island.

For two-thirds of a mile the channel is of a good breadth, with no dangers until approaching the east end of Crane island, when it narrows to little more than a cable. The steep cliffy shore of Shaw island must now be kept aboard to avoid the Passage rock, which lies $1\frac{1}{2}$ cables eastward of Passage island. The marks to run through this passage are, Nob islet, just touching the north end of Cliff island, and just open southward of the south side of Crane island; these marks are very plain, and lead a cable's length south of Passage rock, which only shows at low water. Nob islet is a remarkable round islet, 50 feet high, with two or three bushes on its summit; it lies just westward of Cliff island.

When Orcas nob is just over the narrow passage between Double islands and the west shore of West sound, bearing N.W. by N., a vessel is eastward of Passage rock, and may steer up West sound, or eastward for East sound, or Rosario strait. Passing out of West sound the same marks are equally good; steer down just westward of Broken point (a remarkable cliffy peninsula on the north side of Shaw island) until they are on

when steer for them, giving the south side of Crane island a moderate berth, and passing out of Wasp channel, as before directed.

If desired, a vessel may pass into Wasp channel to the southward of Yellow island, between it and Low island, a small islet, thence northward of Nob islet, and as before directed, between Crane and Cliff islands.

There is yet another passage into Wasp channel southward of Cliff island, between it and Neck point, the remarkable western extreme of Shaw island. The breadth between them is something over a cable, the depth 6 fathoms ; but there is a patch of 4 fathoms, with kelp on it. If taking this channel there is a reef lying S.W. $\frac{1}{2}$ S., and extending more than a quarter of a mile from the south-west end of Cliff island ; this reef is sometimes covered, and is the only danger known not visible.

These two latter passages are the shortest into the Wasp channel for vessels from the southward. The eye will be found the best guide ; a good look-out is necessary, and to a steamer there is no difficulty. The flood-tide sets to the west in the eastern entrance of Wasp channel, but in the western entrance the flood from the Middle channel partially sets to the eastward, and causes some rippings among the islands, which may be mistaken for shoal water. To the northward of Crane island, between it and Orcas, there is a narrow channel, but though deep it is only fit for boats.

NORTH PASSAGE.—This clear deep channel leading to Deer harbour, the westernmost port in Orcas island, lies between Steep point, the south-west point of Orcas, and Reef island, the northernmost of the Wasp group. It is nearly a quarter of a mile wide and 20 fathoms deep, and the only danger to avoid on it is the reef off the west side of the latter island. To enter, pass half a mile or a convenient distance along the south side of Jones island, and keep Steep point and the shore of Orcas aboard within $1\frac{1}{2}$ cables, until the east point of Yellow island and west point of Brown island are in one. Deer harbour may be entered equally well between Reef and Brown islands ; a patch of 2 fathoms lies S.W. by W. nearly a cable from the north-west point of the latter.

ORCAS ISLAND is the most extensive of the group known as the Haro archipelago, and contains the finest harbours. It is mountainous and in most parts thickly wooded, although in the valleys there is a considerable portion of land available for agricultural purposes, and partially clear of timber. Its southern side is singularly indented by deep sounds, which in some places almost divide the island ; this is particularly the case in the East sound, separated only from the waters of the strait of Georgia by a low neck of land a mile across. On the eastern side of this sound, Mount Constitution rises to an elevation of nearly 2,500 feet wooded to its summit ; on the west side is the Turtle Back, a long wooded

range 1,600 feet, and west of it, again rising immediately over the sea, that singular bare top cone known as Orcas nob, a remarkable object when seen either from the north or south.

The ports of Orcas are Deer harbour, West and East sounds; but on the western and northern sides of Orcas there is no convenient anchorage. A vessel might drop an anchor if necessary southward of the Bill of Orcas, a remarkable projecting bare point, with a nob on its extreme; 12 fathoms will be found within a cable's length of the shore; a small vessel might anchor in $4\frac{1}{2}$ fathoms, just within a small islet in the bay two-thirds of a mile southward of the bill.

The north coast is steep and precipitous, except between the Bill and Thompson point, a distance of $2\frac{1}{2}$ miles; here occurs the low land at the head of East sound, and the points are shelving with large boulder stones extending some distance off; immediately off this part of the coast is Parker reef, described in page 78.

From Thompson point, a bare cliffy point, the coast forms a slight curve easterly to Lawrence point, distant 6 miles.

Lawrence point, the sloping termination of the high range of Mount Constitution, is the eastern extreme of Orcas island; on its northern side it is a steep and almost perpendicular cliff, and from it the coast turns abruptly to the southward, forming the western side of the strait of Rosario; at the distance of 4 miles from the point is the entrance to North Obstruction pass.

DEER HARBOUR is the westernmost of the three ports of Orcas, and as before observed is conveniently entered from the Middle channel by North passage between Steep point of Orcas and Reef island, or between the latter and Brown island of the Wasp group. The harbour is a mile long in a north and south direction, and about the same breadth at its southern end; it narrows, however, rapidly, and terminates in a shoal creek, and fresh water streams fed from a lake. Fawn islet lies off the steep cliffy shore of the west side of the harbour; below it the depth of water varies from 10 to 15 fathoms, abreast and above it from 5 to 8 fathoms; the bottom is mud.

A convenient berth is in 7 fathoms, half way between Fawn islet and the eastern shore, or vessels may go a quarter of a mile above the islet, where 5 fathoms will be found and a snug anchorage. Between Fawn islet and the western shore is a passage a cable wide with 9 fathoms. There are no dangers to be avoided in this harbour, except a reef of rocks extending from the north side of Crane island; the west end of the island in one with the west end of Cliff island of the Wasp group bearing S. by W. $\frac{1}{2}$ W. leads on to the western edge of this reef, on which there is only one fathom. If working up the harbour, a vessel should not

stand so far to the eastward as to shut in the east end of Cliff island by the west end of Crane island, which will be more than a cable clear of the reef.

WEST SOUND may be entered from Middle channel, either by the Wasp or Upright passages already described, or from Rosario strait by either of the Obstruction passes. Having entered by the Wasp passage, cleared the Passage rock, and being off Broken point—a remarkable cliffy point—the extreme of a small peninsula on the north side of Shaw island, West sound will be open, extending in a N.W. $\frac{1}{2}$ N. direction for more than 2 miles, with Orcas nob immediately over the head of it. The breadth of the sound is about three-quarters of a mile, and the depth of water from 10 to 16 fathoms, with no hidden dangers; therefore convenient anchorage may be had in any part above Double islands, which lie close off its western shore, half a mile N.W. of Broken point, but the snugest anchorage, and the best for vessels intending to make any stay, is either in White beach bay, on the eastern shore, or in Massacre bay at the north-west head of the sound.

WHITE BEACH BAY, so named from the quantities of white clam shells, the remains of native feasts, lying on its shores, and giving them the appearance of white sandy beaches, is on the eastern side of the sound, 2 miles above Broken point; a small islet, Sheep islet, lies in the middle of the bay, nearly connected with the shore at low water. There is good anchorage in 9 fathoms with the islet bearing N.E. $\frac{1}{2}$ N., and Haida point, the northern point of the bay, N.W. by W., distant a quarter of a mile.

MASSACRE BAY is the continuation of the head of the sound, between Haida and Indian points, and the anchorage is nearly a mile above White beach bay. Harbour rock covering at one-third flood, lies almost in the centre of the bay, between the two entrance points; it bears from Haida point W. $\frac{3}{4}$ S. a third of a mile, and from Indian point on the opposite side N.E. $\frac{1}{2}$ E., nearly three cables, and may be passed on either side in 9 fathoms. If to the eastward, Haida point should be kept aboard within $1\frac{1}{2}$ cables; if to the westward, the eastern cliffy part of Broken point, and the eastern side of Double islands kept in one astern, leads nearly a cable clear westward of the rock; when Indian point bears South, good anchorage will be found in the centre of the bay in 8 fathoms, mud bottom.

HARNEY CHANNEL, between Orcas and Shaw islands, connects the West and East sounds of Orcas. It commences at Broken point, and runs in an easterly direction for 3 miles, when it enters Upright channel between Foster and Hankin points; the former is a low sloping green

point, the southern termination of the peninsula which separates the two sounds; the latter is the eastern bluff wooded point of Shaw island. The depth of water in this channel varies from 20 to 30 fathoms, and its average breadth is half a mile, though it narrows for a short distance about its centre to a quarter of a mile.

The north side of Harney channel is a series of small bays with shingle beaches, and there is a deep cove two-thirds of a mile west of Foster point; just westward of this cove, and N.W. from Hankin point, is a rocky patch which lies more than a cable off shore, and covers at half flood.

Camp cove is immediately northward of Foster point; it is a convenient cove for boats, or a small vessel might anchor there in 6 fathoms; there is a good stream of fresh water running into it.

High Water rock lies more than a cable's length from the shore, and half a mile north-eastward from Foster point; it is awash at high water, and there is a depth of 8 fathoms between it and the shore.

BLIND BAY is on the south shore, midway between Broken and Hankin points. A small round islet partially wooded lies in the centre of the entrance, and a reef of rocks covering at high water extends from its western point, almost choking the entrance on that side, but leaving a narrow passage close to the islet; a rock covering at a quarter flood also lies off the eastern side of the islet, leaving a channel of 5 fathoms almost equally narrow on that side, so that the bay is only eligible for coasters, which should keep the island close aboard in entering; the eastern side is the best. Anchorage in 4 or 5 fathoms may be had with the islet bearing N.N.W., distant 2 cables.

EAST SOUND.—Entering this sound by Upright channel, or through the Wasp passages and Harney channel, when abreast Upright hill from which Diamond point, the western point of the sound, bears North 2 miles, its entrance will be easily made out. If by the Obstruction passes, as soon as a vessel is at their western entrance, the whole length of the sound will be open bearing N.W. $\frac{1}{2}$ W.; a remarkable conical hill over 1,000 feet high, rises on either side of the entrance, which lies between Diamond and Stockade points. From between these points the sound runs in a N.W. by W. direction for 6 miles; for the first 2 miles the breadth is three-quarters of a mile, it then contracts at Cascade bay to half a mile, and opens out again above to more than a mile; the head of the sound terminates in two bays, a jutting cliffy point separating the two. The general depth of water in the sound is 15 fathoms.

STOCKADE BAY, on the eastern side of the sound entrance, nearly a mile North of Stockade point, the north-western entrance point of North Obstruction pass, affords anchorage in 8 fathoms, about 3 cables from the

shore ; there is a good stream of fresh water running into the bay ; with a strong S.W. wind some swell would set into this anchorage.

GREEN BANK, on the western side, immediately opposite Stockade bay, is a bank of sand extending half way across the sound ; on it there are from 5 to 9 fathoms, with one patch of 4 fathoms, and a vessel might anchor on it if necessary, as being more convenient than the deep water immediately off it. The best anchorage is in 6 fathoms at half a mile North of Diamond point, with a small green islet, which lies just off a white shell beach, bearing West, distant about 4 cables' lengths.

WATER.—On the eastern side of the sound, 2 miles above Stockade bay, is a small hook facing the S.E. forming Cascade bay. Anchorage may be had $1\frac{1}{2}$ cables from the beach in 10 fathoms ; but it would not be a desirable place to lay with a south-easterly wind. A large stream falls by a cascade into the bay and it would be a convenient place to water a ship.

FISHING and SHIP BAYS.—Fishing bay, the westernmost of the two bays at the head of the sound, has good anchorage in 10 fathoms, with Arbutus point, the cliffy extreme of the jutting peninsula before mentioned, bearing N.E., midway between it and the west side of the sound.

Ship bay, eastward of Arbutus point, runs off shoal for 2 cables, or nearly to the extreme of the point ; but it affords good shelter, perhaps better than the one just described. Arbutus point should be brought to bear W. by N., and at the distance of 3 cables there is good anchorage in 9 fathoms, mud bottom.

CHAPTER IV.

ROSARIO STRAIT.—BRITISH COLUMBIA ; AND SOUTH SHORE OF STRAIT OF GEORGIA.

VARIATION $21^{\circ} 50'$ to $22^{\circ} 15'$ East, in 1864.

ROSARIO STRAIT is the easternmost and one of the principal channels leading from the strait of Fuca into that of Georgia. Its southern entrance lies between Lopez and Fidalgo islands, and from thence its general direction is from N.N.W. to N.W. for 25 miles, when it enters the latter strait. Its western shores are formed by Lopez, Decatur, Blakely, and Orcas islands ; its eastern by Fidalgo, Cypress, Sinclair, and Lummi islands, as well as by the coast of the main land.

Like Haro strait, the Rosario has several smaller channels which branch off to the eastward, and lead between islands to the United States settlements in Bellingham bay, or by a more circuitous route into the strait of Georgia itself ; among the principal of these channels, are Guemes, Bellingham, and Lummi. The greatest breadth of the strait, which is at its southern entrance, is 5 miles ; the narrowest, which is about the centre between Blakely and Cypress islands, is something less than $1\frac{1}{2}$ miles ; the depth varies from 25 to 45 fathoms, occasionally deeper.

The tides are strong, from 3 to 7 knots in the narrower parts. The principal dangers are the Bird and Belle rocks, which lie almost in the centre of the strait, 4 miles within the southern entrance. There are several anchorages available for vessels delayed by the tides or other causes ; Davis bay on the eastern side of Lopez island, 3 miles within the southern entrance ; Burrows bay, immediately opposite it under Mount Erie on the west side of Fidalgo island ; Ship bay in Guemes channel ; and Strawberry bay, on the western side of Cypress island, are the principal ones. Vessels entering Fuca strait, and bound to any of the ports of Puget sound, or up Rosario strait, either by day or night, should make New Dungeness, which is 69 miles from the light at Cape Flattery, and has near its extreme point a *fixed* white light (page 12), and then Smith or Blunt island.

SMITH or BLUNT ISLAND lies almost in the centre of the eastern end of Fuca strait, N.N.E. $\frac{1}{2}$ E. 12 miles from New Dungeness, and 6 miles S. by W. $\frac{1}{2}$ W. from the entrance of Rosario strait. It is about half a mile in length, clifty at its western end, and 50 feet high ; a large

kelp patch extends for nearly a mile and a half from the western extreme, which should be avoided ; there are 6 fathoms at its outer edge. From the eastern end of the island, which is low, a sand spit extends in a north-easterly direction for three-quarters of a mile, partially covered at high water ; on the north side of this spit there is anchorage in 5 fathoms, sandy bottom, something less than half a mile from the shore, and in a direct line between the high water end of the spit and the extreme of the kelp off the west end of the island ; but no vessel should lie here with any appearance of bad weather. The ebb tide here, as in the narrower straits, runs from 2 to $2\frac{1}{2}$ hours after low water.

LIGHT.—On the summit of Smith or Blunt island, near the west end, is a lighthouse painted white, with a red lantern, which shows at an elevation of 90 feet above the sea a white light, which *revolves* every *half minute*, and is visible at 15 miles.

DIRECTIONS.—Having made Smith island, which vessels bound from sea up Rosario channel should do on about a N.E. $\frac{1}{2}$ E. bearing, it may be passed on either side ; to the northward appears most convenient. When Dungeness light bears S. by W. keep it so, steering N. by E., which leads midway between Smith island and an extensive kelp patch lying W. $\frac{1}{2}$ S. $8\frac{1}{4}$ miles from it, on which the least water yet found is $3\frac{1}{2}$ fathoms ; by day this patch will be always seen in time to avoid it.

When the light on Smith island bears E. by S. a vessel will be to the northward of the patch, and a course may be steered for the entrance of the strait, which, however, should not be entered at night, until there is a light on Bird or Belle rocks, unless by those perfectly acquainted with the navigation, and the state of the tide. If passing to the southward of Smith island, remember that there are two kelp patches nearly 3 miles S.S.E. from the light, and 4 miles W. by N. from Partridge point, a remarkable white-faced cliff on the main ; the least water that has been found among these patches is 5 fathoms, but they should always be avoided.

Vessels from the southern parts of Vancouver island, bound up Rosario strait, should of course pass northward of Smith island. The only dangers to be avoided are the Salmon bank, with 10 feet of water over it, off the south end of San Juan, and the Davidson rock off Colville island. Mount Erie in Fidalgo, kept on with Cape Colville, will clear the former by 2 miles, and it is not recommended to pass the southern side of Lopez island within a less distance than a mile, which will ensure clearing the latter ; moreover, the coast is rocky, and the flood tide sets on to it. There are several indentations, with sandy beaches, on the south side of Lopez, which, although offering shelter for boats, are not recommended as anchorages for vessels.

CAPE COLVILLE, the south-eastern extreme of Lopez island, is the western entrance point of Rosario strait; Walmouth hill, flat topped, and about 500 feet high, rises immediately over it. Colville island, small, and bare of trees, about 40 feet high, lies southward of the cape, distant half a mile; within the island, and so close to the cape as to appear from most points of view a part of it, is Castle island, a high precipitous rock. Entering the strait, Colville island should be given a berth of a mile.

DAVIDSON ROCK, with 2 feet on it at low water, and occasionally uncovering at low springs, lies East a little more than 3 cables from the east end of Colville island, and South nearly a mile from the cape itself; kelp grows about the rock, but the patch is so small that it is difficult to make out. Kellett island, or Cape St. Mary, kept open of the extreme of Cape Colville, leads to the eastward of the rock, and Eagle point of San Juan kept open of the south end of Lopez leads a mile southward of it.

Kellett island is a small flat-topped islet, covered with grass, and lying immediately northward, and close off the low extreme of Cape Colville.

HULAH ROCKS.—Cape St. Mary, the next point northward of Cape Colville, and a little more than a mile from it, forms the southern point of Davis bay.

Hulah rocks, or Kellett ledge, with one fathom water on them, and marked by kelp, lie 3 cables N.E. by N. of Cape St. Mary; there is a deep passage between them and the cape. Vessels passing outside them should give the cape a berth of a long half mile.

ANCHORAGE.—Davis bay affords good and convenient anchorage in a moderate depth of water. After rounding the Hulah rocks, a vessel may stand to the westward into the bay, and anchor in 6 fathoms mud, little more than half a mile from the shore, with Cape St. Mary bearing S.E. by S.; inside this the water shoals rather suddenly to $2\frac{1}{2}$ and 3 fathoms. A kelp patch, on which there is shoal water, lies N. by W. a mile from the cape. There is anchorage in from 4 to 8 fathoms anywhere within a mile of the east shore of Lopez and Decatur islands, from a little northward of cape St. Mary, as high as the white cliff of Decatur island, avoiding the kelp patches just mentioned, or while the Bird rock bears anything to the northward of East, and but little tide will be felt. With the Maury passage open, bearing West, there is good anchorage, from half a mile to a mile from the shore, in from 6 to 8 fathoms.

BURROWS BAY, on the eastern side of the entrance to Rosario strait, is well marked by Mount Erie, a remarkable conical hill, rising 1,250 feet immediately over it, a mile from the coast. The bay is sheltered

from westerly and south-westerly winds by Burrows and Allan islands, and affords good anchorage to vessels wind or tide bound.

Williamson rock, 22 feet above high water, lies in the southern entrance of the bay, half a mile south of Allan island. The best entrance, which is a mile in breadth, is to the southward of this rock, between it and Fidalgo island. On the eastern side of Allan island the water is deep for half a mile off shore, having 18 to 25 fathoms. The eastern shore of the bay is shoal for 3 cables off the beach, and in one spot a boulder, awash at low water, lies nearly 4 cables off, and E. by N. $\frac{1}{2}$ N. nearly $1\frac{1}{2}$ miles from the south point of Allan island.

Anchorage may be had in 6 fathoms, with the passage between Burrows and Allan islands open, bearing W.S.W. half a mile from Young island; but the most sheltered anchorage is in 12 fathoms at the north head of the bay, with the passage shut in, and Young island bearing S. by W. $\frac{1}{2}$ W., half a mile from the eastern shore of Burrows island; if, however, only a temporary anchorage is desired, the former will be found the most convenient.

Vessels from the northward may enter Burrows bay by the passage northward of Burrows island, or between the latter and Allan island; they are about an equal breadth, something over 2 cables at their narrowest part, free from danger, and lie nearly east and west; in the northern passage from 10 to 20 fathoms will be found; in the southern, between the islands, from 20 to 30 fathoms, the latter is the straightest. The ebb tide runs to the eastward into both passages, and during springs, from 3 to 4 knots.

DENNIS ROCK.—There is a deep channel half a mile in breadth, between Williamson rock and Allan island, but vessels taking it, or working up westward of the latter island, must avoid the Dennis rock, which has 2 feet on it at low water and rarely uncovers. It lies N.W. by W. nearly 6 cables from Williamson rock, and W.S.W. the same distance from the south end of Allan island.

DECEPTION PASS.—At 2 miles southward of the south entrance to Burrows bay is a narrow channel separating Fidalgo from Whidbey island, and communicating with the waters of Puget sound and Admiralty inlet; but it is only eligible for such small vessels or steamers as are well acquainted with the locality. The tides run through it with great velocity.

BIRD ROCK, lying almost in the centre of Rosario strait, is composed of three detached rocks close together, the southernmost being the largest, and 20 feet above high water; from Cape Colville it bears N. $\frac{1}{4}$ E. nearly 4 miles, and from the south end of James island, S.E. by S. $1\frac{1}{2}$ miles. There is deep water close to it, but on account of the strength of the tides, sailing

vessels working up or down, particularly during light winds, are recommended to give it a berth of half a mile. There is an equally good passage on either side of the rock; that to the eastward is the widest, being nearly 2 miles across; to the westward it is a mile, with somewhat less tide. By taking the latter channel with a leading wind, a stranger will more easily avoid the Belle rock; passing Bird rock at a convenient distance, steer just outside, or to the eastward of James island, until the passage between Guemes and Fidalgo islands is open.

BELLE ROCK is the most serious danger in the Rosario strait, because it only uncovers near low water, and the tides run over it from 2 to 5 knots. It lies N. by E. $\frac{3}{4}$ E. distant 6 cables from the Bird rock, and the passage between the two rocks carries from 8 to 20 fathoms, but vessels are recommended not to take it except in cases of necessity, on account of the tides. The Belle rock is easily avoided by day; if passing to the eastward of it, keep Lawrence point, the eastern point of Orcas island, *just* shut in by the western extreme of Cypress island, which will lead more than half a mile clear of it; when the passage between Guemes and Fidalgo islands is just open, a vessel will be more than a mile to the northward of it.

If taking the channel westward of Bird rock, keep that rock well eastward of Cape Colville until the Guemes channel is open. The great danger of the Belle rock to a sailing vessel is being left with a light wind in the centre of the strait, as the water is too deep with much prospect of an anchor holding in so strong a tideway.

JAMES ISLAND, almost divided in the centre, is a remarkable saddle island with two summits, lying close off the east side of Decatur island; there are no dangers on its off or eastern side.

WHITE and BLACK ROCKS are three-quarters of a mile apart, and lie off the south-east shore of Blakely island. White rock, the southernmost, is 6 or 8 feet above high water and a little more than a quarter of a mile from the shore at the eastern entrance of Thatcher passage (page 83). Black rock, just awash at high springs, lies N.E. by N. from White rock, and half a mile from Blakely island; there is a deep channel between these rocks, as also between them and Blakely island.

CYPRESS ISLAND, northward of Fidalgo, forms a portion of the eastern side of the strait. It is 4 miles long, by about 2 in breadth, and its high summits, rising to nearly 2,000 feet, are thickly wooded with pine and white cedar; on its northern extreme, a remarkable bare, rocky cone rises immediately over the sea to 720 feet. A reef of boulder stones, some of which uncover, with kelp growing about them, extends half a mile off the south-west point of the island. Between Cypress and Blakely

islands is the narrowest part of Rosario strait, being $1\frac{1}{2}$ miles across, and here the tides during springs occasionally run between 6 and 7 knots.

STRAWBERRY BAY, on the western side of Cypress island, will be known by the small island of the same name, which lies immediately off it, $1\frac{1}{2}$ miles N.W. from Reef point, the south-west extreme, and protects the bay from the westward; it is rather a confined anchorage, and at certain times of tide would be difficult of entrance to a sailing vessel. About 3 cables from the sandy bight of the bay, with the north bluff of Strawberry island bearing W.N.W., and the south point of this island S.W. by S., is the best berth; here 7 fathoms will be found with good holding ground, and nearly out of the tide, which runs with considerable strength inside Strawberry island.

A sailing vessel should not attempt to enter the bay during the strength of the tide, unless with a commanding breeze, and should remember that the tides set with great strength against the points of Strawberry island; it was remarked that, while the ebb was running strongly in Rosario strait, which it continues to do for $2\frac{1}{2}$ hours after low water, a stream of flood made north through Strawberry bay, as soon as it was low water by the shore.

The bay is exposed to S.S.E. winds, which, however, do not frequently blow; from S.E. it is sheltered, and there is no reason to doubt but that, with good ground tackle, a vessel would ride out any gale. There is a passage of 10 fathoms water out to the northward between Strawberry and Cypress islands; and in the event of parting or slipping, a vessel should run through this passage, and take shelter in Birch or Semiahmoo bays, page 99.

There is a belt of flat marsh-land in Strawberry bay, through which several streams of good water run from the mountains.

ROCK ISLET is a small round islet covered with trees, lying nearly 2 cables northward of the north end of Cypress island, and its shores strewn with large boulder stones. There is a passage of 9 fathoms between it and Cypress island; but the ebb tide runs with great strength to the southward, and, indeed, close round the western points of the latter island.

CYPRESS REEF, lying W. $\frac{1}{2}$ S. from Rock islet, is a dangerous rocky patch with kelp growing about it, covering at half flood. While James island is kept open of the west point of Cypress island, a vessel will be clear to the westward of the reef; and when Rock islet bears E.S.E., or either of the Cone islands are open of it, she will be clear to the northward.

SINCLAIR ISLAND, thickly wooded, and comparatively low, lies to the north-eastward of Cypress island, with a deep passage, of nearly a

mile in breadth, between them, leading to Bellingham channel. Shelving rocks project a short distance off its western shores; and an extensive and dangerous shoal, the Panama reef, extends nearly half a mile in a W.N.W. direction off its north-west extreme, some parts of it uncovering at half-tide; a large boulder stands on the inner part of the reef. Great quantities of kelp grow in the neighbourhood, but it is sometimes run under by the tide or concealed by the ripple; there are 6 fathoms close to the end of the kelp. By keeping Cypress cone open to the westward of Rock islet, or the strait between Cypress and Blakely islands well open, a vessel will clear it in passing up and down; and Vendovia island open of the north end of Sinclair island, leads clear to the northward of it.

The PEAPODS are two small rocky islets, bare of trees, lying half a mile from the western shore of Rosario strait, and $1\frac{1}{2}$ miles southward of Lawrence point. They are three-quarters of a mile apart in a N.N.E. and S.S.W. direction, the northernmost being the largest and highest. A little to the westward of a line drawn between them is a third rock which just covers at high water. There are no dangers about them which are not visible, and there is a passage 20 fathoms deep between them and Orcas island.

The eastern side of Orcas island, between the Peapod islets and Obstruction pass, falls back in a bight, where there is considerably less tide than in the main stream of the strait, and if necessary a vessel may drop her anchor within half a mile of the shore in about 16 fathoms.

Lawrence point, the eastern extreme of Orcas, is a long sloping point, the termination of the ridge of Mount Constitution; immediately on its north side it rises abruptly in high, almost perpendicular cliffs, and trends to the westward, falling back for 3 miles in a somewhat deep bight, which is rocky, has deep water, and is unsheltered.

Rosario strait now lies between Orcas and Lummi islands, the direct channel being along the western shore of the latter in a N.W. $\frac{1}{2}$ W. direction. Anchorage may be had, if necessary, within a mile of the shore in 15 fathoms, between Sandy and Whitehorn points, northward of Lummi island.

TIDES.—After passing northward of Lawrence point, the ebb tide will be found to set to the eastward between Orcas and the small islands to the northward of it, as well as to the S.E. through the northern entrance of the strait; when as high as Alden bank, or about 8 miles above Lawrence point, the strength of the tides sensibly decreases, and while a vessel is eastward of a line between this bank and Roberts point, she will be entirely out of the strong tides of the Archipelago and the strait of Georgia; it is recommended with the ebb tide to work up on this shore,

LUMMI ISLAND is 8 miles long and very narrow. On its southwestern side it is high and precipitous, a remarkable double mountain rising about 1,400 feet abruptly from the sea; there are no dangers off its western side; a small high double rocky islet lies close off the shore, 3 miles from its southern point.

CLARK and BARNES ISLANDS are two small wooded islands, 2 miles N.W. of Lawrence point; two smaller islets, the Sisters, bare of trees, and a high rock lie immediately S.E. of Clark island. There is a passage $1\frac{1}{2}$ miles in breadth between these islands and Orcas with a depth of 45 fathoms; there is also a narrow channel with 20 fathoms between Clark and Barnes islands, which a vessel may take if necessary.

The tides set strong about the Sisters, and the best and most direct channel is between Clark and Lummi island. In taking this channel the north point of Lummi island should not be approached within a mile, as shoal and broken ground extends for some distance off it; Sinclair island kept just open westward of the north-west point of Lummi leads to the westward of this foul ground in 15 fathoms, and when the east end of Matia island, or Puffin islet close off it, is in one with the north-west point or bill of Orcas, bearing S.W., a vessel will be clear to the northward of it.

MATIA ISLAND, 3 miles W.N.W. from Clark island, and a mile eastward of Sucia island (page 77), is a mile in length, east and west, moderately high and wooded, and has some good boat coves on its southern side; close off its east point is Puffin islet, and extending a short distance eastward of the islet is a flat covering rock. Vessels bound through Rosario strait are recommended to pass eastward of Matia.

ALDEN BANK, 2 miles in extent north and south, and one mile east and west, lies in the centre of the northern entrance of Rosario strait; its southern limit is 2 miles north of Matia island, and there is a channel 3 miles in breadth between it and the eastern shore.

The depth of water on this bank varies from 3 to 7 fathoms, and in one spot so little as 14 feet is found; the bottom is in some parts rocky, with patches of kelp growing on it; in other parts it is sandy, and offers a convenient anchorage for vessels becalmed or waiting for tide. It frequently happens that a vessel having passed to the northward between East point and Patos island, meets the ebb tide, and is carried to the eastward; in such a case it would be desirable to anchor in 7 or 8 fathoms on Alden bank, and thus prevent being set down the Rosario strait.

Vessels passing up or down are recommended to pass on the eastern

side of the bank ; mount Constitution on Orcas island kept just open eastward of Puffin island, bearing S. by E. $\frac{1}{4}$ E., leads over the eastern edge of the bank in 13 fathoms ; and the low west point of Patos island in one with Monarch head of Saturna island, bearing S.W. $\frac{1}{2}$ W., leads over the northern edge in 7 fathoms.*

WHITEHORN POINT is a remarkable bold bluff about 150 feet high, its face showing as a steep white clay cliff. It is the southern point of Birch bay, and is 9 miles N.W. of the north point of Lummi island, and N.E. by N. distant 10 miles from the entrance of the strait of Georgia, between East point and Patos island.

BIRCH BAY is between Whitehorn point and South bluff ; the latter, which is a moderately high rounding point, forms the north entrance point of the bay ; some large bolder stones stand a short distance off it, and should not be rounded at a less distance than half a mile. The bay runs in a N.E. direction for more than 2 miles, and is nearly the same breadth at the entrance, with a round head, which dries off a considerable distance at low water ; it is open from S.S.W. to West, but no great sea could get up. The holding ground is good, and with S.E. gales it affords excellent shelter. A good berth is with Whitehorn point bearing South, distant a mile, in 4 fathoms ; the water shoals gradually from 14 fathoms a mile off to 6 fathoms between the entrance points.

SEMIAHMOO or BOUNDARY BAY is an extensive sheet of water between the promontory of Roberts point on the west, and South bluff on the east, which bear W. by S. and E. by N. of each other, and are distant 8 miles. The bay extends in a northerly direction for nearly 7 miles, and is only separated from the south bank of Fraser river by a low delta 3 miles across, intersected by streams and swamps ; all its upper part is shallow and dries off for 3 miles at low water.

Vessels should never stand so far to the northward as to bring the white bluff of Roberts point to bear to the southward of S.W. by W., which line of bearing leads more than half a mile outside the shoal edge of the bank ; the general depth of water outside this line is from 7 to 15 fathoms, good holding ground. The western and centre parts of the bay are a good deal exposed to all southerly winds, which send in a considerable sea, but in the eastern part there is always good anchorage unless with a heavy S.W. gale, when vessels might take shelter in Drayton harbour, a small anchorage in the south-east corner of the bay ; with South bluff bearing S. by E., and the end of Tongue spit E. by N., there is good

* See Views A. and B. on Chart of Haro and Rosario Straits, No. 2,689.

anchorage in 6 or 7 fathoms, a little over a mile outside the harbour entrance.*

DRAYTON HARBOUR, at $3\frac{1}{2}$ miles N. by E. of South bluff, is formed by a remarkable low narrow spit over a mile long, which is the termination of the bluff itself. The spit is covered with grass and drift timber, and a few pine trees grow on it; several wooden buildings were erected on it in 1858, and received the name of Semiahmoo town.

DIRECTIONS.—Off the outside of Tongue spit a bank extends for a considerable distance, and vessels should not approach the spit within a long half mile until its extreme point bears E. $\frac{1}{2}$ S., when it may be steered for and passed close. There are 5 fathoms water in the entrance, but the channel is narrow, and no vessel unacquainted with the locality can enter unless by placing boats or poles on the edges of the shoals; when within, it opens out into a considerable sheet of water, but for the most part shoal, drying off from the main shore more than half a mile. The anchorage is in from 7 to 10 fathoms; it is perfectly sheltered, and affords room for 3 or 4 large vessels, as well as several small ones, and on the inside of the spit a vessel might be beached for repairs. The only landing at low water is at the spit end, which is steep-to.

TIDES.—It is high water, full and change, at Drayton harbour at 2h. p.m., and the springs range 14 feet.

ROBERTS POINT is the termination of a remarkable promontory which stretches southerly from the delta of the Fraser river. It presents a broad face to the southward, and its southern extreme is a little more than $1\frac{3}{4}$ miles south of the 49th parallel of latitude; the eastern point of the promontory is a remarkable white-faced cliff, 200 feet high, its summit crowned with trees; from it the land gradually falls to the westward and terminates in Roberts spit, a low shingle point, within which is a small space of level clear land, where a few wooden buildings were erected on the first discovery of gold in the Fraser river, and named Roberts town; for a few months it served as a depôt for the miners, but it has been long deserted.

From this spit the coast trends to the N.N.W. with bluff shores of moderate height for $3\frac{1}{2}$ miles, when it merges into the swampy delta of the Fraser. From most points of view, and particularly from the southward, Roberts point presents the appearance of an island; shoal water and rocky irregular bottom, on which kelp grows in summer, extends for more than a mile E.S.E. from the white face of the point, and vessels are recommended to give it a good berth.

* See Plan of Semiahmoo Bay and Drayton Harbour, No. 2,627; scale, $m = 4$ inches.

ANCHORAGE will be found on either side of the promontory ; to the eastward in 9 fathoms, sandy bottom, with the extreme of the white cliff bearing W.S.W. distant $1\frac{1}{2}$ miles ; Roberts spit, the western termination of the promontory, should be just shut in by the white cliff. To the westward of the spit there is fair anchorage in 8 fathoms good holding ground, with the spit extreme distant three-quarters of a mile and in one with mount Constitution on Orcas island bearing S.E. $\frac{1}{2}$ E., a white flag-staff at the north end of the low land of the point N.E. by E. $\frac{1}{2}$ E., and the bare bluff of the 49° parallel or the monument on its summit N.W. ; here the edge of the bank will be distant a quarter of a mile, and a ship should not anchor any further to the northward, as the Roberts bank trends rapidly to the westward.

There is a granite monument 25 feet high erected on the summit of the parallel bluff, which is only just visible from the anchorage on account of the trees ; it marks the boundary between the British and United States possessions.

A vessel should feel her way cautiously into this anchorage ; the bank is very steep outside, and shoals suddenly within. The anchor should be dropped immediately the spit end is in one with mount Constitution : a signal staff at present stands on the end of the spit.

Ships should not lie at this anchorage with strong southerly or westerly winds, but should shift round to the eastern one, or to Semiahmoo bay, and give the southern face of Roberts point a berth of 2 miles in rounding ; neither of the anchorages at Roberts point can be considered as more than stopping places, and during winter vessels should be prepared to weigh at short warning.

Semiahmoo bay is always safe, and anchorage in almost any part.

ROBERTS BANK, caused by the sediment deposited by the stream of the Fraser river, extends from the spit of Roberts point in a W. by N. direction for $9\frac{1}{2}$ miles, to the sand heads or river entrance, and at this point is 5 miles from the shore ; it then takes a N.N.W. direction for a farther distance of 12 miles, joining Grey point on the north, as it does Roberts point on the south. The portion of the bank northward of the Fraser has been named the Sturgeon bank ; it is steep-to, and a mile outside the edge the soundings are from 70 to 60 fathoms, then 20, and immediately 2 fathoms.

STRAIT of GEORGIA.—Having passed out of the strait of Fuca by either of the channels now described, when to the north-westward of a line drawn between East point of Saturna island and Whitehorn point of the main, a vessel may be considered well in the strait of Georgia, but before entering upon any description of the latter, it may be well to

offer a few remarks on the comparative merits of the two main channels which lead into it, viz., Haro and Rosario straits; both have their advantages and disadvantages under varying conditions.

Haro strait is more tortuous; the water is so deep that it would be impossible for a vessel to anchor in the main stream, and for its whole length the tides, though not stronger, are more varying in their direction.

Rosario strait leads by a very gentle curve almost a straight course into the strait of Georgia; the depth of water, although considerable, is such that if necessary a vessel might anchor in it; in one part it is somewhat narrower than the narrowest parts of Haro strait, and the tides run with equal strength; it has its sunken rocks and dangers in an equal degree with the Haro, and perhaps the anchorages in point of numbers and facilities for reaching them are equal in both: extreme care and vigilance are called for in navigating either with a sailing vessel; to one with steam power neither offer any difficulties.

A glance at the chart will show that to a vessel bound from sea, or from any of the southern ports of Vancouver island, to the strait of Georgia, the Haro channel is preferable, and it will be equally evident that to reach the same destination from Admiralty inlet or Puget sound, Rosario strait is the most direct and desirable. Having entered, however, by either channel, the promontory of Roberts point will be immediately seen with its conspicuous white-faced cliff, and appearing as an island. From the northern entrance of Haro strait it will bear N.N.W. 11 miles; and from the Rosario N.W. by W. 15 miles.

The general direction of the strait of Georgia is W.N.W., and from a position midway between Saturna and Patos islands, 19 miles on this course should take a vessel abreast the entrance of Fraser river, the sand heads bearing N.N.E., distant 3 miles; and for this distance the breadth of the strait, not including the deep indentation of Semiahmoo bay, is 10 miles. Continuing the same course for a farther distance of 19 miles, will lead between Burrard inlet on the east and Nanaimo harbour on the west, the entrance of the former bearing about N.E. $\frac{1}{2}$ E. 16 miles, and the latter S.W. $\frac{1}{2}$ W. 7 miles.

The breadth of the strait, after passing the sand heads of the Fraser, increases to 14 miles; and between Nanaimo and Burrard inlet it is 20 miles. The depth of water is from 70 to 100 fathoms between Roberts point and the western side of the strait, and farther to the westward between Burrard inlet and Nanaimo as much as 200 fathoms in the centre.

The dangers to be avoided in working through the strait are, on the eastern shore, Roberts and Sturgeon banks: and on the western, the neighbourhood of East point, and Tumbo island, and the coasts of Saturna

and Mayne islands, until beyond the entrance of Active pass. A chain of reefs and rocky islets lie parallel with this shore, in places extending nearly a mile off; and as the bottom is rocky and irregular, with a considerable strength of tide, vessels are recommended not to approach it within 2 miles.

It should also be remembered that the ebb sets to the S.W., through Active pass, and that tide races occur in its northern entrance. Roberts bank is easily avoided. The extreme of Roberts spit, or the tangent of the high trees immediately within it, should by no means be brought to bear to the southward of E. $\frac{1}{2}$ S., which will lead half a mile outside the edge of the bank; perhaps East is the safer bearing. If the weather is thick, when 50 fathoms is struck, a vessel will be getting very near the edge. The entrance of Portier pass more generally known as Cowitchin gap, bearing S.W. $\frac{3}{4}$ W., leads directly for the entrance of the river; and Grey point, a remarkable jutting wooded bluff, the south point of Burrard inlet, bearing North, just clears the edge of Sturgeon bank.

The TIDES, although not nearly so strong as among the Haro archipelago, yet run with considerable strength, as much as 3 knots, particularly during the freshets of summer, when the Fraser river discharges an immense volume of fresh water, which takes a southerly direction over the banks, and almost straight for the mouth of Active pass. This peculiar milky-coloured water is frequently carried quite across the strait, and is sometimes seen in the inner channels washing the shores of Vancouver island; at other times it reaches the centre of the channel only, forming a remarkable and most striking contrast with the deep blue waters of the strait of Georgia.

Below the mouth of the Fraser, the tide is rather the stronger on the western shore. On the eastern side, within the line between Roberts and Sandy points, scarcely any tide is felt; and vessels will gain by working up on that shore with the ebb, where good anchorage can also be found, if necessary.

Allowance must be made for the tides, which is not difficult, having once entered the strait of Georgia by daylight, and knowing which tide was running. In the centre of the strait above Saturna and Patos islands, the strength of the tides varies from one to 3 knots, seldom more, unless close to the island shores, which are swept by the rapid currents out of Gabriola, Portier, and Active passes. Above the mouth of the Fraser there is still less stream and plenty of sea room, the breadth of the strait being nearly 15 miles.

FRASER RIVER, in point of magnitude and present commercial importance, is second only to the Columbia on the north-west coast of

America. In its entire freedom from risk of life and shipwreck, it possesses infinite advantages over any other river on the coast, and the cause of this immunity from the dangers and inconveniences to which all great rivers emptying themselves on an exposed coast are subject, is sufficiently obvious. A sheltered strait, scarcely 15 miles across, receives its waters; and the neighbouring island of Vancouver serves as a natural breakwater, preventing the possibility of any sea arising which would prove dangerous to vessels even of the smallest class, unless they ground.*

To the same cause may be attributed in a great measure the fixed and unvarying character of the shoals through which this magnificent stream pursues its undeviating course into the strait of Georgia; and there can be little doubt that it is destined, at no distant period, to fulfil to the utmost, as it is already partially fulfilling, the purposes for which nature ordained it—the outlet for the products of a great country, whose riches in mineral and agricultural wealth are daily being more fully discovered and developed.

The river, with its numerous tributaries, has its rise in the Rocky mountains, between 400 and 500 miles from the coast in a northerly direction, from whence it forces its way in torrents and rapids, through one of the many great parallel valleys which intersect this region, confined by gigantic mountains, with large tracts of country, rich in agricultural resources on either side of them, until it reaches the town of Hope, which is about 80 miles by the windings of the river, in an easterly direction from its entrance.

Above the city of Lytton, which stands at the fork or confluence of the Fraser and Thompson rivers, 55 miles above Hope, many rich deltas occur, or as they are termed by the miners, bars, and among these known as the wet diggings, gold was first discovered in British Columbia.

At Hope the river assumes the character of a navigable stream; steamers of light draught reach this point and even the town of Yale, 15 miles above it, during from six to nine months of the year. In June, July, and August, the melting of the snow causes so rapid a downward stream that vessels even of high steam power are rarely able to stem it, and during these months numbers of large trees are brought down from the flooded banks, which offer another serious obstruction to navigation. Between Hope and Langley, the latter 30 miles from the river's mouth, there is always a considerable strength of current, from 4 to 7 knots, at times more; but at Langley the river becomes a broad, deep, and placid stream, and except during the three summer months the influence of the flood stream is generally felt, and vessels of any draught may con-

* See Plan of Fraser River and Burrard Inlet, No. 1,922; scale, $m = 1$ inch.

veniently anchor. The depth is 10 fathoms; the current not above 3 knots.

Midway between Langley and Hope the Harrison river falls into the Fraser and by it and a long chain of lakes extending in a general N.W. direction, a comparatively easy route has been established, by which the upper Fraser is reached at a point just below the Bridge river, in the heart of the gold region, thus avoiding that difficult and at present almost impassable part of the country between the town of Yale and the Fountains, by the main river a distance of about 90 miles.

Vessels of 18 feet draught may enter the Fraser near high water, and proceed as high as Langley with ease, provided they have or are assisted by steam power. The only difficulty is between the Sand heads and Garry point, the entrance proper of the river, but while there are competent pilots and the buoys remain in their positions, this difficulty disappears. It must be remembered, however, that the tides of the strait of Georgia sweep across the channel of the entrance, and a large ship is recommended to enter or leave with the last quarter of the flood.

The great quantity of deposit brought down by the freshets of summer has created an extensive series of banks, which extend 5 miles outside the entrance proper of the river. The main stream has forced an almost straight though somewhat narrow channel through these banks, and at its junction with the current of the strait of Georgia, which runs at right angles to it, has caused the wall-edged bank before alluded to, extending to Roberts point on the south and Grey point on the north.

The river is at its lowest stage during the months of January, February, and March. In April it commences to rise from the melting of the snows, and is perhaps 2 feet above its lowest level; the flood stream is strong enough to swing a ship at New Westminster up to the end of this month. In May the water rises rapidly, the river is at its highest about the end of June, and remains up with trifling fluctuations until the end of July or middle of August. During these six weeks the banks are overflowed, and extensive plains above Langley covered for a space of several miles; the strength of the stream between Langley and Hope being from 4 to 7 knots, and in the narrow parts even more. The usual rise of the river at Langley due to these floods is about 14 feet, but from the testimony of an officer of the Hudson's bay Company, who has resided more than 30 years there, it has been known to reach 25 feet.

From the middle to the end of August the waters begin to subside, and in September the stream is not inconveniently strong. September, October, and November are favourable months for the river navigation, as the water is then sufficiently high to reach Hope, and the strength of the current considerably abated. The shallow stern wheel steamers have

got to Hope as late as December ; between this month and April, owing to the shoalness of the water and the great quantity of ice formed, navigation even by these vessels only drawing 18 inches, is attended with great difficulty, and rarely practicable at all. The snags or drift trees which become imbedded in the river, also form a serious obstacle to navigation at this season.

In April the steamers commence again to run ; in June, July, and August the rapidity of the current is the great obstacle, but these high-pressure vessels commanding a speed of 11 and 12 knots frequently accomplish the voyage, though at much risk.

The Harrison river route (page 105) obviates some, but not all of these difficulties. At New Westminster the freshets raise the level of the river about 6 feet, but the banks being high no inconvenience is felt, and the strength of the stream is rarely 5 knots, during the winter from 2 to 3 ; for some miles within the entrance the low banks are partially flooded for a month or six weeks. The rise and fall due to tidal causes is from 8 to 10 feet at springs, between the Sand heads and the entrance of the river proper at Garry point ; at New Westminster it is 6 feet, and at Langley scarcely perceptible.

DIRECTIONS.—There are no natural marks sufficiently well defined, or which are not too distant, or too liable to be obscured in cloudy weather, to enable a vessel by their help alone to hit the narrow entrance between the Sand heads with accuracy. A large spar buoy is placed on the south Sand head, and the northern edge of the channel within is marked by similar buoys, somewhat smaller, for the colour of which see chart ; the Sand head buoy can be seen well at a distance of 2 miles.

To make the entrance of the river approximately, the following bearings will be found useful. From the eastern entrance of Active pass, which is now the usual route for steamers from Vancouver island, the entrance bears N. by W. $\frac{3}{4}$ W., 11 miles ; from the entrance of Portier pass, which shows as a very distinct gap between Galiano and Valdes islands, the entrance between the Sand heads bears N.E. $\frac{3}{4}$ E. distant $11\frac{1}{2}$ miles, and when that gap bears S.W. $\frac{3}{4}$ W., and the extreme of the trees on Roberts point spit E. $\frac{1}{2}$ S., a vessel will be within one mile of the entrance, and should have from 45 to 50 fathoms water.

Mount Provost, a remarkable sharp peak on Vancouver island, kept on a bearing S.S.W. $\frac{1}{4}$ W., will also lead for the Sand heads. In coming from the northward, Passage island, at the entrance of Howe sound, kept on or just open of a remarkable peak on Anvil island within the sound, bearing N. by W. $\frac{3}{4}$ W., will clear the edge of the Sturgeon bank until the bearings just given are brought on for entering.

When at the entrance, a remarkable solitary bushy tree will be

seen on Garry point, the northern entrance point of the river proper, straight for which is the general direction of the channel ; it bears from between the Sand heads N.N.E. a little easterly, and is just 5 miles distant. Although to steer direct for this tree would not clear the outer edges of either bank for the whole length of the channel, yet it will be found an excellent guide, not only to make the entrance, but to give almost the straight line in, should the buoys be removed.

The south Sand head dries before low water, and has frequently a ripple on it when covered; when the buoy which is moored off it is seen, it should be brought to bear N.N.E., and then steer to leave it a cable's length on the starboard side, which will lead nearly in mid-channel, the buoys then on the port or north side of the channel should be kept from half a cable to a cable on the port-hand. The least depth in the channel is 11 or 12 feet at low water, and this occurs about midway between the Sand heads and Garry point ; at or near high water from 18 to 20 feet, and sometimes 22 feet, may be carried in to within $1\frac{1}{2}$ miles of Garry point, when it deepens to 4 and 5 fathoms ; the point should be passed close.

There is always a great quantity of drift wood on the point, and the northern side of the river should be kept aboard for nearly 2 miles, where from 8 to 10 fathoms will be found ; it is then necessary to cross to the south side, and to keep close along it, passing the mouth of the South or Boat channel, nearly 2 miles above which, and abreast a clump of high trees, cross again to the north bank to the left of two low sandy islands ; the channel then leads rather along the north side of the river, and with the assistance of the chart will be found sufficiently easy for vessels of 20 feet draught until 6 or 7 miles above Langley.

It is not, however, recommended for a stranger to enter without a pilot, and certainly not under any circumstances unless the buoys are in their places between the entrance shoals ; any further detailed directions would be practically useless ; a pilot, the chart or local knowledge, are absolutely necessary.

NEW WESTMINSTER, the capital of British Columbia, stands on the north or right bank of the Fraser river, just above the junction of the North Fork, and 15 miles in a general north-easterly direction from the entrance proper. It occupies a commanding and well chosen position, being within an easy distance of the entrance, and having great facilities for wharfage along its water frontage, a good depth of water, and excellent anchorage.

The river bank is somewhat precipitous in places, and the country at the back is like all the lower parts of the Fraser (unless, indeed, in the immediate neighbourhood of the entrance, where it is swampy grass land, subject to inundation during the freshets of summer), densely

wooded ; a considerable clearing, however, of the timber has taken place in the vicinity of the town, which already assumes a prominent and thriving aspect, and when the facilities for entering the river and its capabilities are better known, will no doubt rise more rapidly into importance.

The military establishment or camp of the Royal Engineers, a mile above New Westminster, is a most picturesque spot, commanding an uninterrupted view of the Queens reach, a broad, deep, and magnificent sheet of water. From the camp to port Moody, an excellent harbour at the head of Burrard inlet is 4 miles in a north direction ; a good trail exists between the two places, and a waggon road is in course of construction to the outer harbour of the inlet, which, when completed, will be an important work. At 5 miles eastward of New Westminster is the entrance to the Pitt river, which runs in a general direction from N.N.E. to N.E. for 28 miles, terminating in two remarkable lakes enclosed between almost perpendicular mountains, and navigable to the head for vessels of 14 feet draught, the depth in places being far too great for anchorage. A large tract of low grass land lies on both sides of the entrance of the Pitt, which, however, is generally overflowed, or partially so, during 6 weeks of summer.

DERBY or NEW LANGLEY is 12 miles above New Westminster in an easterly direction, on the south or opposite side of the river ; the channel between is deep, and there are no impediments to navigation. This spot was first selected as the capital, and as a town site it is unobjectionable, having a considerable tract of good cleared land in its neighbourhood, and all the requirements of a commercial port ; the depth of water here is 10 fathoms. Large vessels may proceed with ease 7 miles beyond Langley, the navigation then becomes somewhat intricate, and the current too rapid for any vessels but steamers of light draught and great power.

The NORTH FORK is another entrance to the Fraser, navigable for vessels drawing 6 or 8 feet water, and is generally used by the natives proceeding to or from Burrard inlet. Its junction with the main stream occurs immediately below New Westminster, from whence it runs in a westerly direction, and enters the strait of Georgia through the Sturgeon bank, about 5 miles northward of the Sand heads ; a large low partially wooded island lies in its entrance, and splits the channel into two arms.

In many parts of the North Fork the water is deep, in holes, and the bottom irregular ; it can only be considered a boat channel.

BURRARD INLET is the first great harbour which indents the shores of British Columbia north of the 49th parallel. Its entrance, which is between Grey point on the south and Atkinson point on the north, is

14 miles N.N.W. from the Sand heads of Fraser river, 20 miles N. by E. from Portier pass, and 21 miles N.E. $\frac{3}{4}$ E. from Entrance island of Nanaimo. Howe sound immediately adjoins it on the north, Atkinson point, the northern entrance point of the inlet, being the eastern limit of the sound.

The entrance of the inlet is well marked; Grey point, a long wooded promontory terminating in a rounded bluff, is very conspicuous from the southward, while Bowen island, which lies at the entrance of Howe sound, and may also be said to form the northern boundary of the inlet, is very remarkable; its high round and almost bare summit, mount Gardner, reaching an elevation of 2,479 feet, is easily recognized from any point of view. Passage island, small but prominent, lies in the eastern passage of Howe sound, midway between Bowen island and Atkinson point, and is an excellent mark from the southward; as before observed (page 106), Anvil peak, on with or just open westward of this island bearing N. by W. $\frac{3}{4}$ W., clears the edge of the Sturgeon bank.

Burrard inlet differs from most of the great sounds of this coast in being extremely easy of access to vessels of any size or class, and in the convenient depth of water for anchorage which may be found in almost every part of it; its close proximity to Fraser river, with the great facilities for constructing roads between the two places, likewise adds considerably to its importance. It is divided into three distinct harbours, viz., English bay or the outer anchorage, Coal harbour above the first narrows, and Port Moody at the head of the eastern arm of the inlet.

ENGLISH BAY is more than 3 miles in breadth at the entrance between Grey and Atkinson points, which bear from each other N.N.W. and S.S.E., and carries the same breadth for nearly its entire length or almost 4 miles; it is contracted in some measure, however, by the Spanish bank, which extends in a northerly direction from Grey point for three-quarters of a mile, and then curves easterly, joining the south shore of the inlet at the distance of 2 miles within the point. This bank is composed of hard sand, and is dry at low water; its edge is steep-to, having off it from 20 to 7 fathoms and then on shore; when covered its existence would not be suspected; there is no ripple on it unless with strong westerly winds, and then only near low water.

This anchorage is well protected from westerly winds by the Spanish bank, and as there is a good rise and fall of tide, as much as 16 feet at springs, and a clean shelving sandy beach at the creek mentioned in page 110, it would be a desirable place to beach a ship for repairs. The head of English bay on the south shore terminates in a shoal arm, named False creek; on the north shore it leads by the First narrows to Coal harbour. The great volume of water which discharges itself from the

upper parts of the inlet through these narrows has scoured out a deep channel on the north side of the outer anchorage, and from 15 to 30 fathoms will be found northward of a line drawn westerly through the centre of the bay.

DIRECTIONS.—Entering Burrard inlet from the southward, Grey point should not be approached within a mile, as a 3-fathom bank extends westward of it for half a mile ; when the extreme of the bluff bears S.E. $\frac{1}{2}$ S., and the north end of Coal peninsula, which is a conspicuous perpendicular cliffy bluff forming the point of the First narrows, is N.E. by E., steer in E.N.E., which will lead half a mile clear of the Spanish bank. A convenient anchorage will be found half a mile from the south shore off a small stream or creek, with the extreme of the Coal peninsula bearing N. by E. in 7 or 8 fathoms, or higher up if desired ; a remarkable high Nine pin rock stands immediately off the end of Coal peninsula, when the rock is just shut in by the point bearing N. by W. $\frac{1}{2}$ W. a vessel will be far enough up.

COAL HARBOUR is on the south side of the inlet, 2 miles within the First narrows. Vessels intending to pass above the narrows must attend to the tides, and a stranger will do well to anchor in English bay before proceeding higher up.

The First narrows lie between the bluff of Coal peninsula and the north side of the inlet, where the breadth of the channel is not more than $1\frac{1}{2}$ cables with a depth of 12 fathoms. A flat composed of shingle and boulder stones, covering with the early flood, extends off the north shore, so that the peninsula bluff must be kept pretty close aboard ; when, at the entrance of the narrows, the mid-channel course is E. by S. $\frac{1}{4}$ S. for $1\frac{1}{4}$ miles, when the broad inlet is again reached.

The narrow part of the channel is half a mile in length, when it gradually opens out from 2 cables to half a mile, which is the breadth abreast of Brockton point, $1\frac{1}{4}$ miles within the peninsula bluff on the south shore. During the whole way the south shore should be kept aboard within 2 cables when past the narrowest part, until abreast Brockton point ; then steer E. by S. for half a mile to avoid Burnaby shoal, a patch marked by kelp, with 9 feet on it, which lies E. $\frac{3}{4}$ S. 3 cables from the point, but frequently not visible until close upon it. Having cleared this shoal, haul in south for the anchorage, where 8 fathoms good holding ground will be found a third of a mile from the shore.

The strength of the tide in the narrowest part of the First narrows is from 4 to 8 knots. The only directions necessary for a steamer are to keep the south shore aboard and to be quick and careful with the helm ; small craft may go through with ease, the tide being favourable ; to a

sailing ship a knowledge of the locality is necessary; as well as a commanding breeze, and it should never be attempted with the full strength of the stream.

TIDES.—It is high water, full and change, at Burrard inlet at 6 p.m.; and the rise is 16 feet. The ebb stream commences directly it is high-water by the shore, and runs out for two hours after it is low; there is consequently only 4 hours' flood stream.

SECOND NARROWS.—Between the First and Second narrows, a distance of $4\frac{1}{2}$ miles, the course of the inlet is E. $\frac{1}{2}$ N., varying in breadth from a half to $1\frac{1}{2}$ miles. In the centre the depth is 36 fathoms, shoaling gradually towards either shore; but Coal harbour, or near the south shore, offers the best anchorage.

The Second narrows are similar to the First; a bank of the same description, but more extensive, is caused by the deposit brought down from the high mountains by the numerous streams which empty themselves into the inlet on the north side. This bank is dry at low water, and the breadth of the deep channel, at the narrowest part and for half a mile on either side of it, varies from $1\frac{1}{2}$ to 2 cables, with a depth of from 10 to 20 fathoms. The channel, however, is straight, and the tides which runs from 3 to 7 knots set fairly through it. The only directions necessary are to keep the south shore close aboard, and steer from point to point without going far into the bights, which indent the coast on either side of the narrowest part. The great strength of the tide ceases when half a mile from the narrowest part of either narrows.

PORT MOODY.—The entrance of this snug harbour is 4 miles eastward of the Second narrows, at the head of the eastern arm of the islet. It is 3 miles in length, and varies in breadth from a third to half a mile, except at its entrance, where it is only 2 cables across; there are no dangers and a uniform depth of water, with good holding ground. The direction of the port is N.E. by E. $\frac{1}{2}$ E. for nearly 2 miles, and then E. by S. for a mile, terminating in a muddy flat at its head, which reaches within 3 miles of the banks of Pitt river, and about 4 miles from the military camp at New Westminster, on the Fraser. The best anchorage is in the widest part of the harbour, just before reaching the arm which turns E. by S. in from 5 to 6 fathoms, about half a mile from the trail which leads to New Westminster. Abreast the turning point, and on the north shore, a bank dries off for nearly 2 cables at low water, on which good oysters are found.

NORTH ARM, just before reaching port Moody, and 3 miles above the Second narrows, branches off from the main inlet, and runs in a general northerly direction for 11 miles. It is entirely different in

its character from other portions of the inlet. The depth of water varies from 50 to 110 fathoms, and it is enclosed on both sides by rugged mountains rising from 2,000 to 5,000 feet almost perpendicularly, and down the steep sides of which the melting snow in summer forces its way in foaming cascades, rendering the surface water in the inlet below all but fresh.

Croker island lies within a mile of the head of the arm, and on either side of it there is a deep but narrow channel; that to the eastward is the widest. The head terminates in a delta of swampy rushes, through which some rapid streams find their way into the inlet from a deep and narrow gorge in a N.N.W. direction.

There is scarcely sufficient level land in this arm to pitch a tent, nor is there any anchorage except in a narrow creek 2 miles within the entrance, on the eastern shore, named Bedwell bay, where from 7 to 9 fathoms may be found near its head. The breadth of the North arm at the entrance is nearly a mile; a mile within it is contracted to a little over 2 cables, when it shortly opens out again, and maintains an average breadth of two-thirds of a mile to Croker island near the head.

WATER.—During the winter months fresh water is to be obtained in all parts of Burrard inlet, and probably the whole year round there would be no scarcity; in June there is abundance at the creek in English bay, off which is the anchorage.

In Port Moody there is a fine stream close to the oyster bank.

SOUTHERN SHORE OF THE STRAIT OF GEORGIA.

GABRIOLA REEFS are a dangerous cluster of rocks, some of which cover at half flood, others having a few feet water over them. They lie 2 miles off the eastern point of Gabriola island, 8 miles below the entrance of Nanaimo harbour, and cover a space of half a mile. From the north point of Portier pass, the outer extreme of the reef bears N.W. $\frac{1}{2}$ N. 8 miles; and from the easternmost of the Flattop islands, a group of low wooded islets lying close off the east end of Gabriola island, E. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles. There is a passage inside the reefs, but it is not recommended. If the reefs should be covered, which they generally are, when the northernmost Flattop island bears S.W. by W., a vessel will be a mile to the northward of them. A good mark is, Nanoose or Notch hill just open of Berry point, the north-east point of Gabriola island, bearing W. $\frac{1}{2}$ S., which will also lead a mile northward of them.*

* See View on Chart, Strait of Georgia, Sheet 1, No. 597.

But as these marks are not always visible, perhaps those most convenient for vessels coming from the southward are to keep the north and south-west entrance points of Portier pass just touching, on a bearing S.S.E. $\frac{1}{4}$ E., which will lead more than a mile eastward, and working up, while the first summit of Gabriola island inside Berry point is open clear of the Flattop islands, the reef will just be cleared.

Westward of Flattop island the shore of Gabriola is bold until near Berry point and Entrance island, when it should not be approached within a long half mile; foul ground extends for some distance eastward of the point of the island.

ENTRANCE ISLAND lies half a mile N.N.E., of Berry point, the north-east extreme of Gabriola island. It is rocky, 30 feet high, formed of sandstone, bare of trees, but has some vegetation on it. Vessels passing up the strait bound for Nanaimo should round this island; there is a deep passage between it and Berry point named Forwood channel, something more than 2 cables in breadth, which steamers or small craft may use; but the south and west sides of Entrance island must be avoided, as reefs and broken ground extend 2 cables off them.

Having rounded this island at the distance of half a mile, or more if convenient, the entrance of Nanaimo harbour will be distant 5 miles. There are three channels leading to the harbour, viz., Fairway, Middle, and Inner. Fairway channel is the most convenient for vessels bound to Nanaimo from the southward or eastward; but Middle channel is certainly the safest and most desirable for vessels from the northward.

FAIRWAY CHANNEL is the most direct for vessels entering from the southward or eastward. It lies between the shore of Gabriola and Lighthouse island, which is a smooth-topped grassy sandstone island, 3 cables in extent north and south, about 50 feet high, and bears from Entrance island W. by S. $\frac{1}{4}$ S. 3 miles. A ledge of rocks 4 cables long in a north and south direction, lies E.S.E. nearly half a mile from the island; the least depth of water is 9 feet on its northern edge, and 20 feet on its southern. The ledge is generally covered with streaming kelp, and has a channel of 7 fathoms water between it and the island; its north edge bears from the south point of Lighthouse island N.E. by E. 3 cables, and its south end E.S.E., nearly half a mile.

The breadth of Fairway channel between this ledge and Rocky point of Gabriola island is full three-quarters of a mile; for a distance of 2 cables off the latter point from 4 to 7 fathoms, rocky bottom will be found, where occasionally kelp grows, but nothing exists which would bring a ship up. A mid-channel course is recommended, which from a berth half a mile off Entrance island is S.W. $\frac{1}{2}$ W. for 3 miles; the water is deep, and the

bottom irregular, varying from 15 to 40 fathoms; if to the southward of mid-channel it will shoal to 15 fathoms, and shortly to 8 fathoms off Rocky point.

DIRECTIONS.—Having entered the strait of Georgia, between East point of Saturna and Patos island, a W.N.W. course for 38 miles will lead nearly 3 miles outside Gabriola reefs, and abreast Entrance island, the latter bearing S.W., distant 5 miles. A vessel proceeding through Fairway channel if northward of mid-channel must keep a look-out for the kelp on Lighthouse island ledge; when Lighthouse island bears N.W. steer S. $\frac{1}{4}$ W., which leads for the entrance of Nanaimo harbour, distant a little over 2 miles. Strangers should be careful not to mistake for it Northumberland channel, which latter lies from Lighthouse island in a S.S.E. direction, between the high cliffy west coast of Gabriola island and Sharp point, a remarkable narrow projection on the main, and off which, at the distance of half a cable, is a rock which uncovers.

Having passed between Lighthouse and Gabriola islands, there is a good working space of $1\frac{1}{2}$ miles in breadth, between Gabriola on the east, and Newcastle and Protection islands on the west, but the water is too deep for anchorage. The shores of the latter islands should not be approached within a quarter of a mile, as shoal rocky ledges extend off them. Having brought Gallows point, the southern extreme of Protection island, to bear S.W. $\frac{1}{2}$ W., the town will open out.

A vessel may anchor if necessary with the high-water mark of Gallows point bearing W.N.W., distant a quarter of a mile, which will be in the fairway of the entrance, but it is difficult for a sailing vessel to pick up a berth here with a strong breeze, as the space for anchorage is confined.

NANAIMO HARBOUR, when the banks are covered, gives the idea of a large sheet of water, but the deep part is limited.

The entrance lies between Gallows point and the southern bank. A rocky ledge extends for $1\frac{1}{2}$ cables on every side of the point, and in summer is marked by kelp; a large bolder stands on the ledge off the point, distant 150 yards, and covers before high water. The south side of the channel is the northern edge of the great shallow bay to the southward, which although it does not quite dry in this part, has only 2 or 3 feet on it at low water, and is steep-to. The entrance is here marked on either side by a spar buoy about a cable apart in a north and south direction; within them the harbour opens out, but in its centre is the Middle bank, 2 cables long in a northerly direction, and half a cable broad, with a spar buoy on either end. Two narrow winding channels, the North and South, lead into the usual anchorage, which is close off the town, and

westward of the Middle bank ; both are buoyed in the vicinity of the latter, but no stranger should enter either channel without a pilot.*

A remarkable white patch on the cliffy shore of Gabriola island just open northward of the extreme of Sharp point, the latter bearing E. by N. $\frac{3}{4}$ N., leads through the channel until near Gallows point, which should be rounded at a little more than a cable's length. In the North channel two spar buoys will then be seen, a cable's length apart, the southern one on the north end of the Middle bank, the north one on the south edge of the Satellite reef ; steer about West to pass between them, then haul close round the southern buoy and steer for the Mine chimney. Anchor close off the town in 5 fathoms, midway between the buoy and Beacon rock, which dries at low water, and has a buoy on it. The South channel, though of sufficient depth for large vessels, has a somewhat sharp turn at its western end, but is very convenient for vessels leaving with a northerly wind, when they would be obliged to warp out of the North channel.

COAL.—The mines of Nanaimo produce a fair bituminous coal, which answers well for steaming purposes. It is lighter by about 10 per cent than Welsh coal, and its consumption proportionately rapid. The working of the mines have not yet been undertaken on a scale commensurate with their importance, probably owing to the demand having been hitherto comparatively small. As the quality of the coal, however, is becoming better known, the demand is rapidly increasing ; it is now exported to California in large quantities, and ships are inconveniently detained waiting for cargoes. Some new and very promising seams have lately been discovered by boring, and the quality is said to be superior to any hitherto found.

Newcastle island produces large quantities, and the mines there are being rather extensively worked. The Nanaimo coal is far superior to any that has yet been discovered or worked in this country, and there can be little doubt but that it exists in sufficient quantities to supply the whole Pacific coast for almost an indefinite period.

The present price is 25 shillings, or 6 dollars per ton.

DEPARTURE BAY.—A long narrow channel or arm between Newcastle island and the main leads in an N.W. direction from Nanaimo harbour to Departure bay. It is $1\frac{1}{2}$ miles in length, and a cable in breadth, with 12 feet at low water, except on a rock which has only 2 feet on it lying in the centre, 2 cables north-westward of Rocky point, the south point of Newcastle island. Vessels of 15 or 16 feet draught may enter

* See Plan of Nanaimo Harbour and Departure Bay, No. 2,512 ; scale, $m = 4$ inches.

Departure bay by this channel at suitable times of tide, but large vessels must enter northward of Newcastle island.

From Lighthouse island, the entrance of Departure bay bears S.W. $\frac{1}{2}$ W., distant 2 miles, and lies between the steep cliffy north point of Newcastle island, and a small island to the northward of it. The breadth of this channel is 3 cables, and the depth 20 fathoms. Little less than this depth will be found in any part of the bay, and it is not nearly so sheltered as Nanaimo harbour.

Vessels intending to load with coals, and there is no other inducement to anchor here, should bring the steep north point of Newcastle island to bear N. by E., and anchor in not less than 18 fathoms, off the coal mine, 2 cables from the shore; the bank runs up steep within this depth, and shoals from 12 to 2 fathoms. Unless anchored well out, a vessel is liable, with N.W. winds, to tail on the bank; and ships are not recommended to lie here after they have got their cargo in. A stranger should take a pilot for the coaling station in Departure bay, either from outside or in Nanaimo harbour.

MIDDLE CHANNEL lies between Lighthouse and Five Finger island, $1\frac{1}{3}$ miles W.N.W. from it. The latter is a bare rugged islet of about the same dimensions as the former, but of trap formation, instead of sandstone; the five hummocks on it resemble knuckles more than fingers. The channel is perfectly free from danger, and has a depth of 80 fathoms. Passing through the centre of it, an S.S.E. course leads for Nanaimo harbour, between Protection island and Sharp point.

S.S.W. of Five Finger island are three smaller islets of similar character and formation, with some rocks about them, which uncover. These islets and rocks occupy a space of half a mile in a W.N.W. and E.S.E. direction; there is a passage 3 cables wide between them and Five Finger island with irregular rocky bottom, the soundings varying from 9 to 35 fathoms; it is not recommended, but, if used, Five Finger island should be kept aboard.

Inner channel, 4 cables in breadth, lies between the above islets and the shore of the main, and being more direct, is convenient for steamers or small craft, bound to or from the northward; the mid-channel course through it is N.W.

TIDES.—It is high water, full and change, at Nanaimo harbour about 5 p.m., and the range of tide is sometimes 16 feet, which is as much as is met with anywhere on the coast, and makes this a most eligible spot for the construction of docks, for which it offers peculiar facilities. This great range of tide only occurs at midnight during winter, and in the day-time in summer. The superior and inferior tides exist here as they do at

Esquimalt and among the Haro archipelago. On the opposite coast, at Burrard inlet, this irregularity does not exist.

NORTHUMBERLAND CHANNEL, before mentioned as lying between Sharp point and the western shore of Gaoriola island, runs in a S.E. direction for $1\frac{1}{3}$ miles, and then East for 2 miles, when it enters the Dodd and False narrows (page 69), the former on the south side of Mudge island, the latter on the north ; a rock which uncovers extends half a cable off the extreme of Sharp point. False narrows are shoal with no ship passage, but there is excellent anchorage in Percy bay at their western entrance, in from 7 to 10 fathoms, where vessels may lie to wait the tide through Dodd narrows.

Dodd narrows have been already described from the southward; they communicate with the inner channels leading to the southern ports, and save a distance of 20 miles in the passage from Nanaimo to Victoria or Esquimalt ; they are consequently frequented by boats, all small vessels, and sometimes by steam vessels of considerable size acquainted with the locality. Strangers are not recommended to use them. Coming down Northumberland channel, look out for the narrow entrance on the south side, and when it bears S.E. steer for it ; the tides run at their strongest 8 knots, and there is a very short interval of slack water ; the breadth in the narrowest part is 80 yards. The tides in Dodd narrows are about an hour earlier than at Nanaimo, therefore a vessel intending to pass down should be at the narrows an hour before high water at that place, if going through with the first of the ebb, or two hours before low water if with the last of it.

CHAPTER V.

THE STRAIT OF GEORGIA, FROM NANAIMO HARBOUR AND
BURRARD INLET, TO CAPE MUDGE AND BUTE INLET.

VARIATION, 22° 20' East, in 1864.

THE strait of Georgia, as already observed, commences at the northern end of the Haro archipelago, and extends in a general W.N.W. direction to Cape Mudge, a distance of 110 miles. There are many harbours, both on the Vancouver, and continental shores, and several islands, some of considerable size, form other channels, all of which are navigable.

The average width of the main strait westward of Nanaimo is about 9 miles, diminishing at its narrowest part, between Lasqueti and the Ballinac islands, to 5 miles. The general depth of water is great, frequently over 200 fathoms. The tides are not strong, and between Nanaimo and Cape Mudge there are few dangers in the way of ships navigating the strait.

The smaller channels on the continental shore are Malaspina strait and Sabine channel, the former lying between the continent and Texhada island, the other separating Texhada from Lasqueti island.

On the Vancouver shore is Ballinac channel, lying westward of the islands of the same name; also Lambert channel and Baynes sound, the former between Hornby and Denman islands, and the latter dividing both from Vancouver island; they will be separately described.

TIDES.—The meeting of the tides takes place between Cape Mudge and Cape Lazo; that is to say, the flood entering by Fuca strait meets that entering by the north end of Vancouver island, within 20 miles of the former cape, generally much nearer, but varying according to the phases of the moon and the state of the winds; and at the point of meeting a considerable race occurs, which would be dangerous to boats: there is generally such a race at the entrance of Discovery passage. It is high water, full and change, at Cape Mudge and Cape Lazo at about 5.30, and the range during ordinary springs is from 12 to 14 feet. At the entrance of the passage during springs the stream runs as much as from 4 to 6 knots an hour, the flood, or easterly stream, being the strongest.

WINDS.—The prevailing summer wind in the strait of Georgia is from N.W., or the same as on the outside coast, and between May and September it blows strong and steady, commencing about 9 a.m. and dying away

towards sunset. These winds do not generally extend much below point Roberts, among the Haro archipelago they become variable and baffling, while in the main channels of Rosario and Haro the westerly wind entering the strait of Fuca is deflected to S.W., and vessels running up these channels with a fair wind will almost always find it ahead on entering the strait of Georgia. During winter there is a good deal of moderate, calm, and gloomy weather, but gales from S.E. and S.W. are frequent.

NANOOSE HARBOUR, at 8 miles westward of Nanaimo, will be known by the remarkable hill of the same name, which rises between 600 and 700 feet immediately over its north side, and shows as a double or notch peak from the southward.*

Leaving Nanaimo harbour, and passing out by either channel, that between Lighthouse and Five-finger islands to be preferred, or being abreast of and distant between half a mile and a mile from the latter island, a W. by S. course, or straight for Nanoose hill, leads for the entrance of the harbour, distant 7 miles.

The shore westward of Nanaimo is free from danger, and at the distance of half a mile, 20 fathoms will be found; within this line it shoals rather suddenly to 5 and 4 fathoms. Off the north point of the harbour lie a group of small wooded islands; the entrance is between Maude island (the southernmost of them) and Blunden point, on the south shore of the main, and is here nearly three-quarters of a mile in width.

Maude island is small, wooded, and about 100 feet high; it lies E.N.E. three-quarters of a mile from the north point of the harbour. Vessels working in may stand pretty close to it and to Blunden point, but when within the latter, a sand-bank dries for a considerable distance off at low water, and the south shore should not be approached within a quarter of a mile.

Entrance rock, 2 feet above high water, and $1\frac{3}{4}$ miles within Blunden point, extends off a low maple flat on the south side almost into the middle of the harbour, and contracts the width of the entrance here to a quarter of a mile; within this, the harbour opens out to nearly a mile in width, and terminates at the distance of $1\frac{3}{4}$ miles in a shoal mud flat, which dries at low water more than half a mile, and where abundance of oysters are found.

The only danger on the north shore, in entering, is the North rock, which lies nearly 2 cables from the shore, and has 5 feet on the outer part.

DIRECTIONS.—When midway between Maude island and Blunden point, the fair course in is W.S.W. When the east point of Southey island

* See Plan of Nanoose Harbour, No. 585; scale, $m = 3$ inches.

is shut in by the north entrance point, North rock will be passed, and the north shore should be kept rather aboard. Entrance rock should in no case be passed nearer than a cable's length, and in working in, beware of the North rock, and the sand-bank already mentioned as extending off the south shore, and which stretches also for a quarter of a mile westward of Entrance rock ; when that distance within the rock, both shores of the harbour are clear of danger.

No convenient anchorage in less than 18 fathoms will be found, until well up towards the head. When Nanoose hill bears North, anchor in 12 fathoms in the centre of the harbour, or as near to either shore as desired. It is a spacious and well-sheltered anchorage from all winds.

Fresh water may be obtained from a cove at the head on the north side, and there is a convenient nook with a steep shingle beach, where a vessel might be laid for repairs if necessary, on the same side, a mile from the head.

TIDES.—It is high water, full and change, at 5 p.m., and springs range 15 feet.

The COAST for 6 miles westward of Nanoose is strewed with numerous small islands and reefs, the latter generally marked by kelp. The outermost of them, Winchelsea and Yeo islands, extend between 1 and 2 miles from the land, and beyond these there are no hidden dangers.

Between Maude and Southey islands there is a clear passage of 4 cables, with deep water, by which, if necessary, vessels may enter or leave Nanoose harbour. There are also channels among the smaller groups for coasters, and anchorage in fine weather within them at 2 cables from the mainland generally in 10 fathoms.

Small vessels may find good shelter in Schooner cove at $1\frac{1}{2}$ miles westward of the north point of Nanoose harbour. There is a rock awash nearly in the centre of the entrance, but nearer to the north point.

Winchelsea islands are the south-easternmost of the group off Nanoose, and lie N. by W. a little over a mile from Maude island ; they are low, and somewhat less than a mile in extent.

The Grey rock, bare, 12 feet above high water, and rather remarkable, lies 2 cables E.N.E. from the east end of this group.

RUDDER REEF, with a fathom on it, lies a quarter of a mile S.E. $\frac{1}{2}$ E. from Grey rock, and has very little kelp on it. This reef must be avoided by vessels bound westward from Nanoose harbour, and the S.E. end of the Winchelsea islands should be given a berth of at least half a mile.

Yeo and Gerald islands lie west from the Winchelsea group, and are smaller. They may be safely passed at the distance of half a mile to the northward.

BALLINAC ISLANDS, two in number, are larger than the groups just described, and lie farther off shore. They are about 250 feet high; the northernmost one has but two or three trees, and its summit terminates in a sharp, bare nipple; the southernmost is wooded. They have the appearance of one island seen from all points; indeed, are only separated by a narrow passage of less than a cable on the eastern side, which opens out within, and forms a sheltered cove with anchorage for small vessels in 8 fathoms, close to its southern sandy beach; on the west side this channel is almost closed, and there is no passage into it. The islands are steep and bold on all sides, and are conspicuous after passing westward of Nanaimo; vessels bound through the strait of Georgia would do well to steer for them.

Having passed Entrance island, or gained an offing of a mile from Lighthouse or Five-finger islands, a direct course for the Ballinac leads well outside all the small islands and reefs which have been described as lying off the coast westward of Nanoose. Before closing them, it must be decided whether to take the main strait to the northward between the Ballinac and Lasquiti island, which is here 5 miles in width, with a depth of water varying from 100 to 200 fathoms, or to use the Ballinac channel to the southward of them, which latter is some saving of distance, and where far smoother water is found with strong N.W. winds.

BALLINAC CHANNEL lies southward of the islands of the same name, between them and the smaller group which extend off the coast westward of Nanoose. It is a safe, clear passage, $1\frac{1}{4}$ miles in width at its narrowest part, which is abreast Gerald island; the depth in mid-channel is 136 fathoms, and the shores of the islands on both sides may be approached within a cable's length, if necessary. The only danger in the channel in working through is Cottam reef, which has $2\frac{1}{2}$ fathoms on it, and is generally marked by kelp; it lies on the southern side, and from its highest part of north Ballinac island bears N.N.E. $\frac{1}{4}$ E. distant $1\frac{3}{4}$ miles, the centre of Gerald island E. $\frac{3}{4}$ S. $1\frac{1}{2}$ miles, and the north end of Mistaken island W. by S. $\frac{1}{2}$ S. nearly a mile. The northernmost of the Winchelsea islands kept open of Yeo islands on a bearing E. $\frac{1}{2}$ S. leads well clear north of the reef.

To steamers, coasters, or vessels with a fair wind, Ballinac channel is recommended. Large sailing vessels with a foul wind would find it an advantage to make long boards, and pass to the northward of the islands through the main strait.

NORTH-WEST BAY is 5 miles westward of Nanoose. Mistaken island, low, wooded, and half a mile long, lies immediately off its northern entrance point, and S.W. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles from the north Ballinac island. The bay indents the coast for 2 miles in an E.S.E. direction, making a peninsula

of the land which separates it from Nanoose harbour. It is much exposed to N.W. winds and the water in it is very deep ; a considerable stream empties itself into the bay at its western entrance.

From North-west bay the land trends, with a slight indentation, nearly West for 19 miles to Denman and Hornby islands, and to the southern entrances of Baynes sound and Lambert channel. This stretch of coast presents no remarkable feature, wooded bluffs, of moderate height, terminating in sandy or shingle points, off which for a very short distance the water is shoal.

The land between Nanoose and the Komox district, a distance of 24 miles, is undulating, and of a moderate height, from the sea-coast to the base of the mountain ranges, a distance of about 4 miles, and although generally densely wooded near to the sea, is lightly timbered a short distance within, with some patches of prairie land.

QUALICUM RIVER empties itself on this coast, 30 miles westward of Nanaimo, and 5 miles eastward of the eastern entrance of Baynes sound. It is a small stream, only noticeable as affording shelter to canoes or boats within its entrance, and as being the terminus of the trail between the head waters of Barclay sound and the eastern coast of the island, a distance of only 13 miles in a direct line.

Horne lake, from which this stream has its source, is $5\frac{1}{2}$ miles S. by W. from the river entrance ; the trail to it is by an easy ascent through a loosely-timbered country. Crossing this lake in a westerly direction for $2\frac{1}{2}$ miles, and ascending a somewhat precipitous range for about 1,500 feet, the waters of Barclay sound are visible to the S.W. about 4 miles ; the whole journey can be accomplished in a day. There are passes between the mountains a few miles to the eastward, by which communication with Barclay sound might be established, without encountering any elevation above 700 feet.

The entrance of Qualicum river has nothing to mark its position until within a mile of it, when the boulder stones which fringe the whole of this coast will be seen to extend somewhat farther off shore than at other points. It lies W. by S. 17 miles from the Ballinac islands, and when the sharp east point of Hornby island bears N. by W., it will be easily made out at the distance of a mile.

QUALICUM BAY is a slight indentation of the coast, immediately west of the river, where very fair anchorage will be found in 8 or 10 fathoms, three-quarters of a mile from the shore, with the east point of Hornby island bearing N. $\frac{1}{2}$ W. ; the holding ground is good, and northerly winds, which would make it a lee shore, seldom blow with any strength. From N.W. winds it is in a great measure sheltered by the islands, but with those

from S.E. a considerable sea will get up, though there would be plenty of room, and no danger of drifting with good ground tackle.

The mountain ranges westward of Nanaimo are of considerable height, and very striking in their general features and varied outlines; most conspicuous amongst them, and midway between Barclay sound and the east coast, rises Mount Arrowsmith to a height of 6,000 feet; its remarkable summit terminating in three sharp well-defined peaks, is rarely free from snow.

DENMAN and HORNBY ISLANDS lie immediately off the coast, 34 miles westward of Nanaimo; the former is 9 miles long, in a W.N.W. direction, or parallel with the coast, low and generally wooded, with an average width of 2 miles.

Hornby island is much smaller. Over its western side rises rather abruptly a remarkable flat top hill, mount Geoffrey, 1,070 feet high; on its eastern it falls gradually, and terminates in a low bare grassy point; the eastern side is indented by Tribune bay, affording good anchorage. On both these islands there is a considerable quantity of good land, particularly on the latter, also fresh water; and from the nature of the formation, it is probable that coal seams will be found to exist.

Denman island is separated from the main by a good passage called Baynes sound, and Hornby island from Denman by Lambert channel. There is more tide felt in the channel than in the sound; in the former its rate is sometimes 2 knots, the flood coming from the south-eastward. The prevailing winds are north-westerly, therefore, for sailing vessels from the southward, the main strait east of Hornby island is to be preferred.

BAYNES SOUND separating Denman island from the main, is a long narrow sheet of water, with an average navigable width something over half a mile, and with a general depth of 20 to 26 fathoms, so that vessels may, if necessary, drop an anchor in any part; there are, however, two very fair anchorages, Fanny bay on the south or main side, and Henry bay on the north or island side. At the distance of 14 miles from the eastern entrance of the sound is Port Augusta, into which flows the Courtenay river, one of the largest streams in Vancouver island, and in this immediate neighbourhood is a large extent of good clear grass land.

The exit into the strait of Georgia by the north-west entrance of the sound, between the north end of Denman island and Cape Lazo, is nearly 2 miles in width, but a remarkable bridge or bar of sand, strewed with large stones, extends the whole way across, and at low water there is as little as 12 feet on it (page 126); during summer it is thickly covered with kelp, which never altogether disappears. The bar is very narrow, and is always smooth; towards high water, vessels of 19 feet draught may safely pass either into or out of the strait by this channel.

DIRECTIONS.—Entering Baynes sound by the eastern channel, some care is necessary to avoid a shoal sand-spit extending off Maple point on the south side, as well as some rocky patches and foul ground lying off the Denman island shore nearly 2 miles within Yellow island.

Yellow island is small and bare, 80 feet high, and generally of a yellow colour. It lies close off the south-east point of Denman island, is remarkable, may be seen for several miles, and is a good object to steer for coming from the eastward, as it forms the eastern entrance point of the sound. Maple point, which forms the western, is also very remarkable; it lies S.W. by W. $1\frac{1}{2}$ miles from Yellow island, and is low and covered with maples, which in form and foliage bear a remarkable contrast to the pine, the prevailing feature, particularly in autumn and winter, when the leaf assumes a bright yellow or orange colour. If desired there is good anchorage outside, in 6 fathoms, with Yellow island in one with Norris reef bearing N.E. $\frac{1}{2}$ N., and Maple point W.S.W. distant three-quarters of a mile. A sand-spit, which dries at low water, and is rather steep-to, extends one-third of a mile north from Maple point, and the 3 fathom line is the same distance from the shore as far eastward as Qualicum bay; therefore, neither the coast nor the point should be approached within that distance.

Immediately opposite on Denman island, N.W. from Maple point, is Reef bluff, a high clay cliff, with a bare grassy slope; off this cliff, for 2 cables' lengths, extend some rocky patches, which narrow the width of the entrance between them and Maple point spit to something over 3 cables. In entering, it is recommended to steer in nearly mid-channel, or a short half mile from Yellow islet, and when abreast it, or it bears North, at this distance steer W. $\frac{1}{2}$ N., or with the low extreme of Reef bluff in one with the low part of Ship point of Fanny bay, for $1\frac{1}{4}$ miles, or until Maple point bears South, then alter course to W.S.W., or keep Mount Trematon of Lasquiti island on with or just shut in by Boyle point the south-east extreme of Denman island, which will lead midway between Maple point spit and the patches off the north shore. Mount Trematon is a very remarkable bare, castellated nob, 1,000 feet in elevation, and the highest summit of Lasquiti island. Having steered $1\frac{1}{4}$ miles on the W.S.W. course, the first reach of the sound will be well open, and a low grassy point, Base flat, on the west side of Fanny bay, will be seen just open of Ship point, then steer up mid-channel about N.W. by W. $\frac{1}{2}$ W., or with Ship point just on the port bow; this point with the land east of it for a mile shows as two bold wooded bluffs, which should not be approached within 2 cables; the southern side of the sound between Maple point and Fanny bay for about 4 miles is low, and shoal water extends for a considerable distance off it; it is recom-

mended not to stand so far over on this side as altogether to shut in Base flat by the bluffs of Ship point just mentioned.

DEEP BAY.—Maple point from the extremity of the trees turns sharp off at a right angle to the W.S.W. for half a mile, and forms a low sandy spit, in shape resembling the long beak of a bird; within this is Deep bay, in which the depth varies from 15 to 20 fathoms, irregular bottom, but sandy. It is a small, and not very desirable anchorage, and as the shoal extends off the back of the spit for its whole length to the distance of one-third of a mile, the extreme of it, which is steep-to, cannot be steered for until it bears S.E.; if intending to anchor the best berth is in 14 to 16 fathoms about $1\frac{1}{2}$ cables east of the spit, and near the centre of the bay.

FANNY BAY, on the southern side of the sound, 4 miles within Maple point, affords a good though somewhat limited anchorage. Base flat, the delta of a considerable stream, having its rise in the Beaufort range of mountains, forms its western point; and Ship point, a bold wooded bluff, its eastern. Entering from the eastward, give Ship point, and the coast of the peninsula immediately eastward of it, a berth of a quarter of a mile, and anchor in 12 or 13 fathoms in the middle of the bay, with Ship point in one with the Reef bluff, bearing East, which latter will appear as the south-east extreme of Denman island, or with Ship point bearing E. $\frac{1}{2}$ S., distant a short half mile.

The eastern part of the bay dries entirely at low water, and a sandy flat extends a considerable distance off all round the shores, therefore some caution is necessary in anchoring. Small vessels may stand in to 8 fathoms, from which depth it shoals very suddenly off Base flat; a sand-bank dries for more than 3 cables at low water.

From Fanny bay the trend of the sound alters slightly to the northward, taking a north-westerly direction, and increasing gradually in width from a mile to 2 miles, which latter it attains at the north end of Denman island; the general depth of water is 25 fathoms, and both shores are free from danger, with the exception of some rocky or boulder ledges which extend from 1 to 2 cables off the points. Village point, on Denman island, with a large native settlement on it, is remarkable; it is 2 miles N.W. of Fanny bay, and a sand-spit extends a short distance off it.

HENRY BAY.—Denman island towards its north-west end falls away into a remarkable wedge shape, terminating in a singular sharp beak-shaped extreme, called Beak point; the hollow of this beak, on the north-west side of the island, forms Henry bay, which is nearly 6 miles from Fanny bay, and is a safe and convenient anchorage, though like the latter it is somewhat limited in size. The shores are moderately high and wooded; its western extreme is a low but steep shingle spit, with one or two trees

on it, and a clear beach of the same character extends all round the bay. The holding ground is very good, and the anchorage in 9 or 10 fathoms in the centre of the bay, with the western shingle point bearing N.W., when a remarkable clump of trees on Sandy island will be just open westward of it ; here a vessel will be a quarter of a mile from the beach, where a considerable native village is built ; the Indians resort to this bay in large numbers during summer to fish.

From Beak point a series of sand-banks, some of them above water, others covered, extend in a N.N.W. direction for a little more than 2 miles. Sandy island, the largest of them, is two-thirds of a mile from the point, and 6 feet above high water, with large boulder stones dispersed over it ; there is a good boat passage through at half tide. North-west of Sandy island, and the same distance, is White spit, which almost covers, and is very remarkable from the number of clam shells collected on it, giving it an appearance of a white sandy beach ; it is also connected with Sandy island at very low tides.

KELP BAR.—The end of the shoal, which occasionally dries in patches, extends two-thirds of a mile north west of White spit, and from it commences the remarkable kelp bar or bridge before mentioned, (page 123) which connects Denman island with the land about Cape Lazo, distant nearly 2 miles. The bar is composed of sand, interspersed with large boulders, which can be seen at low water ; great quantities of kelp grow on it during summer, and it is rarely entirely without it. In shape it resembles an hour-glass, very narrow in the centre, not above 3 cables' lengths, and with a depth of 15 feet at low water. The western edge of this bar is steep, shoaling suddenly, and vessels working to the N.W. through Baynes sound should not stand so far to the eastward as to shut in a remarkable single tree on the shingle spit of Beak point by the clump of trees on Sandy island, or avoid bringing White bluff (which is $2\frac{1}{2}$ miles within Cape Lazo and is very conspicuous) to the westward of N.W., and when within a mile of it to the westward of N.N.W.

To cross the kelp bar over its narrowest part and in the deepest water, a vessel should stand $2\frac{1}{2}$ miles through the sound, north-westward of Henry bay, until a rather remarkable white beach (on the western shore, West 3 miles from Beak point) is brought to bear S. by W. $\frac{1}{2}$ W., then steer out boldly N. by E. $\frac{1}{2}$ E. ; two or three casts of 15 feet will be struck at low water, but it will immediately deepen to 3, 4, and shortly 15 fathoms ; the same directions will hold good for entering. The white beach may be seen well at 3 or 4 miles distance, but until it is clearly made out, when entering, Cape Lazo should not be brought to the northward of N.N.W., nor the clump of trees on Sandy island to the eastward of S.S.E.

PORT AUGUSTA, in the north-west corner of Baynes sound, although apparently a large sheet of water, its upper part is a mud flat, which almost dries at low tides, and is formed by the Courtenay river, which flows into it.*

From White bluff before mentioned a remarkable elbow-shaped tongue of land named Goose spit projects to the southward and westward; it is grassy, with one or two hillocks, and bare, with the exception of two solitary small clumps of trees. Goose spit forms the northern entrance point of the port, and Grassy point the southern; the latter is very low and swampy, the delta of a considerable stream; off it, at low water, sand and boulders dry for 2 cables, and the water shoals suddenly from 10 to 1 fathom at the distance of $3\frac{1}{2}$ cables, leaving a width of less than a mile between the entrance points.

Goose spit is steep-to at its western end, but shoal water extends 3 cables off its southern face; and if working in, the low western extreme must not be brought to the southward of West. The best directions are, to steer in West, passing a quarter of a mile from the spit, and anchoring when it bears N.E. in 13 or 14 fathoms, mud bottom, distant 3 or 4 cables. A little more than half a mile within the spit the water shoals suddenly from 7 fathoms to a few feet.

Rounding the spit end, which may be done very close, a deep cove runs to the eastward for a mile, or close up to White bluff; its upper half dries at low water, but there is snug anchorage in its outer part, in 14 fathoms, with the spit end bearing S.E. by S., distant 2 cables. This is an excellent place with a S.E. gale, though no sea to speak of could get up in any part of Port Augusta.

COURTENAY RIVER is a deep and rapid mountain stream, but on account of falls and other obstructions is only navigable for a few miles for boats and canoes; it has its rise in Mount Washington, from whence it flows in an E.S.E. direction, having a considerable extent of rich grass country on either side, lightly timbered with maple and pine, and in some parts entirely clear.

Mount Washington is remarkable, and rises to 5,400 feet; it is the westernmost of a range 10 miles in length, terminating in mount Beecher to the east; to the southward and westward of it are several high mountain ranges and peaks from 4,000 to 7,000 feet above the sea, the highest summits being covered with snow all the year round. Between the former and the Beaufort range to the south-east is Bedford valley, through which flows the Puntluch, a stream falling into the Courtenay 2 or 3 miles above the head of Port Augusta.

* See Plan of Port Augusta, No. 585; scale, $m = 3$ inches.

The Beaufort range rise on the western side of Baynes sound, 7 or 8 miles from the coast, and stretch for 12 miles in a W.N.W. and E.S.E. direction, varying in elevation from 4,500 to 5,400 feet ; they are very remarkable, presenting 7 or 8 distinct summits, which are rarely free from snow.

This range, together with Mount Washington, form the eastern boundary of the great central valley and chain of lakes which run through the length of Vancouver island from the head of Barclay sound.

LAMBERT CHANNEL, between Denman and Hornby islands, is a safe passage running 6 miles in a W.N.W. and N.W. direction. It is a mile wide at its southern entrance, gradually increasing to the north-west as it opens into the strait of Georgia ; the general depth of water is from 25 to 30 fathoms, shoaling to 16 on either side within 2 cables of the shore. Coming from the southward, Yellow island marks the western entrance point, while Mount Geoffrey, a remarkable flat-top hill, 1,070 feet high, on Hornby island, rises over the eastern side of the channel ; either of these may be steered for until approaching the entrance, when W.N.W. is a mid-channel course through.

Yellow island and the western shore is free from danger ; on the eastern side is Norris rock, of considerable extent at low tide, but at high, a mere patch 5 or 6 feet above water ; it lies N.E. $\frac{1}{2}$ N. $1\frac{1}{2}$ miles from Yellow island, and E. $\frac{1}{2}$ S. three-quarters of a mile from Norman point, the eastern entrance point of the channel ; from the latter point some reefs and foul ground extend nearly 4 cables towards Norris rock, leaving a narrow passage of 8 fathoms water pretty close to the latter, but it is not recommended.

The eastern side of Lambert channel, between Norman point and Shingle spit, a distance of 2 miles, has two groups of covering rocks, extending nearly 2 cables off, and the shore should not be approached within a quarter of a mile ; these rocks generally break when there is any wind, and are marked by kelp in summer. Shingle spit is a remarkable low point on the eastern side of the channel, 2 miles within Norman point ; shoal water extends off its extreme, which should be given a berth of a cable's length ; temporary anchorage will be found on either side of it, according to the winds, to the northward, in 13 fathoms, less than 2 cables from the shore ; to the southward, in 9 or 10 fathoms ; but one patch of the covering rocks before mentioned lies E.S.E. from the spit end, distant 4 cables.

After passing Shingle spit the width of the channel increases, and there are no dangers which are not visible. On the western side there is anchorage in 12 fathoms off a low maple flat W.N.W., a little over 2

miles from Shingle spit, with the high boulder of Hornby island bearing N.E., but with N.W. winds it would be exposed.

Two miles north-westward of this flat is Komox bluff, a bold wooded headland, the north-east point of Denman island, from whence the coast trends away to the westward and terminates at the distance of 3 miles in Beak point. This stretch of land is shelving, with kelp patches and shallow water extending some distance off, and vessels should give it a berth of half a mile; indeed, after passing Komox bluff, a good limit in standing to the westward is Shingle spit of Hornby island in one with the south-east point of Denman island; it is better not to stand so far to the westward as to open out the channel between these two points, in order to avoid the shoal ground in the neighbourhood of Sandy island and the eastern side of Kelp bar; these marks are very prominent, and answer equally for vessels bound through Lambert channel from the northward.

Off the north end of Hornby island stands a remarkable boulder rock, 7 or 8 feet high, with smaller ones near it, and vessels should not approach the shore in this neighbourhood within a long half a mile, at which distance are 7 to 10 fathoms.

TRIBUNE BAY, on the south-east side of Hornby island, affords good anchorage with all but easterly or south-easterly winds, to which it is quite open. It is easy to enter or to leave, and conveniently situated as a stopping place for vessels bound either way, being 35 miles west of Nanaimo, and 40 eastward of Cape Mudge and the entrance of Discovery channel. It indents the island in a W.N.W. direction for $1\frac{1}{2}$ miles, with a width of three-quarters of a mile. At its head are two bays, separated by a jutting point; the northern has a clean white sandy beach.

The eastern end of Hornby island terminates in a rather remarkable point, called St. John, grassy, and bare of trees. Off it, in a S.S.E. direction, are 2 or 3 small low islets. Some reefs which generally break extend nearly half a mile outside the islets; these should be given a berth, and it is not recommended to pass nearer than half a mile to the north-east coast of Hornby island. The entrance of Tribune bay is one mile west of St. John point; its eastern shores are bold and cliffy, its western low and shelving, with shallow water, and covering rocks extending a considerable distance off them.

The outermost of these dangers is a one-fathom rocky patch, called the Nash bank, which must be carefully avoided. It is a quarter of a mile in extent, and lies N.E. by E. nearly a mile from point Downes, the western entrance point, and S.W. by S. from the largest and outermost of the low islets off point St. John. There is a passage of three-quarters of a mile between it and the eastern side of the bay, but no safe passage to the west

of it. Norris rock kept in one with Yellow island, bearing S.W. $\frac{1}{2}$ S., leads 3 cables south of it, in 14 fathoms, and when the centre of the white sandy beach at the head of the bay bears W.N.W., steer in for it, which will lead the same distance east of the reef. Yellow island just open south of Norris rock, S.W. $\frac{1}{4}$ S., leads half a mile south of the reefs off point St. John. With a leading wind it is recommended to pass the eastern side of the bay within a short half mile, and to steer up for the white sandy beach as soon as it is open, anchoring with the eastern bluff of the bay bearing E. by N. $\frac{1}{2}$ N., 3 or 4 cables from the eastern shore, in 9 fathoms, sandy bottom ; this berth will be three-quarters of a mile from the white beach at the head, and will enable vessels to leave conveniently on the approach of a S.E. wind, which they should always do. There is anchorage, if desired, in 4 fathoms, much closer in.

CAPE LAZO will be seen after passing the eastern end of Hornby island, from which it bears W.N.W., distant 15 miles. It is a remarkable salient point about 250 feet high, flat and grassy on its summit, but wooded behind, and falling abruptly to the sea in yellow clay cliffs. Although a bold-looking headland, shoal water extends a considerable distance off, and it is recommended not to approach its eastern and south-east sides, nearer than 2 miles, as only $4\frac{1}{2}$ fathoms uneven bottom is found at the distance of $1\frac{1}{2}$ miles. Large boulder stones dry off for half a mile at low water. When the pitch of the cape bears S.W., it may be approached to a mile in 11 or 12 fathoms, and the coast to the westward may safely be passed at that distance.

MITTLENATCH ISLAND, at 16 miles N.W. of Cape Lazo, is half a mile in extent, 200 feet high, bare and peaked. Between it and the Vancouver island shore, distant nearly 6 miles, is the fair channel to Cape Mudge and Discovery channel.

OYSTER BAY.—From Cape Lazo the coast trends W.N.W., is moderately high, and slightly indented with boulder beaches, which makes boat landing attended with danger unless in very calm weather. At the distance of 15 miles is Kuhushan point, the southern extreme of a large but not very deep indentation, named, Oyster bay ; Shelter point, nearly 4 miles W.N.W. from Kuhushan, is its northern extreme. There is fair anchorage in 10 or 12 fathoms in this bay for vessels waiting wind or tide. A good berth is a little more than half a mile from the shore with Mittenatch island bearing N.E. $\frac{1}{2}$ E., and the highest part of Cape Mudge just open of the low extreme of Shelter point N.W. by N. A reef extends half a mile eastward, of Shelter point, which affords considerable protection from N.W. winds ; 4 miles north-westward of Oyster bay is the entrance to Discovery passage (page 155).

CAPE MUDGE is one of those peculiar headlands so frequently met with on this coast, and resembles point Roberts and Cape Lazo, except that the yellow clay cliff which forms its face is more covered with vegetation. The cape is between 200 and 300 feet high, flat, and wooded on its summit, falling to the westward as it enters Discovery passage with a low boulder point; the high land of Valdes island appears behind it from the south-eastward. A boulder beach extends in a semi-circular form from it to the eastward, and at the distance of 2 miles in this direction the depth is not more than 5 fathoms. The edge of this shoal water is fringed with kelp during summer, and is generally well defined by a tidal line, and sometimes heavy ripples, which it is recommended not to stand into. The western low part of Cape Mudge should not be brought westward of W.N.W. in entering or leaving Discovery passage.

DIRECTIONS.—The southern shore of the strait of Georgia, with its anchorages and smaller channels, having been now described, a few remarks will be offered on the navigation of the main strait.

From the coast of Gabriola island (page 112) abreast Nanaimo, to the opposite shore of the continent, about Burrard inlet, the width of the strait is 14 miles, the navigation free from danger, and the strength of the tide between 1 and 2 knots an hour. Coming from the southward, mount Shepherd, on the south end of Texhada island, is a very remarkable object, and shows as a high solitary peaked island standing in the middle of the strait; it is 2,900 feet in elevation, and is plainly seen in clear weather more than 30 miles off.

Proceeding westward, the long and comparatively low island of Lasqueti rises above the horizon, its singular bare turret-shaped summit 1,000 feet high presenting an unmistakeable feature. The Ballinac, and smaller islands westward of them, will now soon be made out. When abreast the former, the width of the channel contracts to 4 miles between them and the small island of Sangster off the south-east end of Lasqueti; after which it opens out again to 7 miles, and the rather remarkable flat-topped mount Geoffrey on the west end of Hornby island will be plainly seen. The southern coast of Lasqueti is bold, with no dangers off it which are not seen, except Seal rocks, which cover at half-tide, and lie $1\frac{1}{2}$ miles west of Sangster island; off its west end are the small groups of Flat and Bare islands, but no hidden dangers. False bay, which indents its west end, is exposed, and not recommended as an anchorage.

The Sisters islets are the next remarkable objects; they are two small black rocks 10 feet above high water, S.W. by S. from the west point of Lasqueti, with a deep water channel over a mile wide between them and Flat islands. When abreast the Sisters, the main strait turns

to the N.N.W. between them and Hornby island for 4 miles, and then resumes its original trend to the W.N.W. : the distance between the Sisters and point St. John, the low bare east point of Hornby island, is 5 miles ; the latter, with the small islets off it, should be given a berth of nearly a mile. The Sisters are bold on all sides, but should not be approached too close in calm or light winds, as the tide sets straight past them. Having passed point St. John, the distance to the entrance of the Discovery passage is 38 miles. The strait maintains a uniform width of 9 miles, until near Mittlenatch island, or for 30 miles, the only stopping places being Oyster bay, already described, 4 miles from Cape Mudge, and Gillies bay on the west side of Texhada island. The shore of Texhada island is bold.

Gillies bay is N. $\frac{1}{4}$ W. $10\frac{1}{2}$ miles from point St. John, and 2 miles north-west of a small group, the Mouatt islets, which lie nearly a mile from the shore. It will be known by a remarkable white patch on its northern point, which is seen for many miles, and shows as two distinct white spots. An anchor may be dropped a quarter of a mile from the beach in 12 fathoms, but it is only a stopping place.

In standing to the westward towards the Denman island shore, Lambert channel should not be opened out between Shingle spit and the south-east end of the island, (page 128,) nor should Cape Lazo be approached nearer than 2 miles.

NORTHERN SHORE OF THE STRAIT OF GEORGIA.

HOWE SOUND, immediately adjoining Burrard inlet (page 109) on the north is an extensive though probably useless sheet of water, the general depth being very great, while there are but few anchorages. It is almost entirely hemmed in by rugged and precipitous mountains rising abruptly from the water's edge to elevations of from 4,000 to 6,000 feet ; there is no available land for the settler, and although a river of considerable size, the Squawmisht, navigable for boats, falls into its head, it leads by no useful or even practicable route into the interior of the country.

The entrance is between Atkinson point, the north point of Burrard inlet, and Gower point, nearly 12 miles apart. The sound penetrates the continent in a northerly direction for 20 miles, and although of such considerable width for nearly 12 miles of its length, yet it is choked by some large and numerous smaller islands, between which are several ship passages. Bowen island, the largest and easternmost, is remarkable, its highest summit ; rising to nearly 2,500 feet, being round, smooth, and partially bare, unmistakably pointing out the entrance from any direction ; the island is 7 miles in length in a northerly direction, and more than 3 in width.

QUEEN CHARLOTTE CHANNEL, the easternmost passage into Howe sound, is between Bowen island and Atkinson point; Passage island, half a mile long only, but very prominent from the southward, stands in the centre of the channel and on either side of it is a deep water passage; that to the west is $1\frac{1}{2}$ miles in width and the best, the shores of Bowen island being steep and bold; some small rocky islets lie a short distance off the eastern side of the other, but the channel is a good one and a mile wide. A tide ripple is frequently met with off Atkinson point caused by the meeting of the ebb streams from the sound and Burrard inlet.

Snug Cove.—Northward of Passage island $1\frac{3}{4}$ miles, and on the eastern shore, is White Cliff point, and opposite on the Bowen island shore, distant $1\frac{1}{2}$ miles, is a double-headed cove. Snug cove the southernmost of these, though narrow, affords excellent anchorage to small craft in 9 fathoms, sheltered from all winds; Deep cove, the northernmost, is larger, but with a S.E. wind, when anchorage would be most required, a swell would set in. After passing White Cliff point the width of the channel increases to $2\frac{1}{2}$ miles, and 3 miles to the northward is Bowyer island, with a deep ship passage on either side of it, that to the westward being the widest.

Vessels bound to Port Graves, which is the principal anchorage in the sound, should pass westward of Bowyer island between it and Hood point, the north point of Bowen island. The latter is a rather remarkable low flat peninsular point, with a small high cliffy island lying off it, connected at low water; both island and point are bold. From Hood point, Hope point bears W. $\frac{1}{2}$ S. 3 miles, and after rounding it, a North course leads into the harbour.

Bound up the sound by Queen Charlotte channel, a N.N.W. course leads mid-channel; pass eastward of White rock, Centre island, and Anvil island, through Montagu channel; the depth of water is 140 fathoms; the eastern shore quite bold.

White Rock is a small but remarkable islet 30 feet high; some covering rocks extend a quarter of a mile N.N.W. and S.S.E. of it. Centre island lies midway between it and the south point of Anvil island.

Anvil Island is oval-shaped, and 3 miles long, and its summit, Leading peak, 2,746 feet high and very remarkable, resembles the horn of an anvil pointed upwards. From almost all parts of the strait of Georgia this peak appears as a most prominent object; it is mentioned in page 109 as an excellent leading mark to clear the shoals off the Fraser river by being kept just open westward of Passage island, on a N. by W. $\frac{3}{4}$ W. bearing.

MONTAGU CHANNEL, 5 miles above Bowyer island, and between Anvil island and the eastern shore, is a mile wide and over 100 fathoms

in depth; passing out of it the sound takes a N. by W. trend for 7 miles to Watts point, when it runs to the eastward for a further distance of 4 miles, terminating in a low delta, through which flows the Squawmish river. The sound carries its depth to the head and shoals from 100 fathoms suddenly to 2 fathoms; the latter depth is so close and the mud is so soft, that supposing a vessel to anchor, she would be certain to drag on shore with any wind up the sound.

COLLINGWOOD CHANNEL, to the westward of Bowen island, between it and the group of smaller islands which stud the centre of the sound, is the most direct route to Port Graves. In entering both shores are steep and bold; the direction of the channel for 4 miles is North, its width about a mile, and the general depth varies from 50 to 100 fathoms. The small islands forming the western side have no dangers but what are visible, except Passage rock, which lies almost midway between Worlcombe and Pasley islands, and covers at half-tide. Worlcombe is the outermost of the small islands, half a mile long, east and west, and very narrow. Passage rock bears from its eastern point W.N.W. $3\frac{1}{2}$ cables and in working in or out vessels should not stand so far to the westward, between Worlcombe and Pasley islands, as to shut in the western points of White and Ragged islands by the low east point of Pasley island.

White island, $1\frac{1}{2}$ miles within Worlcombe, is small and round, with some white quartz veins showing through the foliage. Ragged island is a short distance within it again, and has four or five very remarkable bare white rocks lying off its eastern end.

Having passed Ragged island, the western side of the channel is formed by Keats island, 3 miles long, moderately high, with a bare cliffy summit near its centre. From Cotton point, its eastern extreme, the entrance of Port Graves bears N. by E. $\frac{1}{4}$ E. 3 miles.

BARFLEUR PASSAGE lies to the westward of the central group of small islands, between them and Keats island; it is a safe ship channel, but not quite so wide as the one last described.

Working in, it is better not to approach nearer than a quarter of a mile to Popham island and the two smaller ones north of it, which form the eastern side of the passage. A rock, which breaks at low water, extends $1\frac{1}{2}$ cables into the channel westward from the second of these islands, and bears North the same distance from the north point of Popham island, otherwise there are no dangers which are not visible. At the distance of $2\frac{1}{2}$ miles this passage leads into Collingwood channel. The passages between the small islands are not recommended to be used unless by coasting vessels.

SHOAL CHANNEL, the westernmost entrance to Howe sound, is between Keats island and the mainland of Gower point. It is convenient for vessels coming from the westward, and leads to Plumper cove, a snug anchorage on the north-west side of Keats island; Gower point, the south-west extreme of the channel, is not very remarkable, but when approaching it a large boulder rock will be seen at its extreme, and a similar one on the shore a quarter of a mile to the westward of it; a conspicuous cone also rises immediately over the coast, 3 miles within the point on the west side of the channel, and is seen a long distance off.*

The south point of Keats island, which forms the eastern point of entrance to the channel, has a small but prominent and thickly wooded island lying close off it, Home island. From a little within this island a bar of sand and shingle extends quite across the channel to the steep cliffs of the mainland; the greatest depth over it, at low water, is 15 feet, and that in the centre of the passage, which is here half a mile in width. On either shore there is as little as 12 feet; the width of the bar in the centre is not over a quarter of a mile; it does not shoal very suddenly from outside, and a vessel might anchor in 9 or 10 fathoms sandy bottom, with Home island bearing E. $\frac{1}{2}$ S.

Plumper Cove.—Immediately after crossing the bar of Shoal channel the water deepens to 20 fathoms, and two small islets, partially wooded, and almost joined at low water, will be seen N.N.E. a mile off; between them and the shore of Keats island is Plumper cove, which is perfectly secure with all winds, and however hard it may be blowing outside, it is generally a calm here. Both shores of the channel are now steep, and to enter a vessel should pass round the north end of the islets and anchor in 8 fathoms in the centre of the cove. There is room to lie at single anchor, but a vessel of any size is recommended to moor, dropping her outer anchor in 10 fathoms, when the north end of the islets bear West, and running up the centre of the cove, drop the inner one in 6 fathoms; there is only room for one large vessel, but several small ones could find shelter.

THORNBOROUGH CHANNEL is a continuation of the one just described, and leads up the western side of the sound, between Gambier island and the main. Its direction after passing Plumper cove is N.N.W., and at the distance of 6 miles is Woolridge island, rather on the eastern shore; the wider channel lies westward of this island, but there is over 100 fathoms of water through Latona passage to the eastward of it, and a width of a quarter of a mile. Passing Woolridge island, the arm turns to the north-eastward, and northward of Anvil island leads to the head

* See Plan of Shoal Channel, No. 585; scale, $m = 3$ inches.

of the sound ; the depth of water is very great in every part, and there is no anchorage above.

GAMBIER ISLAND, lying in the centre of the sound, immediately northward of Bowen island, is almost square shaped, and 6 miles in extent either way. On its western side rise two very remarkable cone-shaped mountains over 3,000 feet in elevation ; the southern face of the island is indented by three very deep bays or inlets, in the easternmost of which only is convenient anchorage found. Close off the south-west point of the island are the Twins, two small islets ; they are the only part of its coast which may not be approached very close.

Port Graves, the easternmost of the three bays on the south side of Gambier island, is the principal anchorage in Howe sound. It is about 8 miles from the entrance, and may be reached with great facility by either of the channels already described ; its entrance will not, however, be very apparent to a stranger, until closing Hope point, which forms its eastern side.*

Hutt island, scarcely half a mile long, but very high and remarkable, lies close off the north-west side of Bowen island, and is a good guide to the port in entering by either of the western channels ; from it Hope point bears N. by W. $1\frac{1}{2}$ miles ; keep the Hope point shore on board on the starboard hand. The direction of the port, as also of the two deep bays westward of it, is north, and it runs more than $1\frac{1}{2}$ miles in that direction, the width not quite half a mile.

On the western shore three-quarters of a mile within the entrance a shingle spit extends out for a short distance, which should be given a berth, as shoal water extends half a cable off it ; when within this spit there is anchorage anywhere in 10 fathoms, but half a mile or more inside it, in 7 fathoms, is the best berth. Vessels entering by Shoal channel, and bound for Port Graves, after passing Plumper cove should steer N.E. until Hope point is aboard and the harbour open, in order not to mistake either of the western bays for it.

The COAST from Gower point, the western entrance of Howe sound, trends W. $\frac{1}{2}$ S. for 18 miles to the entrance of Malaspina strait, and is free from danger. White islet, a bare rock 50 feet high, lies $1\frac{1}{2}$ miles from the shore, 6 miles westward of Gower point, and is remarkable, always showing very white ; there is deep water close to it and inside it. At 4 miles N.W. of this islet the coast recedes and forms Trail bay. There is a very marked drop in the land at the head of this bay, across which, by a portage of half a mile, the natives carry their canoes into Seechelt arm,

* See Plan of Port Graves, No. 585 ; scale, $m = 3$ inches.

one of the many arms of Jervis inlet. The Trail islets, four in number, lie something more than half a mile off the western end of this bay, and if necessary small vessels may drop an anchor inside them in 12 or 13 fathoms,

Thormanby islands, two in number, almost joined, and upwards of 2 miles in extent, are 18 miles from Gower point and form the south-east entrance point of Malaspina strait; there is a deep but very narrow channel, Welcome pass, between these islands and the main.

TEXHADA ISLAND, lying parallel with and on the eastern side of the strait of Georgia, is 27 miles in length, with an average width of scarcely 4 miles. Throughout its whole length stretches a ridge of rugged trap mountains, wooded generally to their summits; at the southern end mount Shepherd reaches a height of 2,900 feet; towards the northern end the range decreases in elevation, but there is scarcely an acre of cultivable land throughout the island. Its shores are steep and bold on all sides, and the land rises abruptly, except at the north extreme.

On the north side 3 miles from Marshall point, there is a boat cove; the only anchorage, and that merely a stopping place, is Gillies bay, on the south-west side (page 132); good limestone is found at the north end of the island.

LASQUETI ISLAND lies parallel with Texhada at its south-east end, and is separated from it by a channel about a mile in width. Its length is 9 miles, its average width something more than 2 miles, and it is remarkable from a singular turret-shaped summit, 1,000 feet high, called mount Tremeton, rising nearly in its centre. On its southern side are several boat coves, and in Tucker bay, on the northern, there is very fair anchorage, with some good land in the neighbourhood.

Sangster island, half a mile long, lies S.S.W. a mile from Young point, the eastern extreme of Lasqueti. There is a deep passage with 70 fathoms water between the two, but a rocky ledge with shoal water on it extends off the western point of Sangster; and the Seal rocks, which cover at half-tide, lie W. $\frac{1}{2}$ N. a little more than a mile from the same point; it is not recommended to pass between the island and the rocks.

Jenkins island lies 3 miles westward of Sangster, and close to the south shore of Lasqueti. The Sea Egg rocks, always uncovered, lie 3 cables off its west end.

False bay, at 3 miles westward of Jenkins island, and the same distance N.E. by E. of the Sisters islets, is a deep bight, but is not recommended as an anchorage, though small vessels would find shelter in its north-west corner in 7 fathoms.

STEVENS PASSAGE, between the Sisters islets and Lasqueti, is upwards of a mile wide, and perfectly safe and clear. Flat islands,

on its eastern side, should be given a berth of a quarter of a mile, likewise Bare islands, a small group lying off the north-west end of Lasqueti.

SABINE CHANNEL, between Texhada and Lasqueti islands, is a good ship passage 9 miles long, in nearly an East and West direction, with very deep water ; its breadth at the western end is 3 miles, but several high conical islands lying off the north-east side of Lasqueti contract the width at the eastern end, in some parts to three-quarters of a mile. There is also a narrow but deep channel, Bull passage, to the southward of these islands, by keeping close along the Lasqueti shore.

Tucker Bay, on the north side of Lasqueti, and equidistant from either end, is a very fair anchorage. Entering from the westward it is 4 miles from Bare island, and will be readily known by a group of small wooded islands which form its eastern side ; its western point is sloping and somewhat remarkable, partially bare of trees. The water shoals rather suddenly from 30 to 16 fathoms, and the anchorage is in 14 fathoms, with the outermost and westernmost of the small islands bearing N.N.E. and the west point of the bay W. by N. $\frac{1}{2}$ N., which will be within a quarter of a mile of the shore. The tides through Sabine channel are as much as 2 knots an hour, the flood running to the westward, the ebb to the eastward. With a strong N.W. wind and flood tide, the bay, though safe, would not be a comfortable anchorage ; from the eastward sailing vessels would find some difficulty in reaching it in consequence of the prevailing N.W. winds and the narrowness of the channel at that end.

MALASPINA STRAIT is a wide navigable channel, separating Texhada island from the mainland. Its general direction is W.N.W. for 30 miles, when it again enters the strait of Georgia between Marshall point, the north-west extreme of Texhada, and Harwood island ; its southern entrance lies between Upwood point, the south-east extreme of Texhada, and the western of the Thormanby islands, and is 4 miles in width.

Upwood point is rugged and precipitous ; stunted pines grow between the crevices of the bare trap rock ; the land behind more thickly wooded. Almost immediately over it rises mount Dick, a very remarkable hump-shaped hill, 1,100 feet high, and 3 miles within is mount Shepherd, the highest summit of the island. A covering rock lies 2 cables off the point.

Thormanby islands, lying close to the mainland, and appearing as part of it, terminate at their north-west point in a steep clay cliff, off which, at low water, dries a boulder point. The Texhada shore is bold, and almost straight for its whole length, fronted by narrow shingle or boulder beaches.

The eastern side of the strait from Thormanby islands to Francis point, a distance, of 6 miles, is somewhat broken, and a rocky patch of considerable extent lies a mile S.E. by E. from the latter point, and extends nearly the same distance parallel with the shore. The least water found on it is 10 fathoms, though there is probably less.

JERVIS INLET is one of the most considerable of those numerous and remarkable arms of the sea which indent the continent of America from the parallel of Fuca strait as far as lat. 60° N. ; it extends by winding reaches in a northerly direction for more than 40 miles, while its width rarely exceeds 1½ miles, and in most places is even less.

Neither in a commercial point of view, as a refuge for shipping, or as a means of communication with the interior of the country, does it appear likely ever to occupy any very prominent place, as it is hemmed in on all sides by mountains of the most rugged and stupendous character, rising from its almost perpendicular shores to five, six, and sometimes eight thousand feet. The hardy pine, which flourishes where no other tree can find soil to sustain life, holds but a feeble and uncertain tenure here ; and it is not uncommon to see whole mountain sides denuded by the blasts of winter, or the still more certain destruction of the avalanche which accompanies the thaw of summer. Strikingly grand and magnificent, there is a solemnity in the silence and utter desolation which prevail here during the months of winter, not a native, nor a living creature to disturb the solitude and though in summer a few miserable Indians may occasionally be met with, and the reverberating echo of a hundred cataracts disturb the silence, yet the desolation remains, and seems inseparable from a scene which nature never intended as the abode of man. The depths below almost rival the height of the mountain summits ; bottom is rarely reached under 200 fathoms, even close to the shore, and frequently at much greater depths ; there are a few spots where vessels may drop an anchor, but they are either open and exposed, with an inconvenient depth of water, or from the narrowness of their entrance are only adapted to steamers or coasting vessels.

The entrance of the inlet is between Francis point and Scotch Fir point, which are 12 miles apart in a W.N.W. direction. Nelson island lies immediately in the centre, and divides it into two channels, the westernmost being the principal one. Both channels can be made out from point Upwood, the south-east extreme of Texhada island, which lies directly in front, and serves as a barrier to westerly winds, to which the inlet would otherwise be much exposed.

AGAMEMNON CHANNEL, the eastern entrance to the inlet, is 9 miles N. by W. from point Upwood ; after running between Nelson island and

the main in a general northerly direction for 9 miles, it joins the main channel of the inlet ; its average width is little more than half a mile, the tides run from 1 to 3 knots, the depth of water varies from 50 to 100 fathoms and it affords no anchorage. The southern entrance is encumbered by a group of small islands, the centre and largest of which, Pearson island, is a quarter of a mile in extent, wooded, and 250 feet high ; from it the entrance bears N.N.W. Westward of Pearson a little more than a quarter of a mile are the Channel islets, two or three small islets joined by reefs ; and eastward of it at the same distance is Martin island, also very small. Thus there are three passages into Agamemnon channel ; the westernmost, between the west point of the channel, point Fearney, and the Channel islets ; the middle, between Channel islets and Pearson island ; and the easternmost, between the latter and Martin island. The passages are about the same width, something over a quarter of a mile, and have deep water ; 20 fathoms is the least found in the middle channel ; there is also a passage eastward of Martin island.

Vessels entering by the western passage, or coming from the westward along the shore of Nelson island, must avoid the Nile rock which covers at quarter flood, at a mile S.W. by W. $\frac{1}{2}$ W. from Fearney point and the same distance west from the largest Channel islet. It is steep all round, and lies half a mile from the nearest point of Nelson island, off which a reef extends ; unless the rock is seen it is recommended to pass outside or southward of it. The southern Channel islet in one with the north end of Pearson island points to the rock.

Pender Harbour* is the only anchorage deserving the name, with a moderate depth of water, to be found in the neighbourhood of Jarvis inlet, and its entrance is so encumbered by islands as to render it difficult of access to anything but steam or coasting vessels ; it immediately adjoins the Agamemnon channel on the south, and lies E.N.E. three quarters of a mile from Pearson island, indenting the coast for 3 miles in the same direction.

Williams and Charles islands lie immediately across the entrance ; there is a passage in to the northward of the former, and also between the two ; the first-mentioned, between Williams island and Henry point, the north entrance point of the harbour, is not a cable in width but it is the best, and has a depth of 20 fathoms. Immediately within are the two Skardon islands ; pass on either side of them and steer up the harbour, which is now something more than a quarter of a mile in width, and the depth will soon decrease to 12 fathoms. A mile within the entrance a peninsula extends to the south from the northern shore ; pass between its southern

* See Plan of Pender Harbour, No. 585 ; scale, $m = 3$ inches.

point and Mary island, something more than a cable apart, with a depth of 12 fathoms, and anchor in Gerrans bay, a quarter of a mile to the southward, in 6 or 7 fathoms; there is also good anchorage in Garden bay just eastward of the peninsula in 5 or 6 fathoms. The harbour runs three-quarters of a mile above Garden bay by a very narrow passage with only 2 fathoms in it, and then opens out with a depth of 7 fathoms.

Entering the harbour between Williams and Charles islands, the channel is only 100 yards width, with 7 fathoms, and a rock which covers at three-quarters flood lies N.N.W. from the east point of the latter island, distant something more than half a cable.

The WESTERN or ENTRANCE PROPER of Jervis inlet is between Alexander point, the south extreme of Hardy island, on the east, and Scotch Fir point on the west. The points are not remarkable, but the opening is readily made out; it is nearly 2 miles in width, and takes for a short distance a N.N.W. direction. Scotch Fir point is rocky, and has two small islets lying close to the westward of it, which like the point itself are covered with stunted pines. Hardy island lies close to and is nearly connected with Nelson island; Blind bay between them is useless, and its entrance choked by small islands.

Thunder Bay, formed on the western side $1\frac{1}{2}$ miles above Scotch Fir point, is one of the few spots in Jervis inlet where a vessel may drop an anchor, and being near the entrance is likely to prove convenient. The bay is about half a mile deep, with a sandy beach at its head, off which, at the distance of 2 cables, 17 fathoms will be found; immediately outside it there are 30 fathoms, and the lead then drops suddenly to a great depth.

A mile within Scotch Fir point the inlet takes a N.E. by E. direction for 12 miles, when it forms a junction with Agamemnon channel at the northern end of Nelson island. Just before reaching this point, Hotham sound, a wide opening, trends to the N.N.W., terminating at the distance of 7 miles in a double-headed bay; the water in every part of it is too deep for anchorage.

NELSON ISLAND, in the middle of the entrance to Jervis inlet, is 10 miles long in a northerly direction, and about 4 or 5 miles wide; its shores are much broken and indented by several bays, in none of which, however, can anchorage be obtained in consequence of the great depth. The island is mountainous, the summits ranging from 500 to 1,000 feet in height. Cape Cockburn, its south point, is of white granite, about 80 or 90 feet high, covered with a few dwarf pines; a rock lies one cable south of it.

Captain island, north of Nelson island, and separated from it by a narrow passage, is about a mile in extent, rocky, and steep-to.

One Tree islet, off the east side of the inlet, $1\frac{1}{4}$ miles north-east of Captain

island, is small, and has a single tree on its summit, which is very conspicuous; its height is about 50 feet. A rock awash at low water lies a cable of its east side; but the islet may be approached close on the west side; just within it, on the east shore, is a bight where a coaster may drop an anchor.

PRINCE OF WALES REACH.—Dark cove, on the west side of Jervis inlet, within the Sydney islets, is 2 miles north of Captain island, and 12 miles from the entrance. The cove is only about 2 cables in extent, but affords a snug anchorage in 15 fathoms, and is the only spot in the inlet deserving of that name; a vessel of considerable size could moor within it. There is a clear deep passage one cable wide into this cove on either side of Sydney islets.

Vancouver bay, on the east side of inlet, 19 miles from the entrance, is about half a mile in extent, and of square shape. From its head, which is low, a considerable valley extends to the eastward, but the shores on both sides are craggy and precipitous, and the bay is too deep to afford anchorage, there being 60 fathoms within a cable's distance of the bank, which extends a short distance from its head.

PRINCESS ROYAL REACH.—Deserted bay, also on the east side of the inlet, at the termination of Princess Royal reach, and about 37 miles from the entrance, is small, and affords an indifferent anchorage in its eastern part near the head in about 16 fathoms, exposed to west and south-westerly winds. A valley extends from the head of the bay to the north-east, through which a trail runs to the Lillooet lakes on the Fraser river, and is much frequented by the natives in the summer season.

QUEENS REACH.—The head of Jervis inlet terminates in a patch of low swampy land, through which flow some small streams, and a bank dries off about one cable; it does not afford any anchorage, there being 25 fathoms within half a cable of the outer edge of the bank. A remarkable peak, mount Victoria, rises 2 miles north of the water's edge to a height of 7,452 feet, and is a very conspicuous object on approaching the head of the inlet.

Princess Louisa inlet, on the east side of Jervis inlet, 5 miles below the head, is narrow, and about 4 miles long in an E.N.E. direction; it is connected by a narrow gorge to the main inlet, which at low tide becomes almost a waterfall rendering it impossible for boats to enter except at high water; within, like Jervis inlet, it is deep, and the mountains on either side rise to 7,000 and 8,000 feet.

SEECHELT ARM, the entrance to which is on the east side of Jervis inlet, one mile north of Agamemnon channel, is an extensive arm of the sea, penetrating the land for 17 miles in a south-easterly direction towards the strait of Georgia, and only separated from the

latter by a low neck of land 1,100 yards wide, forming an extensive mountainous peninsula to the westward, called See-chelt peninsula. On the east side of the arm, at a distance of 7 and 11 miles from its entrance, are two smaller branches extending to the north-eastward for upwards of 10 miles.

The arm at 3 miles within its entrance contracts in breadth to less than a third of a mile, and is partially choked up with rocks and small islands, which preventing in a great measure the free ingress and egress of the tide, cause most furious and dangerous rapids, the roar of which may be heard for several miles. These rapids prevent any vessel, or even boat, from entering the arm, except for a short time after high and low water, when the tide slackens for a very limited period; it would, however, be hazardous for any vessel, except a very small one, to attempt to enter at any time, although there is a passage with from 4 to 7 fathoms between the islands and the south or peninsula shore.

The shores of the arm, except near its south part or head, are high and rocky, and it is a useless sheet of water, unless as regards fishing; in the summer season the natives catch great quantities of salmon.

TIDES.—It is high water at full and change in Jervis inlet at 6 hours, the rise and fall being about 14 feet; within the See-chelt arm the rise and fall seldom exceeds 6 or 7 feet.

The tidal streams are, except near the entrance of See-chelt arm, weak and irregular and influenced by winds.

HARWOOD ISLAND, off the west entrance to Malaspina strait, $1\frac{1}{2}$ miles from the continental shore and about 3 miles north-west of point Marshall, is $2\frac{1}{2}$ miles long in a northerly direction, $1\frac{1}{2}$ miles wide, from 150 to 200 feet high, flat, and thickly wooded. It is bordered by a sandy beach, and at its north point is a low grassy spit. There is deep water between the island and the shore.

Midway between point Marshall and Harwood lies the Black rock, of small extent, and about 6 feet above high water.

Bare islet, one mile south-west from Harwood, is a bare yellow cliffy rock about 2 cables in extent, and 30 feet above high water.

The COAST.—Westward of Jervis inlet, the north shore of Malaspina strait runs in a westerly direction for 11 miles, terminating at Grief point; for a considerable distance inland it is low, and bordered by a sandy beach; there are no off-lying dangers that are not seen.

From Grief point the north or continental shore of the strait of Georgia runs in W.N.W. direction for nearly 20 miles almost straight to Sarah point, the south-east entrance point of Desolation sound. Throughout the whole distance the coast is low, not rising to more than 500 or 600 feet, and but slightly indented. There is a fresh-water stream of considerable

size 4 miles west of Grief point, and at a mile farther westward a vessel may anchor in fine weather for night or tide at a distance of 3 or 4 cables off shore near the coast abreast Harwood island in 12 to 13 fathoms.

In navigating along this coast between Grief and Sarah points, a vessel will avoid danger by keeping not more than half a mile off shore, and passing northward of Harwood and Savary islands. When past Hurtado point, a vessel ought to steer more to the westward, and pass southward or westward of the White, Double, and Powell islets.

SAVARY ISLAND, nearly 6 miles W.N.W. of Harwood island and one mile from the continental shore, is 4 miles long in a W.S.W. direction, but narrow. A sandy beach strewn with huge boulders surrounds it, and extends a considerable distance off its north and west sides, which should not be approached nearer than half a mile. The height of the island varies from 80 to 120 feet, and the south side is faced by some remarkable white sandy cliffs, very conspicuous from the south-east; its east extreme is a granite cliff, steep-to. There are several clear grassy patches on the island, but the soil is poor and sandy. A sandy bar or ledge, of 1 to 2 fathoms water, extends from its west point to Hernando island.

Hurtado point, on the main abreast Savary island, is about 250 feet high, bold and cliffy. There are 37 fathoms in mid-channel between it and the island.

MYSTERY ROCK, apparently a short distance to the eastward of Savary island, is of small extent and uncovers at low water. Uncertainty exists as to its exact position, but during the survey the rock was twice seen by Mr. Bedwell in 1862 from the south point of Harwood island, though not from anywhere else. Vessels therefore in navigating this locality should observe great caution when going between Savary and Harwood islands, but by keeping within half a mile of the continental shore this danger will be avoided.

RAGGED ISLANDS, close to the continental shore and running parallel to it, are a rocky group of small islands $2\frac{1}{2}$ miles long and 3 cables wide; their south-east part is about $2\frac{1}{2}$ miles north-west of Hurtado point, and some rocks extend 4 cables from their north-west extreme.

White islet, a mile to the south-west of them, is a very remarkable bare white granite rock about 70 feet high. A rock which uncovers at low water lies one cable east of it, but in the middle of the passage between the islet and Ragged islands are 37 fathoms.

Double islets, half a mile west of the north-west part of the Ragged group, are small, and about 90 feet high, with a single tree on each of their summits.

Powell islets, one mile north-west of Double islets, are two in number, small, about 90 feet high, and covered with a few stunted bushes and trees; the westernmost islet is steep-to on its north and west sides.

SARAH POINT, at 20 miles W.N.W. of Malaspina strait, may be called the north-west entrance point of the strait of Georgia. It is a rounding rocky point sloping gradually to the sea from a height of about 700 feet, at a short distance within it. The coast here turns sharply round to the eastward into Malaspina inlet.

HERNANDO ISLAND, 2 miles west of Savary, and 3 miles N.N.E. of Mittlenatch island (page 130), is about 2 miles in extent, flat, thickly wooded, and from 120 to 170 feet high. A ledge composed of sand and huge boulders extends two-thirds of a mile from its south-east point, and there is only $1\frac{1}{4}$ fathoms in the channel between it and Savary islands. From the west side some rocks extend off upwards of 2 cables in many places, and it should not be approached nearer than half a mile in passing.

Stag Bay, on the north side of Hernando, affords anchorage in 12 to 15 fathoms at a distance of about 2 cables off shore, and is useful as a stopping place for vessels bound to Bute inlet or Desolation sound. There is a small fresh water stream in the east part of the bay.

Tongue point, the north-west extreme of Hernando and of the bay, is a low sharp sandy point or spit covered with a few trees, steep-to, and may be approached to 50 yards. Vessels should anchor about three-quarters of a mile from this point, with the east part of Twins island bearing N. by E.

BAKER PASSAGE, to the northward of Hernando island and leading from the strait of Georgia to the entrance of Desolation sound, is about 3 miles long in a north-easterly direction, and one mile wide in the narrowest part, being bounded on the north side by Cortes and Twins islands. The only danger is at its north-west entrance point, off which a boulder ledge extends upwards of 3 cables in a south-easterly direction.

Twins island, about $1\frac{1}{2}$ miles north of Hernando, are two rocky islands connected by a sandy beach at low water, covering an extent 2 miles long in a north-westerly direction, and about one mile broad; their south shore is steep-to and may be approached to one cable. Some small islets lie a short distance off their north side, and the Centre rock, which covers at a quarter flood, is in the middle of the passage between them and Cortes; the northernmost Twin is 490 feet high, rising to an almost bare summit in the centre; the southern one is about 300 feet, and on both of them are numerous indications of iron and copper ores. None but small craft should go north of these islands.

If entering Baker passage from the strait of Georgia, to avoid the ledge

off Reef point, the south extreme of Cortes island, bring Tongue point, the north-west extreme of Hernando island, on a N.E. bearing, and steer for it, passing about a cable off, then keep midway between Hernando and the Twins.

BLIND CREEK, on the east side of Cortes island, $1\frac{1}{2}$ miles north of Twins island, is a basin of about 4 cables in extent, with from 7 to 9 fathoms ; there is, however, in the entrance a rock which covers at a quarter flood, rendering the place useless as an anchorage.

Three islets, lying half a mile off the entrance of the creek, are three bare white rocks about 60 feet high, almost connected at low water ; there are 27 fathoms at a distance of 2 cables eastward of them.

LEWIS CHANNEL, off the entrances to Desolation sound between Cortes and Redonda islands, to the westward of the latter, runs nearly straight upwards of 12 miles in a north-westerly direction, and varies in breadth from one mile to 3 cables, widest at the south-east part ; its shores are generally rocky, low in the south part, but rising gradually to the north-west, steep-to and everywhere free from danger ; no directions are necessary for navigating it.

Turn point, the south-west entrance point of this channel and the east extreme of Cortes island, is about 100 feet high, rocky, and covered with a few stunted trees ; the coast turns suddenly from north-east to north-west around it, and close in shore to the northward of the point are two islands forming a small boat cove.

In Lewis channel the tides are weak and irregular, seldom exceeding 2 knots, and influenced by the winds.

SQUIRREL COVE, on the west side of Lewis channel, $4\frac{1}{2}$ miles from Turn point, is a small land-locked basin of 6 to 7 fathoms water, with room for a vessel of considerable size to lie at single anchor. It is entered by a narrow passage about 130 feet wide, with 5 fathoms water, on the west side of the island in the entrance, which protects the cove from the southward. The shores are moderately high, and though much broken, very picturesque and fertile in appearance. To the northward of, and connected at high water with the cove, is a long narrow lagoon, stretching to the north-west nearly across Cortes island.

Squirrel cove can only be entered by steamers or sailing vessels with a fair wind, and the chart is the best guide. There are no dangers whatever within or near it.

Boulder, the south-east point of entrance, is low, and may be easily known by a large boulder on its west side ; a rock, which covers, lies nearly one cable south of it, but the point may be rounded at a distance of 2 cables.

Northward of Squirrel cove the west side of Lewis channel becomes more rocky, and gradually increases in height ; it takes a northerly direction for a mile to Junction point, and then trends to the north-west for 7 miles, the channel ending at Bullock bluff, the north extreme of Cortes island. At $3\frac{1}{2}$ miles from Junction point the depths in the channel shoal to 27 and 30 fathoms, and a vessel may anchor in about 18 fathoms at a cable's distance from the west shore. Vancouver's ships anchored here in 1792 while exploring this part of the coast.

KINGHORN ISLAND, in the south entrance to Desolation sound, and forming the south-east point of entrance to Lewis channel, is about 2 miles in circumference, and from 400 to 500 feet high ; it is clifty and steep-to on the south-west or channel side.

The west side of Redonda island, north-west of Kinghorn, forms the eastern boundary of Lewis channel, and is sterile, rocky, and steep-to, rising in the northern part to craggy mountains upwards of 3,000 feet high. At a distance of 6 miles from the south entrance of Lewis channel the Tea-kerne arm penetrates this island 4 miles in an E.N.E. direction, but is too deep to afford anchorage, except for small craft near its head and close to the south side of entrance.

SUTIL CHANNEL.—This extensive channel, which leads from the western part of strait of Georgia to the entrances of Toba and Bute inlets, is bounded on the east side by Cortes and on the west by Valdes and Read islands. Its length in a northerly direction is 15 miles ; and the breadth at its entrance to the strait of Georgia 6 miles, decreasing to one mile in the northern part. The soundings in mid-channel are deep, though there are several dangers off both shores near the southern parts, but northward of Mary island it is quite clear.

There are several good anchorages on either side, two of which, Drew harbour and Carrington bay, are easy of access to all vessels, and useful as stopping places.

The tides in the Sutil channel are weak, seldom exceeding 2 knots ; the flood stream runs to the northward from the strait of Georgia ; it is high water at full and change at 6 hours, and the rise and fall is 12 feet.

CORTES ISLAND.—The west side of this island, which forms the eastern boundary of Sutil channel, is generally low, and indented by several bays and creeks, in many of which good anchorage may be found. Off Reef point, its south extreme, a ledge composed of sand and boulders extends three-quarters of a mile, and covers at three-quarters flood ; off its outer edge are 6 fathoms. The north side of Texhada island well open south of Savary and Hernando islands bearing E. by S., will lead a quarter of a mile south of the ledge, and also south of the Boulder reef (page 149).

From Reef point the west coast of Cortes runs in a northerly direction for $3\frac{1}{2}$ miles, is flat, from 80 to 150 feet high, and bordered by a sandy beach extending upwards of 2 cables off in some parts; it afterwards turns in a westerly direction, becoming rocky and broken, with a few islets a short distance off it in some places.

GORGE HARBOUR, the entrance to which is on the west side of Cortes island, $4\frac{1}{2}$ miles N.N.W. from Reef point, is 2 miles long in a westerly direction, and one mile broad at the widest part, affording good anchorage in 9 to 12 fathoms. The entrance to it is through a narrow gorge nearly half a mile long, bounded on either side by steep cliffs about 200 feet high, and less than 40 yards wide in some places, with 6 fathoms in the shoalest part; the tide runs through it from 3 to 4 knots. There are several small islands within the harbour, and the shores are rocky, varying in height from 100 to 300 feet. The best and most convenient anchorage is in the west part, about half a mile from the entrance.

Guide islets are just south of the entrance, and useful in indicating it, from being two small, bare, yellow-topped islets about 20 feet high, and conspicuous from the south-east. They are steep-to, and there is a clear passage on either side of them into Gorge harbour.

Bee islets, within the harbour and 3 cables north-west of the entrance, are two small bare rocks about a cable apart, and 4 feet above high water. They may be approached close to, and the best anchorage is from 1 to 2 cables west of them.

Brown island, in the middle of the harbour, about 3 cables north-east of the entrance, is nearly a mile in circumference, and thickly timbered. Its height is about 150 feet, the shores are rocky, and may be approached to a cable's distance. Ring island, at about one cable east of Brown, is wooded, but much smaller; the New rock, which covers at a quarter flood, lies nearly a cable east from it, and ought to be guarded against. There is good anchorage between Ring island and the north-east part of harbour in from 7 to 9 fathoms.

DIRECTIONS.—In entering Gorge harbour, which can only be done with a favourable tide, unless in a steamer, after passing Guide islets, steer boldly up the gorge or entrance, and take care, on nearing its north part, to pass between Tide islet and the west shore, the passage east of the islet being shoal, when haul to the north-west, pass on either side of the Bee islets, and anchor in from 10 to 12 fathoms, muddy bottom, one or 2 cables to the westward of them. Proceeding to the eastern part, after passing Tide islet, keep to the northward, and rounding the west side of Brown island at a cable's distance, haul to the eastward, and passing along the north shore of it and Ring island at half a cable distance, anchor

midway between the latter and the north-east end of harbour in from 7 to 10 fathoms. If requiring to water, this anchorage is more convenient; but vessels to avoid the New rock should not go to the southward of Ring or Brown islands.

MARY ISLAND, on the east side of Sutil channel about 3 miles N.W. by W. $\frac{1}{2}$ W. from Reef point, is of a round shape, about 6 miles in circumference, and from 70 to 150 feet high. Its shores are bordered by a sandy beach, strewed with huge boulders, and extending upwards of a mile in a south-south-east direction off its south point is a ledge about 2 cables wide, called the Boulder reef, which covers at high water.

From the north part of Mary island a sand-spit extends in a northerly direction to within one cable of Cortes island. There are 8 fathoms in the passage between the spit end and Cortes island.

In passing west of Mary island, keep the north side of Texhada island open south of Savary and Hernando islands E. by S. until Camp island comes open west of Mary island N.N.W., which marks will clear the Boulder reef on the south and west sides.

CAMP ISLAND, off the west extreme of Cortes island and 7 miles from Reef point, is of small extent, and wooded; between it and Cortes island is Plunger pass, about 3 cables wide, deep, and clear of danger. Two cables west of Camp is Centre islet, which is bare, and about 12 feet above high water; at this spot Sutil channel turns from N.N.W. to North, and becomes narrower.

CARRINGTON BAY, on the north-west side of Cortes, about 3 miles from Centre islet, is a mile deep in an easterly direction, about 3 cables wide, and affords anchorage at a distance of 3 cables from its head in 7 to 11 fathoms. Along its north side are some small islets, and a rock which uncovers at low water, but if intending to anchor in the bay, by keeping about one cable's distance from the south shore will clear all danger. At the head of the bay is a large salt water lagoon.

VON DONOP CREEK, the entrance of which is $5\frac{1}{2}$ miles from Centre islet, is long and narrow, penetrating Cortes island in a south-easterly direction for upwards of 3 miles. There is good anchorage in 5 to 6 fathoms near its head, but the entrance being only 30 yards wide in some places, with $3\frac{1}{2}$ fathoms in one spot, a vessel should not use it as a stopping place, as Carrington bay is much more convenient and easy of access.

One mile north of Von Donop creek the coast of Cortes turns north-west for 3 miles to Bullock bluff, at the termination of the Sutil channel; it is rocky and steep-to, rising abruptly to upwards of 1,100 feet.

VALDES ISLAND.—Cape Mudge, the south extreme of Valdes island and the south-west entrance point of Sutil channel, has been described in

page 130. A bank extends in a south-easterly direction for some distance from the cape, and until well inside the channel the cape ought not to be approached within 2 miles, as the eastern limit of this bank has not been defined. The coast of Valdes turns sharply round the cape to the N.N.W., running in a straight direction for $3\frac{1}{2}$ miles, and bordered the whole distance by a beach, running off upwards of a cable in many parts. The land is flat, and heavily timbered, but appears very fertile.

DREW HARBOUR, on the east side of Valdes, 6 miles from Cape Mudge, is about one mile deep, 3 to 4 cables wide, and rendered perfectly secure and locked by a narrow strip of land called Rebecca spit, which forms its eastern boundary; the anchorage, in 9 to 15 fathoms sandy bottom, at a distance of half a mile from its head, is the best in Sutil channel; its shores are low, and bordered by a sandy beach.

Heriot islet, lying to the north-west of the entrance, is about 250 feet high, rocky, of small extent, and separated from Valdes by a narrow boat pass. In the bay to the southward of it is fair anchorage, and fresh water may be procured; the soundings, however, in the entrance of it are irregular.

If intending to anchor in Drew harbour a vessel may round the north part of Rebecca spit at a distance of about one cable, proceed up the harbour in mid-channel, and anchor about half a mile from its head in 15 to 9 fathoms. The east side of Rebecca spit ought not to be approached within 2 cables.

HYACINTHE BAY, on Valdes island, and $1\frac{1}{2}$ miles north-west of Drew harbour, is of small extent, with from 16 to 20 fathoms water, but affords no anchorage; a small rock 4 feet above high water, lies in the middle of the entrance.

Open bay is half a mile north of Hyacinthe bay, and separated from it by a rocky point. It is half a mile in extent, with from 10 to 12 fathoms water, but as the bottom is rocky, and the bay open to the south-east, a vessel should not anchor there. Breton islets, extending upwards of a mile in a south-easterly direction from the north part of Open bay, are small, and from the outer one, which is wooded, a reef extends 3 cables, covering at a quarter flood. The passage between these islets and Rebecca spit is deep and clear of danger.

HOSKYN INLET, formed between Read and Valdes islands, on the east side of the latter, is 7 miles long in a northerly direction, with an average breadth of two-thirds of a mile; the shores are broken and rocky, with some small islands off the south entrance and along the east side, and there is no anchorage within it, except for small craft.

Village bay, on the west side of this inlet, just within the entrance,

is about one mile deep and a third of a mile wide, with from 12 to 24 fathoms, but affords no good anchorage; there is a large village at its head.

READ ISLAND, bordering the west side of the north-west part of Sutil channel, is 9 miles long in a northerly direction, and from one to 3 miles broad; its southern part is low, but rises gradually to the northward to 1,600 feet in some places; the shores are rocky, steep-to, and much indented, especially on the east side near the middle. Viner point, its south extreme, is bare, and about 40 feet above high water; it lies 7 miles north of Cape Mudge.

BURDWOOD BAY, on the east side of Read island, 2 miles from Viner point, is about a mile wide, 2 to 3 cables deep, and contains several small islets. There are 12 fathoms at a short distance off shore, in its north and south parts, where a vessel may stop in fine weather, but the bay is open to the south and east.

EVANS BAY, the next inlet on the east side of Read island, to the northward of Burdwood bay, is about 3 miles long in a northerly direction, $1\frac{1}{2}$ miles wide at the entrance, and branches off in two narrow arms near its head; its shores are rocky and much broken, and there is no anchorage except in Bird cove, on the west shore, where small craft may find shelter. Frederick point, the north-east point of entrance to the bay, is bold, and may be approached to one cable.

Hill island, just outside the entrance of Evans bay, is of small extent, but conspicuous from its centre 490 feet high. The shores are rocky, and may be approached to a quarter of a mile.

PENN ISLANDS, near the middle of the Sutil channel, to the northward of Evans bay, cover an extent about $1\frac{1}{2}$ miles long and one mile wide; they are rocky, covered with stunted trees, and their greatest elevation is about 270 feet. A vessel should not venture among them, but there is a clear passage on their east and west sides.

The east side of Read island to the northward of the Penn islands is rocky, but may be approached anywhere to a quarter of a mile.

DIRECTIONS.—Entering the Sutil channel from the strait of Georgia, pass within half a mile on either side of Mittenatch island, and steer N.W. by W. or N.W. $\frac{1}{2}$ W. for the entrance, taking care to keep the north side of Texhada island open westward of Hernando and Savary islands E. by S., until Camp island opens west of Mary island N.N.W., to clear the reefs extending off the south points of Cortes and Mary islands (page 147); when clear of the latter danger haul more to the

northward, steering about N.N.W., or N.W. by N., and passing about a quarter of a mile westward of Centre islet, steer up mid-channel, going, as most convenient, on either side of the Penn islands.

If entering this channel in thick weather, and the above marks be not seen, when past Mittlenatch island keep it on a S.E. $\frac{1}{2}$ E. bearing, and steer N.W. $\frac{1}{2}$ W. till the south part of Mary island bears N.E. by N., a vessel will then be clear of the Boulder reef.

A vessel may beat through this channel, but till past the dangers in the south part it would not be prudent to near the west sides of Cortes and Mary islands within $1\frac{1}{2}$ miles in standing to the eastward; and in standing towards Cape Mudge do not approach it within 2 miles, or bring Mittlenatch to the eastward of E. by S. $\frac{1}{2}$ S., until the cape bears S.W., when a vessel may stand to half a mile of the Valdes shore. If intending to anchor, Drew harbour and Carrington bay are easy of access for any class of vessel, and but little out of the regular track.

CALM CHANNEL, to the north of Lewis and Sutil channels, leading from them to Bute inlet, is 9 miles long in a N.W. by W. direction, and about one mile broad; its shores rise abruptly to a great height, are everywhere clear of danger, and the tides weak, except in the north-west part. The Rendezvous islands, three in number, which lie on its west side near the south part, cover an extent 3 miles long in a W.N.W. direction, and about half a mile wide. There is a deep passage, Drew pass, between them and the north part of Read island; and between the middle and southernmost island is a small spot with from 7 to 15 fathoms, where a small craft may anchor. This channel is not well adapted for any vessels except steamers, as there is generally but little wind, and no anchorage; no directions are necessary for navigating it.

STUART ISLAND, at the northern termination of Calm channel, and in the entrance of Bute inlet, is about 4 miles in extent, of an undulating surface, rising in some parts to 800 and 1,000 feet. Its shores are rocky and clear of danger; the tides run strongly round its north and west sides, but there is a clear passage into Bute inlet to the eastward of it, nearly a mile wide, with a very slack stream.

BUTE INLET.—This extensive arm of the sea, which penetrates the continent for nearly 40 miles in a winding course to the northward, presents many similar features to Jervis inlet (page 139), the general breadth varying from one to two miles, and the shores on either side rising abruptly and almost precipitously in many places to stupendous mountains from 5,000 to 8,000 feet high, whose summits are generally covered with snow all the year round. At the head are two extensive valleys, one penetrating to the north-west and the other to the south-east,

from which flow streams, the one to the westward, called by the natives Homalko river, is navigable for a long distance by boats and stern-wheel steamers of light draught. Off these rivers some sand-banks extend a short distance, affording indifferent anchorage near their outer edges; but the soundings everywhere else in the inlet are very deep. The water for some distance from the head is nearly fresh, and of a milky white appearance; in the summer months there is a constant outset, varying in strength from 1 to 2 knots.

ARRAN RAPIDS, at the entrance of the inlet on the west side, between Stuart island and the continent, are 2 cables wide in the narrowest part. The tides rush through with great strength, the flood from the westward, and it would be very hazardous for a vessel to go through them except at slack water.

ORFORD BAY, on the east side of the inlet, 19 miles from the entrance, is of small extent, with 35 fathoms close to edge of the bank, which extends from the head. A small vessel may use it as a stopping place.

WADDINGTON HARBOUR, at the head of the inlet, being in fact its termination, is about 2 miles in extent, and affords an indifferent anchorage off the edge of the banks, extending from the Homalko and Southgate rivers and off its east shore. Except in the vicinity of the rivers, the land rises almost precipitously to 4,000 and 5,000 feet, is most sterile and rocky, covered with stunted pines. The best anchorage is near the north part, about half a mile off shore, in 15 fathoms; but it is exposed to the south-west, and strong winds from this quarter would make the anchorage unpleasant, if not unsafe.

HOMALKO RIVER enters Waddington harbour on the west side, and is a stream of considerable extent, winding to the north-west through a large valley. At the entrance is a bar with only 1 to 2 feet over it at low tide, but within the water deepens to 1 and 3 fathoms; the breadth varies from 50 to 200 yards, and the river is navigable for boats and small steamers several miles. The shores for 2 miles from the entrance are low and swampy, covered with willows, but further up on the western side the land rises 4 or 5 feet above high water, and appears very fertile, though heavily timbered; the opposite side is steep and rocky; in summer months the current runs upwards of 5 knots out of the river.

Homalko river and Waddington harbour are likely to become places of some importance, as from the sources of the former an easy route has been discovered to the gold mining regions in the far north of British Columbia.

In navigating Bute inlet but few directions are required, as the points may be everywhere approached to half a cable, and, if intending to

anchor in Waddington harbour, when nearing it, steer for its north part, anchoring about three-quarters of a mile off the head in 15 fathoms, and about 3 cables from the high northern shore; the anchor should be dropped immediately 15 fathoms are obtained, as the bottom shoals rapidly.

Sailing vessels in entering or leaving the inlet should keep close to the eastern shore, or the ebb tide may take them through the Arran rapids to the westward.

TIDES.—It is high water, full and change, in Calm channel at 7 hours, and the rise and fall is 14 feet. In Bute inlet it is high water at 6 hours, and the rise and fall varies from 12 to 14 feet.

CHAPTER VI.

FROM THE STRAIT OF GEORGIA WESTWARD TO CAPE SCOTT AND
THE SCOTT ISLANDS.

VARIATION 22° 10' E. in 1864.

DISCOVERY PASSAGE, formed between the west side of Valdes island and the Vancouver shore, is the only known navigable outlet from the north part of the strait of Georgia to the N.W. Its length in a N.W. and S.E. direction from Cape Mudge to Chatham point is $23\frac{1}{2}$ miles, and its average breadth a little more than one mile; but at Seymour narrows it contracts to less than half a mile. Its shores, southward of the narrows, are moderately high and apparently fertile, but northward of them steep, rugged, and mountainous.

TIDES.—Southward of Seymour narrows the streams run with great strength, from 4 to 6 knots at springs, and turn at high and low water by the shore. At the southern entrance, near Cape Mudge and between it and Willow point, heavy races or tide rips rage during the flood, which would be dangerous to small vessels in blowing weather. It is high water, full and change, at 5 h. 30 m., and the rise and fall is about 11 feet.

Northward of Seymour narrows the streams are comparatively slack; they run from $1\frac{1}{2}$ to $2\frac{1}{2}$ hours after high and low water. At the narrows it is high water, full and change, at 4 hours, and the rise and fall is about 13 feet.

SOUNDINGS.—In Discovery passage, when to the southward of Seymour narrows, the soundings in mid-channel vary from 30 to 60 fathoms, except at one mile N.W. by W. from Cape Mudge, where a shoal patch of 8 fathoms exists. In Seymour narrows the least water in mid-channel is 35 fathoms, but northward of them the depth increases to 100 and 140 fathoms.

QUATHIASKY COVE.—Cape Mudge, with the bank off it to the south-east, have been already described in page 130. From it the west side of Valdes island takes a north-westerly direction, and at the distance of 3 miles is a small indentation named Quathiasky cove, bordered by a sandy beach. The cove is only fit for steamers or small craft, and only affords room for one vessel to moor in its south-east and another in its northern part; the former is recommended, about one or 2 cables south-east of

Grouse island, in 10 fathoms, well sheltered from all winds. A slight tide runs through the cove, but sweeps strongly past the entrance.

The land between Cape Mudge and Quathiaskey cove is about 100 feet high, flat, and fertile; an Indian village of considerable extent stands midway between the two places. Grouse island, in the centre of the cove, is small and moderately high; a shoal extends for two-thirds of a cable off its south-east point, which ought to be guarded against in entering. If intending to anchor in the cove, a vessel should enter south of Grouse island (guarding carefully against the tides) and keep well over towards the south shore until inside; moor mid-way between the south-east point of the island and the opposite shore, in from 7 to 10 fathoms. If necessary a vessel may proceed to the north part of the cove inside Grouse island, and anchor in from 7 to 9 fathoms.

GOWLLAND HARBOUR, the next opening in Valdes island, about 5 miles north-west of Cape Mudge, is of considerable extent, being upwards of $2\frac{1}{2}$ miles long in a N.W. and S.E. direction, and a quarter to two-thirds of a mile broad. The best berth, if stopping for a short time, is in 6 or 7 fathoms about 2 cables east of Vigilant point, the north-west extreme of Gowlland island; in the south part of the harbour the water is deeper, and the anchorage more extended. The shores are rugged, and there are several rocks and islands within it. Off the entrance is Steep island, about 100 feet high, 4 cables long, N.W. and S.E., and one cable wide; the western side is cliffy.

Gowlland island, which protects the harbour to the south-east, is about one mile long and a quarter of a mile wide, high and rugged, with a summit at either end, the southern one being nearly 400 feet high.

Entrance bank lies nearly across the entrance to the harbour, and partly dries at low water; it is composed of sand, being 4 cables in length N.W. and S.E., and one cable broad; there is a clear passage on either side of it, with not less than 4 fathoms; its south end, in 3 fathoms, is a cable north of Vigilant point.

DIRECTIONS.—If entering Gowlland harbour from the southward, round Steep island at a distance of about a cable, and steer N.E. by E. for Vigilant point, which is steep-to, and ought to be rounded at less than half a cable's length to avoid Entrance bank. Having passed the point, anchor in 5 to 7 fathoms, muddy bottom, about 2 cables east of it, or proceed further to the south-east, where more extended anchorage will be found. The passage south of Gowlland is choked up with rocks.

If coming from the north-west, when Vigilant point bears East, steer for it, passing as before directed.

* See Plan of Gowlland harbour, No. 2,067; scale, $m = 3$ inches.

MAUD ISLAND.—From Gowlland harbour to Seymour narrows the coast takes a W.N.W. direction, being steep-to, high, and rugged. Maud island, the south-east point of the narrows, is small, about 300 feet high, and there is a boat passage between it and Valdes island: a small islet, called Yellow islet, lies 4 cables E.N.E. from it.

WILLOW POINT of Vancouver island, the south-west point of Discovery passage, lies S. by W. nearly 2 miles from Cape Mudge. It is low, covered with willow bushes, and off it a sandstone ledge extends to the north-east for nearly 3 cables. In passing the point do not approach within half a mile.

From Willow point a low coast runs north-west for 7 miles to Orange point, and is bordered the whole distance by a sandy beach. Orange point is bare and round, of a reddish colour, not unlike the top of an orange; about $1\frac{1}{2}$ miles south-east of it is the entrance of a large stream of fresh water, the Campbell river, navigable for some distance by boats or canoes.

DUNCAN BAY, of which Orange point is the east extreme, is about half a mile deep, and affords good anchorage in 14 to 7 fathoms, sand, well out of the tide, and sheltered from all except N.W. winds. This bay is easy of access, and the best anchorage southward of Seymour narrows: a good position to anchor is about 3 cables S. by W. of Orange point, in 7 to 14 fathoms.

Race point, lying about 3 miles N.W. from Duncan bay, is bold and steep-to. The tide runs past it with great velocity, and, during the flood stream, the rippling off it is very dangerous for boats.

MENZIES BAY, immediately south-west of Seymour narrows, is of considerable extent, running in a W.N.W. direction for $1\frac{1}{2}$ miles, and three-quarters of a mile broad, but in its centre is a large sand-bank, which partly dries at low water, with a narrow but clear passage on either side: good well-sheltered anchorage in 5 to 6 fathoms may be procured between this bank and the head of the bay.

The east shore of the bay is high and rugged, the western shore low; both are steep, and from the head an extensive valley runs to the north-west, and a bank extends off 2 cables.

If intending to anchor in the bay, it is recommended to keep within a cable's length of the east shore for half a mile; when steer to the westward towards the centre of the bay, and anchor in about 6 fathoms, muddy bottom, half a mile from the head, and 2 cables from the east shore.

SEYMOUR NARROWS, at $10\frac{1}{2}$ miles N.W. by W. from Cape Mudge, are about $1\frac{1}{2}$ miles long, from 3 to 5 cables wide, and the shores on both sides are high, rugged, and steep-to. In consequence of the contraction in breadth of Discovery passage the tide rushes through these

narrows with great velocity, nearly 9 knots at springs; the flood and ebb streams run for nearly equal intervals of 6 hours, a very short period of slack water intervening between them.

It is recommended to choose the early part of a favourable tide to pass through these narrows, for during the greatest strength a boiling race extends across and steerage becomes very difficult.

Northward of the narrows, Discovery passage takes a north-westerly direction for 12 miles to Chatham point, the shores becoming more high and rugged than before. On the eastern shore are several bays or openings, but, with the exception of Plumper bay, too deep to afford anchorage: the western shore is nearly straight, and near Chatham point are Otter cove and Elk bay, both affording anchorage.

PLUMPER BAY, half a mile north of Seymour narrows, is about two-thirds of a mile deep, and the same in width, affording anchorage in from 14 to 9 fathoms, near its south-east part, easy of access, well sheltered, and out of the tide. If unable to proceed through the narrows in consequence of the tide, Plumper bay becomes a very convenient stopping place, and no directions are necessary for entering it.

Deep Water bay, separated from Plumper bay by a peninsula, is about one mile deep, and half a mile broad, but too deep for anchorage.

GRANITE POINT is a high white granite bluff on the western shore, at the northern termination of Seymour narrows. On either side of the point is an opening, the southern one running east for nearly 3 miles, and containing several islands; the northern one is smaller, but both are too deep to afford anchorage. At 2 cables N.W. from Granite point is a rock with only 9 feet water.

NODALES CANAL is an extensive opening running in a N.E. by E. direction between Thurlow and Valdes islands; its western entrance, which is upward of a mile wide, with deep water, is $1\frac{1}{2}$ miles N.E. by N. from Chatham point; there are some tide rips off it.

ELK BAY, on the west side of Discovery passage, at 9 miles north-west of Seymour narrows, is about $1\frac{1}{2}$ miles broad and three-quarters of a mile deep. It affords indifferent anchorage, in 14 to 15 fathoms, about one-third of a mile from the head, and exposed to northerly winds; Otter point, its southern extreme, slopes gradually to the sea, with a small shingle beach running off.

A rock which covers at half flood lies $1\frac{1}{2}$ cables off the shore, three-quarters of a mile north-west of Elk bay.

OTTER COVE, on the west side of Discovery passage, and just south of Chatham point, is a small but snug anchorage, completely sheltered from all winds by Limestone island, in the centre of the entrance.

Intending to anchor in this cove, pass close to, on either side of Limestone island, and anchor midway between it and the head of the cove, in 10 to 6 fathoms ; a large vessel should moor.

CHATHAM POINT, nearly 24 miles from Cape Mudge, is the north-west extreme of Discovery passage, and also separates it from Johnstone strait. It is a low rocky point, and at 2 cables N.E. from its north extreme is the Beaver rock, awash at low water ; in rounding, the shore ought not to be approached nearer than half a mile. Between the point and the Nodales canal are several strong eddies or tide ripples.

DIRECTIONS.—In proceeding through Discovery passage from the southward, if the tide be favourable, a vessel has only to keep in mid-channel till past Seymour narrows ; but if the tide be unfavourable, after passing Cape Mudge, keep about 2 or 3 cables off the eastern or Valdes island shore, which is steep-to, and the tide does not run so strong. If unable to get through the narrows, Menzies and Duncan bays afford good anchorages. The latter ought to be preferred, being easier of access.

North of Seymour narrows, the tides being comparatively weak, a vessel may proceed either in mid-channel or close to either shore, except in rounding Chatham point, which should not be approached nearer than 4 or 5 cables, to clear the Beaver rock. Plumper bay affords a good stopping place to a vessel unable to proceed through Seymour narrows from the northward.

Sailing vessels of any size ought not to attempt to beat through southward of the Seymour narrows.

JOHNSTONE STRAIT, which separates the north-east side of Vancouver island from the main, is comprised between Chatham point and Beaver cove, being about 55 miles in length in a W. by N. and E. by S. direction, with a varying breadth of one to 2 miles. The shore on both sides is high and rugged, more especially the southern one, which may be said to be a continuous mountain range, rising almost abruptly from the sea, the summits of which vary from 2,000 to 5,000 feet in height, some of the higher ones being clad in snow all the year round.

The shores of the strait are nearly everywhere steep-to, except a few spots along the northern side, which will be hereafter described. There are no anchorages whatever along the south shore, but several on the northern, Knox, Blinkinsop, and Forward bays, as well as Ports Harvey and Neville, all of which, except the latter, being easily accessible to sailing vessels.

The south shore, west of Salmon bay, takes a general westerly direction for 34 miles to Beaver cove, where the high land suddenly terminates,

* See Chart of Johnstone and Broughton straits, No. 581 ; scale, $m = 0.5$ of an inch.

and is indented with a few slight bays, all of which are too deep to afford anchorage. Bauza cove, one mile east of Beaver cove, is a small deep bight, and affords no anchorage; some small islets lie in its entrance.

From Chatham point to the west end of Thurlow island, the soundings in mid-channel are very deep, no bottom in many places being found with 150 fathoms. About $1\frac{1}{4}$ miles west from the west point of Thurlow, and half a mile off the south shore of the strait is the Ripple shoal, with 7 to 9 fathoms on it. Near Helmcken island the strait is shoaler and the bottom irregular, the depths in mid-channel varying from 17 to 80 fathoms; but west of Hardwicke island it again deepens to no bottom at 150 and 170 fathoms.

TIDES.—Everywhere in Johnstone strait it is high water, full and change, at Oh. 30m., and the rise and fall of tide is from 15 to 17 feet. The streams run from 2 to $2\frac{1}{2}$ hours after high and low water by the shore, and except in the vicinity of Helmcken island and to the eastward of Knox bay, they are not strong. In the former place they run from 3 to 7 knots, and in the latter 2 to 4 knots; but in other parts of the strait they seldom exceed 1 to 3 knots per hour. Near Helmcken island are several heavy tide rips, which in blowing weather would be dangerous to boats or small craft; and just west of Chatham point is an overfall, producing a considerable swell at times.

THURLOW ISLAND is on the north side of Johnstone strait, to the westward of Nodales canal; its south side, which borders the strait, is rocky and about 13 miles long in a westerly direction; the eastern half is indented by several bays, off which lie some small islands.

KNOX BAY, on the south side of Thurlow, and 7 miles westward of Chatham point, is two-thirds of a mile deep and about the same in width, affording anchorage in from 15 to 17 fathoms 2 cables from the head, off the edge of the bank, which is steep-to. The anchorage is well protected from east or westerly winds, but it ought only to be used as a stopping place for the night or tide, as from the steepness of the bank a vessel would touch if a southerly wind sprang up. Off its south-west point foul ground extends for nearly one cable. If intending to anchor, steer for the head of the bay, and anchor immediately 16 fathoms are obtained.

Between Knox bay and Nodales canal lie the Pender islands, which are very rugged and barren, the largest being 150 feet in height; foul ground exists to the east and west of them for nearly half a mile, and their south side ought not to be approached nearer than 2 cables. The tide sets strongly through them.

Westward of Knox bay the coast of Thurlow island is almost straight, running in a W.S.W. direction for nearly 6 miles, when it turns to the north-west: its shores are high and rugged, steep-to, and may be approached to a cable's distance. Eden point, the north-west extreme of Thurlow, is bold and cliffy; half a mile south-east of it is a small bay, too deep to afford anchorage, except for small craft.

RIPPLE POINT, on the south or Vancouver shore of the strait, 6 miles west from Chatham point, is steep-to, and between it and Knox bay are some heavy tide rips in blowing weather. The coast between Ripple and Chatham points is indented by two slight bays, but the water in them is too deep to afford anchorage.

RIPPLE SHOAL.—Camp point, $9\frac{3}{4}$ miles W. by S. $\frac{1}{2}$ S. from Ripple point, slopes gradually to the sea; a rocky beach extends a short distance off it; and half a mile to the north-east of it is the Ripple shoal, with from 7 to 9 fathoms, marked by kelp, about 3 cables in extent, with deep water around it.

SALMON BAY.—The coast between Ripple and Camp points runs in a W.S.W. direction, curving slightly inwards; and westward from Camp point to Salmon bay it is nearly straight for $4\frac{1}{2}$ miles. Salmon bay at high water appears of considerable extent, but affords no anchorage, the bank, which runs off half a mile from its head, being too steep. A river of considerable extent empties itself into this bay, and is said to be navigable for canoes several miles inland. At this place is the only break in the mountain range on the south shore, and a valley of considerable extent stretches away to the south-east, in the centre of which appears a remarkable bare summit.

HELMCKEN ISLAND, lying 3 miles westward of Thurlow island, in the centre of the strait, is $1\frac{1}{2}$ miles long east and west, and about half a mile wide, with a clear channel of the same width on either side of it. The island is about 150 or 200 feet high, with a rugged coast line: the Speaker rock, which covers at one quarter flood, lies $2\frac{1}{2}$ cables N.E. from its eastern point, and is in the track of vessels using Current passage.

Race passage, to the southward of Helmcken island, is half a mile wide, but deep and clear of danger; the tide sets strongly through it as much as 6 knots at springs, and there are some heavy tide rips in it eastern part. This is the passage generally used.

Current passage, to the northward of Helmcken, is about half a mile wide, and deep, the tide being as strong as in Race passage.

HARDWICKE ISLAND forms the north side of Johnstone strait for 7 miles to the westward of Thurlow island, and is separated from

the latter by Chancellor channel. It is high and rugged, and the south shore steep-to, except near its south-west extremity, where Earl ledge runs off for 3 cables, only uncovering at low water.

Two islets lie off the west point of Hardwicke, and outside them the Fanny reef, which covers or is awash at high water; between the reef and the north shore there are some heavy tide rips.

BLINKINSOP BAY, on the shore of British Columbia, $2\frac{1}{2}$ miles north-west of Hardwicke island, and 25 miles from Chatham point, is about $1\frac{1}{2}$ miles deep, and half a mile wide; its shores are high, and from the head a bank dries out at low water for nearly a mile. This bay affords good anchorage, in 10 to 12 fathoms, about one-third of a mile N.E. of its south-west point, well sheltered and easy of access. The only direction required is to enter in mid-channel, and anchor on obtaining 12 fathoms, as the bank is rather steep.

Jesse island, lying about 2 cables off the shore, nearly half a mile to the south-west of Blinkinsop bay, is small and steep-to.

PORT NEVILLE, the next opening in British Columbia west of Blinkinsop bay, is of considerable extent, running in a north-easterly direction for 7 miles, and varying from one quarter to one mile in breadth. It affords a spacious and secure anchorage, but in consequence of the Channel rock lying near the middle of its entrance channel, great caution is required in entering. Its shores, except near the eastern side of entrance and head, are high, sloping gradually to the water's edge.

The depth of water in the port varies from 6 to 9 fathoms, with a muddy bottom; but in the shoalest part of the entrance channel there are not more than $2\frac{3}{4}$ or 3 fathoms, and in the middle of its north part, $3\frac{1}{2}$ cables S.W. $\frac{1}{2}$ S. from Boulder point, is the Channel rock, of small extent and very dangerous having only 4 feet over it, so that unless vessels specially require to enter this port, the anchorage of port Harvey, and Blinkinsop bays, which are at no great distance from its vicinity, ought to be preferred, being both secure and easy of access.

The entrance channel into Port Neville is $1\frac{1}{4}$ miles long, and about 3 cables wide, running in a northerly direction; the soundings in it vary from $2\frac{3}{4}$ to 5 fathoms, shoalest in the north part. The best passage is on the western side of Channel rock, there being about 17 feet at low water; the passage eastward of it has only 12 feet. Boulder, the north-east point of the channel, is low, with a stony beach round it: a shoal runs off it to the northward for 5 cables with $1\frac{1}{2}$ fathoms in some parts.

Robbers Nob is a remarkable low grassy point on the north side of the port, about one mile from Boulder point; to the westward of it is a shoal bay, into which flow some large streams; the best anchorage is about half a mile south-west of the Nob in 6 or 7 fathoms.

Shoal creek, at the head of Port Neville, is about 2 miles long, narrow, and not recommended, as its entrance is only a cable wide, with a rock in the middle; from its head a mud flat extends off nearly a mile.

DIRECTIONS.—Should it be required to enter Port Neville, the following directions ought to be attended to: after rounding Milly island, which is just S.W. of the entrance, and may be approached close to, proceed up mid-channel until Robbers Nob comes in line with Boulder point N.N.E. $\frac{1}{2}$ E., when keep well over to the western side of channel to avoid Channel rock. When Boulder point bears N.E. by E. the vessel will be clear to the north-west of the rock, and may then steer into the port N.N.E. $\frac{1}{2}$ E., anchoring in 7 fathoms, about half a mile S.W. by W. from Robbers Nob. If necessary, a vessel may anchor in the entrance about half a mile north of Milly island in $4\frac{1}{2}$ or 5 fathoms.

TIDES.—It is high water, full and change, in Port Neville at 0 h. 30 m., the rise and fall of tide being 17 feet: the stream runs from 1 to 2 knots at the entrance.

SLIMPSON REEF.—The coast between Ports Neville and Harvey runs in a W. by S. direction, slightly indented. W. by S. $\frac{1}{4}$ S. 4 miles from the entrance of Port Neville, and one quarter of a mile off shore, lies the Slimpson reef, which covers at half flood.

PORT HARVEY, the next inlet westward of Port Neville on the north side of Johnstone strait, runs in a northerly direction for 4 miles, with a breadth varying from one quarter to three-quarters of a mile, and affords good and well sheltered anchorage in 7 to 9 fathoms, muddy bottom, at the distance of half a mile from its head. There are several small islets within it, and the shores are rugged; from its head swampy ground extends to the north-east, and to the north-west is a narrow gorge, which partly fills at high water and joins Knight inlet. The soundings in the entrance vary from 60 to 80 fathoms, shoaling rapidly towards the head.

Broken islands, off the east side of the entrance, are low, rugged, and of small extent; they may be approached to one quarter of a mile on the west side, but only a boat passage exists to the eastward of them.

HAVANNAH CHANNEL, the western entrance of which is $1\frac{1}{2}$ miles north of Broken islands, runs in a north-easterly direction from the east side of Port Harvey, connecting it with Call creek. Its length is about 4 miles, and its breadth varies from one half to one mile. There are several islands within it, which lie mostly in mid-channel; Hull island, the largest, being three-quarters of a mile long, and half a mile broad. Its shores are high and much broken, and the depths in mid-channel vary from 9 to 50 fathoms.

BOUGHEY BAY, in the south-east part of Havannah channel, is about one mile deep in a southerly direction, and half a mile broad; a vessel may anchor in this bay at a distance of half a mile from the head, in from 10 to 14 fathoms, but the passage to it has not been sufficiently sounded to recommend its being used as an anchorage.

Browning rock, in the north part of Havannah channel, about one-third of a mile north of Hull island, has only 12 feet over it, and lies nearly in the fairway of the channel to Call creek; there is an apparently clear passage to the westward of it.

CAUTION.—As the soundings are uneven and the bottom rocky to the west and north-west of Hull island, care ought to be used in navigating this channel near that neighbourhood.

CALL CREEK, the south part of which may be said to commence at the north-east point of Havannah channel, is an inlet of considerable extent, its length in a north-easterly direction being 12 miles, and its breadth varying from one half to $1\frac{1}{2}$ miles; the shores on either side are high and precipitous, rising abruptly to mountains from 1,000 and 4,700 feet in height. The head terminates in a low swamp, and a valley extends to the north-east from it.

The soundings in the entrance are about 40 fathoms, but increase to upwards of 120 fathoms towards the head; there is no anchorage whatever except near its entrance, on the north side amongst the Warren islands, where from 6 to 14 fathoms will be found. These islands, four in number, and small, are half a mile from the entrance; they run parallel to the shore from 1 to 2 cables off it. A vessel may anchor between the two southern islands in from 6 to 10 fathoms.

CHATHAM CHANNEL, the east part of which commences at Root point the north-west extreme of Havannah channel, trends to the westward, connecting these waters with Knight inlet; its breadth as far as surveyed varies from 2 to 3 cables, the depth in mid-channel is 4 fathoms at a distance of three-quarters of a mile west of Root point. It is not recommended to use this channel until further explored, as only 4 miles of it have at present been examined.

Captain Vancouver's tender, the *Chatham*, a small brig, passed through this channel to the westward in July 1792, and the least water found was 3 fathoms.

DIRECTIONS.—If intending to anchor in Port Harvey, keep in mid-channel till within the Mist islands, when the anchorage opens out, and anchor in 7 fathoms in the middle of the harbour, about half a mile from the head.

A sailing vessel of considerable size can beat in as far as Mist islands, and may stand to a cable's distance anywhere towards the west shore;

in making the eastern board, keep outside the line of the Broken islands, and out of the bight between Transit point and the Mist islands.

The anchorages in Boughey bay, Havannah channel, and among the Warren islands on the shore of Call creek, are secure; but the passages to them, though probably deep, have not been sufficiently examined so that directions can be given for entering them.

TIDES.—It is high water, full and change, in Port Harvey at 0 h. 30 m., and the rise and fall of tide is 10 feet.

ESCAPE REEF, lying 2 miles west of Broken islands, and half a mile off the north shore of Johnstone strait, is about a cable in extent, has 4 feet least water on it, and is marked by kelp in the summer. This reef, which has deep water around it, is in the track of vessels entering Port Harvey from the westward; to avoid it keep in the middle of the strait, till the entrance of the port comes well open, bearing N.N.E. or N. by E., when steer in for it.

FORWARD BAY, 3 miles W.S.W. from Port Harvey, is a slight bend in the coast, about $1\frac{1}{4}$ miles broad, and three-quarters of a mile deep, with a small islet 30 feet high off its south-west point: its shores are moderately high, and a bank extends nearly 3 cables from its head.

This bay affords good anchorage, in 14 to 10 fathoms, off the edge of the bank, and about two-thirds of a mile N.E. of its south-west point, well sheltered from all except south-easterly winds, and even these send in no sea; it is easy of access for any class of vessel, and a very good stopping place; in entering it from the eastward guard against the Escape reef.

BOAT HARBOUR.—From Forward bay, the northern shore of Johnstone strait becomes comparatively low, and trends W. by S. for 15 miles to Weynton passage, at the termination of the strait. Boat harbour, a small cove affording shelter to boats, is 6 miles westward of Forward bay, the coast between the two places being nearly straight, and may be approached to a quarter of a mile.

HANSON and CRACROFT ISLANDS, between Boat harbour and Weynton passage, are low, with rocky shores, and are separated by a passage one mile wide. The south side of Hanson is 3 miles long, and off its south-west point are some rocks extending for 2 or 3 cables to the westward. Cracoft, to the eastward of it, is about 2 miles long; and off its south part, at the distance of half a mile, are the Sophia islets, of small extent.

DIRECTIONS.—For a steamer, or sailing vessel with a fair wind, the navigation of Johnstone strait is perfectly easy, it being only requisite to keep in mid-channel, except when nearing Helmcken island from the east-

ward, when a vessel ought, after passing Thurlow island, to keep within 3 cables of the southern shore, or Camp point, till past the Ripple shoal, which, from being marked with kelp, is likely to have less than 7 fathoms over it. In the vicinity of Helmcken the tides are strong, but not enough to stop a steam vessel of moderate power; to the westward of it they have no great strength.

If wishing to anchor for the night, Knox, Blinkinsop, and Forward bays, and Port Harvey on the northern side, afford good anchorage, and are, with the present Admiralty charts, so easy of access as to require hardly any directions.

If beating through the strait, when to the eastward of Helmcken island, the shores on both sides may be approached to one cable, except for half a mile on either side of Pender islands, the south side of which latter ought not to be approached nearer than 2 cables, as the tide runs strong in their vicinity. Between Thurlow and the west end of Hardwicke island, it is not advisable to beat, as the tide thereabouts runs strong and irregularly, there being also several dangers in the track, viz., Ripple shoal and Speaker rock, east of Helmcken island; and Earl ledge to the westward of it. From Hardwicke island to Beaver cove, the south shore may be approached to one cable; and the only dangers along the north shore are the Slimpson and Escape reefs, which can be easily avoided by tacking short of them, keeping more than half a mile out when near the latter; elsewhere the north shore may be approached to 2 or 3 cables.

BROUGHTON STRAIT, which connects Queen Charlotte sound with Johnstone strait, is upwards of 14 miles in length, east and west, the breadth varying from 4 miles at the east, to one mile at the west entrance. Its southern shore is formed by Vancouver island, and the northern one by the south side of Malcolm island, and both, except near Beaver cove, are low. There are several islands, rocks, and shoals in the eastern part; but a clear navigable passage along the southern side half a mile wide in the narrowest place, which is abreast Alert bay in Cormorant island. There are several anchorages along either side, available as stopping places,—Alert bay, on the south shore of Cormorant island; Port McNeil on the Vancouver shore, and Mitchell and Rough bays on the south side of Malcolm island. The Nimpkish river, which disembogues on the south shore of the strait, is a stream of considerable size, and said to be navigable by canoes for a two days' journey.

At the eastern entrance of the strait the depths vary from 60 to 100 fathoms, decreasing rapidly to the westward; abreast the Nimpkish river are from 19 to 20 fathoms; but to the westward of it the bottom becomes irregular, depths varying from 15 to 40 fathoms.

TIDES.—In Broughton strait it is high water, full and change, at 0 hours 30 minutes, the rise and fall of tide being 14 or 15 feet. In the navigable channel the streams run 1 to 4 knots, but in the Race and Weynton passages 3 to 6 knots, turning everywhere about 2 hours after high and low water by the shore.

BEAVER COVE, at the south-east extreme of Broughton strait, runs in upwards of a mile in a southerly direction, and is half a mile wide; its shores are high, and the depth is too great for anchorage. Mount Holdsworth, a remarkable conical peak, 3,000 feet high, and very conspicuous from the eastward, rises 3 miles to the south-west of the cove.*

NIMPISH RIVER, which flows into a shallow bay on the south shore, 5 miles westward of Beaver cove, is upwards of a cable wide at entrance, with $2\frac{1}{2}$ fathoms, but only navigable for any distance by canoes; a bank dries off it for nearly a mile, leaving a narrow winding channel, with about 5 feet water, into the river. Green islet, off the outer edge of this bank, is about 4 feet above high water, and small and bare; half a mile west of it is a rock which uncovers at low water. In navigating the strait, this islet ought not to be approached within 3 cables.

On the north bank of the Nimpish, at the entrance, is a small plateau of grassy land, on which are the ruins of a large native village, called Oheslakee.

PORT McNEILL, on the south side of Broughton strait, about 10 miles west from Beaver cove, runs in a W.S.W. direction for 2 miles, is three-quarters of a mile broad, and affords a good, well-sheltered anchorage, in 6 to 9 fathoms. Its shores are low, and bordered by a sandy beach, which runs off three-quarters of a mile from the head. From Ledge point, the north point of entrance, a narrow ledge, with 3 to 5 fathoms on it, runs out E.N.E. $1\frac{1}{4}$ miles, and kelp grows over it in summer.

Eel reef, lying 9 cables S.S.W. from Ledge point, and about 2 cables off the south shore of the port, covers at three-quarters flood.

If intending to anchor in Port McNeill keep half a mile from the southern shore in entering to avoid the ledge off Ledge point, and anchor when the point bears N.E., about 5 or 6 cables distant, in from 5 to 6 fathoms, sandy bottom.

The coast from Port McNeill runs about W.S.W. 4 miles to the entrance of Queen Charlotte sound. It is bordered by a sandy beach, and may be approached to 2 cables.

WEYNTON PASSAGE.—Pearse islands, in the centre of Broughton strait, at its eastern entrance, are a group of small low islands, with

* See Plan of Beaver cove, No. 2,067; scale, $m = 3$ inches.

some rocks extending a short distance north and south-east of them. Weynton passage, between Hanson and Pearse islands, is about $1\frac{1}{4}$ miles wide, with depths in mid-channel varying from 40 to 60 fathoms. The shores on both sides are very much broken into rocks and small islands; the tide rushes through from 5 to 6 knots; and unless wanting to anchor in Mitchell bay, it ought not to be used.

RACE PASSAGE, between Pearse and Cormorant islands, is two-thirds of a mile wide, but a rock lies in mid-channel at its south part; the tide runs from 3 to 6 knots through, and the passage is dangerous.

CORMORANT ISLAND lies in the centre of the strait, to the west of the Pearse islands. It is about 150 feet high, $2\frac{1}{2}$ miles long, east and west, three-quarters of a mile wide, and bordered by a sandy beach. Gordon point, its south-east extreme, is $2\frac{1}{2}$ miles W. by N. from Beaver cove.

ALERT BAY, on the south side of Cormorant island, is nearly one mile wide, and half a mile deep, affording a good and well sheltered anchorage in from 6 to 9 fathoms, muddy bottom, easy of access, the shores being everywhere clear of danger. Yellow bluff, the south-west point of the bay, may be recognized by a remarkable yellow cliff at the extreme of the point.

HADDINGTON ISLAND, 7 miles west of Beaver cove, in the centre of Broughton strait, is small; its south and west sides are steep-to, but from the northern one a bar, with as little as 9 feet water in some parts, runs across the strait to Malcolm island.

Between Haddington island and the ledge running off from the north point of Port McNeill, is a passage three-quarters of a mile wide, with not less than 7 fathoms water in mid-channel.

MALCOLM ISLAND, which forms the north side of Broughton strait, is $13\frac{1}{4}$ miles long W.S.W. and E.N.E., with an average breadth of nearly 2 miles; the shores are generally low, a sandy beach extending off a short distance from them. On its south side are Mitchell and Rough bays, in which vessels may anchor in 6 or 8 fathoms. Donegal head, its east point, is high, cliffy, bordered by a beach, and the tide runs strong in its vicinity. Dickenson point, on the south side of the island, is connected by a bar, with 9 feet in some parts, to Haddington island.

Foul ground marked by kelp extends half a mile off the west side of Malcolm island; and W.N.W. $1\frac{1}{2}$ miles from Pulteney point, its south-west extreme, is a shoal patch of 5 fathoms, also marked by kelp.

DIRECTIONS.—In navigating Broughton strait from the eastward, when abreast Beaver cove in mid-channel, a W. $\frac{1}{2}$ S. course, to pass not more than 2 cables south of Cormorant island, will keep a vessel clear to the

northward of Nimpkish bank, and when the west point of Cormorant island bears N. by E. she will be westward of it; then steer to round the south-west point of Haddington island within a quarter of a mile, to avoid the ledge off Ledge point; when the north shore of Cormorant island opens of Haddington island E. by N., a vessel may steer out of the strait in mid-channel. None, except small craft, should go to the northward of Haddington island.

Sailing vessels of any size would find it tedious to beat through this strait, and as there are several dangers it is not recommended to do so.

QUEEN CHARLOTTE SOUND is an extensive arm of the sea, connecting the inner waters north of Vancouver island with the Pacific. Its length is upwards of 30 miles, running in an easterly direction, and its breadth varies from 10 to 20 miles, being bounded on the north by the shores of British Columbia, and on the south by the north shore of Vancouver island. In the north and north-east parts are innumerable rocks and islands, of which little is at present known; but along its southern sides are two broad and navigable channels to the Pacific.

Broughton strait enters this sound at its south-east part. From thence to Thomas point the coast of Vancouver runs W. by N. for 9 miles, and is low; it is bordered the whole distance by a beach composed of sand and boulders, and foul ground marked by kelp exists off it, from one quarter to half a mile.

If intending to enter Beaver harbour from the eastward, do not approach this shore within a mile till near Thomas point; and as but very few soundings have been obtained in this part of Queen Charlotte sound, if beating to windward, great caution ought to be observed when standing to the northward.

BEAVER HARBOUR, on the south side of the sound, 9 miles westward of Broughton strait, is 3 miles wide at entrance and 2 miles deep. The harbour is protected or formed by several islands lying across, and within the entrance; its shores are low, and from the south shore a bank extends off 3 or 4 cables; a short distance inland from its western side are seven remarkable hills, varying in height from 400 to 640 feet. There is good anchorage in the south and west parts of the harbour, but north-easterly winds send in a heavy sea, rendering it impossible to land on the south shore for days together.*

On the south shore is Fort Rupert, a Hudson Bay Company's fort or trading post, which has been established several years, and is in charge of a chief trader; adjacent to it is a small quantity of clear land, also a very fine garden, where fruit, and vegetables common to the climate,

* See Plan of Beaver harbour, No. 2,067; scale, $m = 3$ inches.

are grown in great abundance. In the vicinity of the fort is a large native village.

Thomas point, the south-east extreme of the harbour, is low and rocky; some rocks lie upwards of 2 cables off it to the westward. The channel between it and Deer island is about 4 cables wide, with from 13 to 6 fathoms, and clear of danger.

Moffat rock, 8 cables to the westward of Thomas point, is 3 cables off shore, just at the outer edge of the bank, and uncovers at low water.

Deer island, two-thirds of a mile north of Thomas point, is about $1\frac{1}{2}$ miles in circumference, wooded, and about 240 feet high; its shores are rocky, and extending nearly 4 cables off its north-west part is a reef marked by kelp, with 9 feet water over it; a short distance off the south-east point are some islets and rocks.

Round island, half a mile N. by E. of Deer island, is small, but high, and conspicuous from the eastward.

Peel island, in the north part of Beaver harbour, is three-quarters of a mile long S.W. and N.E., about a third of a mile broad, and between it and the west shore of the harbour is a passage 2 cables wide in the narrowest part, with 17 fathoms water; 4 cables north of it are the Charlie islets, small, and two in number. There is a good channel into the harbour close along the east side of Peel island, which is steep-to.

Cattle islands, which lie in the middle of the harbour, are small and connected with each other at low water. At $1\frac{1}{2}$ cables south of them is Shell islet, the observation spot on which is in lat. $50^{\circ} 42' 36''$ N., long. $127^{\circ} 25' 7''$ W.; a reef awash at high water lies one cable south of it.

Cormorant rock, lying one-third of a mile off the western shore of the harbour, and nearly half a mile west of Shell islet, covers at high water, and has from 4 to 6 fathoms close to; mid-way between this rock and Cattle islands is a shoal patch of $3\frac{1}{4}$ fathoms.

Dædalus passage, leading from the west part of Beaver harbour to the northward, is 2 cables wide in its narrowest part, and has not less than 17 fathoms in mid-channel.

Dillon point, the north-west extreme of the harbour, and separating it from Hardy bay, is bold and rocky; some small islets lie to the south-east of it close in shore.

DIRECTIONS.—Beaver harbour is easy of access to either sailing vessels or steamers. There are three passages into it, but the southern one, between Thomas point and Deer island, is the best, and generally used, being wide enough for a vessel to beat through; and the only caution required in entering it, is not to round Thomas point nearer than 2 cables, in order to avoid the rocks off its north-west part, after which steer for Shell islet, and anchor in 10 to 12 fathoms about 2 cables south-east of it,

with Fort Rupert bearing S.S.E., and Thomas point East, or E. by N. Good anchorage in from 6 to 9 fathoms, and better sheltered from north-westerly winds, may be obtained to the westward of the Cattle islands: but in rounding Shell islet give it a berth of about 2 cables, to avoid the reef south of it.

If entering the harbour by the Dædalus passage, the only direction required is to steer mid-channel; a sailing vessel could not easily work through it however, as the breadth abreast Peel island contracts to 2 cables.

TIDES.—It is high water, full and change, in Beaver harbour at Oh. 30m., and the rise and fall is from 15 to 16 feet.

HARDY BAY, to the westward of Beaver harbour, and separated from it by Dillon point, runs in a southerly direction for 4 miles; its breadth at the entrance is 2 miles, narrowing to the head, where it terminates in a narrow creek, $1\frac{1}{4}$ miles long, and 2 to 4 cables broad, with a sand-bank running off its head for three-quarters of a mile. The shores of the bay are rugged, and off the west side, near the head, are some out-lying rocks. The soundings in the outer part of the bay vary from 100 to 40 fathoms, and there is no anchorage, except in the small creek at the head, which is difficult of access, and should not be used by a stranger.

Off the north-east point of the bay, about three-quarters of a mile from the shore, are the Masterman islands, small, and four in number; foul ground exists between them and the shore.

GOLETAS CHANNEL, which runs along the north shore of Vancouver island to the Pacific, is 22 miles long east and west, with a breadth varying from one to $2\frac{1}{2}$ miles. Its shores are high, rugged, and steep-to, except in the western part, and may be generally approached to a quarter of a mile; the northern side is composed of a group of islands, mostly small, through which are several navigable passages. There are four anchorages within the channel; Shushartie bay on the south side; Port Alexander, Shadwell passage, and Bull harbour on the north side; and all, with the exception of the latter, easily accessible to sailing vessels. Duval point, on the south side at the eastern entrance of the channel, is 15 miles west of Broughton strait.*

The soundings throughout the channel to the west entrance are very deep, varying from 190 to 80 fathoms, but there the bottom suddenly rises from 40 to 7 and 9 and in one part to less than 3 fathoms, forming Nahwitti bar, stretching completely across the channel, and in a great measure preventing any heavy sea rising inside it during westerly gales.

* See Chart of West end of Vancouver island, No. 582; scale, $m = 0.5$ of an inch.

TIDES.—It is high water, full and change, in the Goletas channel at Oh. 30m., and the rise and fall varies from 12 to 14 feet. The streams in the east part of the channel run from 1 to 3 knots, but near the west entrance, in the vicinity of the Nahwitti bar, they are much stronger, running from 2 to 5 knots, turning shortly after high and low water by the shore.

SHUSHARTIE BAY.—From Duval point the south shore of Goletas channel runs 15 miles in a westerly direction to Shushartie bay, with a rugged rocky outline, and rises gradually to a chain of hills varying from 400 to 1,000 feet high; it is everywhere steep-to. Shushartie bay is about half a mile in extent, and its shores are high, except at the head, from which a sand-bank runs off more than 2 cables. There is a very limited but fairly sheltered anchorage just inside the north-east point of bay, in about 13 fathoms, at the distance of a cable off shore, but from the steepness of the bank it should only be considered as a stopping place.*

Dillon Rock, which covers at one quarter flood at $1\frac{1}{2}$ cables west of the east point of bay, is in the way of vessels entering from the eastward.

DIRECTIONS.—If entering Shushartie bay from the eastward, and the Dillon rock be covered, do not steer in for the anchorage till the easternmost peak of the Shushartie saddle (a remarkable double-topped mountain 1,900 feet high situated south of the bay) comes in line with the village at the head of bay S. $\frac{3}{4}$ W., when proceed in with that mark on, which leads west of Dillon rock; when the north-east point of bay bears E. by N., the vessel will be clear south of it, and should steer for the eastern shore, anchoring immediately 14 fathoms are obtained, as the bank is steep, which will be about one cable's distance off it, with the extremes of the bay bearing N.E. and N.W. by W.

If entering from the westward keep the western shore aboard till Halstead point bears E. by N., when steer in as before directed.

SHINGLE POINT, 2 miles west of Shushartie bay, is low; a beach runs off it a short distance; westward of this point it is difficult to land, except in fair weather.

CAPE COMMERELL, 22 miles west of Duval point, is the northernmost point of Vancouver island, and the south point of the west entrance to Goletas channel. The cape is low, and some rocks extend off it for nearly 2 cables; to the eastward of it the coast forms a large bay 3 miles wide and about one mile deep, with $2\frac{1}{2}$ to 6 fathoms rocky bottom, and not in any way adapted for anchoring. There is an Indian village on the east side of the cape.

* See Plan of Shushartie bay, No. 2,067; scale, $m = 3$ inches.

GORDON GROUP consists of a number of small islands running in an east and west direction for 5 miles, and bordering the north part of the east entrance of Goletas channel. They are high and steep-to, and on the eastern or Doyle island is Miles cone, a remarkable summit 380 feet high. Their eastern extreme is 2 miles north of Duval point.

Duncan island, one mile south of the Gordon group, is about a mile in circumference, and 300 feet high ; at $1\frac{1}{2}$ miles west of it are the two Noble islets 30 feet high, between which and the group it is not advisable for a large vessel to go.

CHRISTIE PASSAGE, between the west side of the Gordon group and Balaklava island, is half a mile wide, and its south entrance is nearly 6 miles from Duval point ; it runs in a northerly direction, and connects Goletas with the New channel ; its shores are free from danger, and the depths in mid-channel are from 35 to 45 fathoms. The tide runs from 1 to 3 knots through it, the flood to the southward.

If intending to go through this passage from Goletas channel, a large vessel should enter it west of the Noble islets.

BROWNING PASSAGE, to the west of Balaklava island, between it and Galiano island, runs in a north-westerly direction from the Goletas to New channel. Its length is about 3 miles, its breadth in the narrowest part 2 cables, and there are some small rocks and islets off its south-east and north-east points ; it is deep, and a mid-channel course through is free from danger. The tide is very weak in this channel.

GALIANO ISLAND, the largest of the islands on the north side of Goletas channel, is of triangular shape, nearly 8 miles long, and $3\frac{1}{2}$ miles broad, the base fronting to the southward. The shores are very much broken along the north and east sides ; a remarkable peak of conical shape 1,200 feet high, mount Lemon, rises near its south-west part, and Port Alexander is formed at its south-east extreme.

PORT ALEXANDER, upwards of 7 miles from Duval point, and on the west side of Browning channel, runs in a north-westerly direction for $1\frac{1}{2}$ miles, with a general breadth of about 4 cables ; there is a small islet in the middle of it, half a mile from the entrance, and another close off Boxer point on the west side of entrance. This port is easy of access to steamers and sailing vessels with a fair wind, and affords good anchorage in 12 to 13 fathoms, half a mile from its head, well sheltered from all except south-easterly winds.

The south side of Galiano island is high, steep-to, and cliffy, running in a straight direction to the westward ; at $4\frac{1}{2}$ miles west from Boxer point is a small cove which would afford shelter to small craft in westerly winds.

SHADWELL PASSAGE, in the north-west part of the Góletas channel, between Galiano and Hope islands, is $3\frac{1}{2}$ miles long in a northerly direction, and its breadth varies from one half to $1\frac{1}{2}$ miles; the eastern shore is straight in a north-easterly direction, but the western is indented into several small bays, with some rocks and islets off them.

The soundings in the south part of this passage are from 80 to 100 fathoms, decreasing rapidly from 9 to 13 fathoms to the northward; a vessel may anchor about 2 or 3 cables N.W. of Centre island, sheltered from all except northerly winds. The tide runs with considerable strength as much as 4 knots between Centre island and Turn point.

Vansittart island, in the centre of the passage at its north part, is one mile long, and three-quarters of a mile wide; west of it are some rocks and small islets extending out 6 cables; and half a mile from the north point are two wooded islets called Nicholas islands.

Willes island, at the south-east part of the passage is steep-to, and may be approached to a cable; a quarter of a mile to the southward of it is a small low islet, named Slave island.

Centre island, in the middle of the passage, and 5 cables S.W. from Vansittart island, is small; west of it some kelp extends a short distance, but there is a clear passage on either side of it.

One Tree islet, 4 cables west of Vansittart, is small, about 40 feet high, and has a single tree on its summit, which is very conspicuous when seen from the northward, and of great use in identifying the passage; this islet may be approached close to on the west side, but between it and Vansittart are rocks and foul ground.

Cape James, the north-west extreme of Shadwell passage, is a high rocky bluff; some rocks extend off it to the southward for a short distance, and foul ground, marked by kelp, exists between it and Turn point.

DIRECTIONS.—Going through Shadwell passage to the northward, round Willes island, its south-east point, at about one or 2 cables' distance; when abreast Turn point steer to pass about one cable off either side of Centre island, and 2 cables west of One Tree islet, after which a north-westerly course will lead out clear. To the eastward of Vansittart island the passage is deeper, and nearly straight, and perhaps to a sailing ship or stranger it would be easier to navigate than the western one; if proceeding through it, keep in mid-channel.

Shadwell passage may be used by steamers or sailing vessels with a fair wind; it would hardly be prudent to beat a large vessel through it, as there is generally a heavy swell and strong tide in the north part. It is the passage usually taken by the Hudson Bay Company's vessels when bound north from the inner waters.

The best anchorage in Shadwell passage is near the middle, with One Tree islet bearing N.E. by N., Centre island S.E., and Turn point South, in 9 fathoms.

HOPE ISLAND, the westernmost of the group which form the north side of Goletas channel, is 6 miles long, east and west, and its greatest breadth is $3\frac{3}{4}$ miles. The island is moderately high, and its shores are very much broken ; the sea breaks heavily along its north and west sides, and off Mexicana point, the western extreme, a reef extends 3 cables ; the south shore is steep, and may be approached to one quarter of a mile.

BULL HARBOUR has its entrance on the south side of Hope island, 2 miles from the western entrance of Goletas channel. Though small, this harbour affords a very secure landlocked anchorage. It runs in a northerly direction for $1\frac{1}{2}$ miles across Hope island, its head being only separated from the north shore of the island by a narrow rock of low land 403 feet wide ; its breadth at the entrance is 5 cables, contracting to one cable at half the distance from the head, after which it again increases to nearly 2 cables.

Indian island, $1\frac{1}{2}$ cables north of the narrowest part of the entrance, is small, but completely shuts in the harbour to the southward, leaving a passage to it on the eastern side one cable in width ; between the island and the west shore are only 11 feet water. The anchorage is to the northward of this island, in about 4 fathoms water, but there is only room for 1 or 2 vessels of moderate size to lie moored.

If intending to enter Bull harbour, steer up mid-channel, passing east of Indian island, and moor immediately the vessel is north of it, anchors north and south. Steamers or only small sailing vessels should use this anchorage, as from its narrow and tortuous entrance it is rather difficult of access to long vessels.

Westward of Bull harbour the coast of Hope island is rocky and edged by kelp ; the sea in westerly winds breaks heavily along it.

NAHWITTI BAR, or ledge, stretching across the west entrance of the Goletas channel, is of sandstone formation, and on the eastern edge rises suddenly from 40 to 9 fathoms, the depth increasing very gradually to the westward. Its breadth within the 10-fathom line is from one to nearly 3 miles, broadest at the south part, where are several shoal spots, called Tatnall reefs, with $2\frac{1}{2}$ and $3\frac{1}{2}$ fathoms, at a distance of $1\frac{1}{4}$ miles from the south shore ; northward of these patches the depths vary from 6 to 9 fathoms. In heavy westerly gales the sea breaks right across the Goletas channel at this bar.

Lemon point, Galiano island, open north of Shingle point, Vancouver

island, bearing E. by N., leads over the Nahwitti bar in the deepest water from 7 to 9 fathoms, well to the northward of Tatnall reefs.*

DIRECTIONS.—Bound to the westward through Goletas channel, steer in mid-channel, or within half a mile of either shore, until west of Bull harbour, after which keep Lemon point open north of Shingle point E. by N., until Mexicana point bears North, when a vessel will be to the westward of the Nahwitti bar. A sailing ship, if beating through the channel, should keep south of Duncan and Noble islands; elsewhere, until west of Bull harbour, the shores on either side may be approached to a quarter of a mile; when west of Bull harbour, in standing to the southward, tack when Shingle and Lemon points are in line E. by N., and do not approach nearer than half a mile towards Mexicana point, as there is generally a heavy swell setting in on it, and the ground is uneven.

If obliged to anchor for the night, or tide, Shushartie bay, though small, is easy of access, the only danger being the Dillon rock off its east point. Port Alexander, and Shadwell passage, along the north shore, are also easy of access with a fair wind to sailing vessels, and the latter is preferable, being more roomy and better holding ground.

NEW CHANNEL, to the northward of the Goletas channel, and separated from it by the islands which form the north shore of the latter, is an extensive clear passage to the Pacific Ocean, about $12\frac{1}{2}$ miles long, and a breadth varying from $1\frac{1}{2}$ to 4 miles. Its depth in the shoalest part is 60 fathoms, near the eastern entrance, and its shores, except near the west part of the Gordon group, may be approached to nearly half a mile; the north limit of the channel is formed by Walker group to the eastward, and a few low rocks and islets to the north-west.

Generally a heavy swell sets through New channel from the westward, and with the exception that there is more room for a large vessel to work in or out than in Goletas channel, there is no reason to use it in preference to the latter, unless, if running in before a heavy westerly gale, the sea were breaking across the west entrance of Goletas channel at the Nahwitti bar.

Doyle island, the south-easternmost of the Gordon group and at the south-east point of New channel, is three-quarters of a mile long, and, as before stated, has a remarkable summit, 380 feet high, Miles cone, on its centre; there are some small islets off its east point. The north side of the Gordon group to Crane islets is steep-to, and may be approached to one-third of a mile.

The Crane islets are small, 30 feet high, and steep-to, there being

* See View A. on Chart No. 582.

100 fathoms water at a cable's distance. They lie $2\frac{1}{2}$ miles westward of Doyle island, and about 3 cables north of Gordon group.

Boyle island, $1\frac{1}{4}$ miles west of Crane islets, and half a mile north of Hurst island, is small; at half a mile north-west of it is the Grey rock, which covers at one quarter flood, and is dangerous to vessels beating through this channel. The best mark to clear this rock, is to keep the Crane islets just touching the north side of Gordon group E. by S. $\frac{3}{4}$ S., which leads nearly half a mile north of it; when Boyle island bears South a vessel will be clear east of it, and when the south-west and north-east points of Christie passage come open S. $\frac{3}{4}$ W., she will be clear to the north-west of it.

The north shore of Balaklava island is rugged, and half a mile N.W. from its north-west point are three low islets, 6 feet above high water, at the north entrance to Browning channel.

The north shore of Galiano island is also rugged; some outlying rocks lie a short distance off it, but it may be approached to one-third of a mile.

Westward of Cape James, the north-east point of Hope island, the shore is generally rocky, and the sea breaks heavily along it; do not approach it within half a mile.

WALKER GROUP, at the north-east part of New channel, from 2 to 3 miles north of its south side, is composed of a number of small islands and rocks, covering an extent of 6 miles in a westerly direction, and 2 miles broad, the highest is about 300 feet above the sea; among them are several small creeks and bights, which would afford shelter to boats, or even small craft; along their south side some rocks extend a short distance off. Castle point, at the south-east extreme of the group, is bold, cliffy, and steep-to, with no bottom at 60 fathoms 2 cables south of it.

White rock, at the south extreme of Walker group, lies 2 miles W.S.W. from Castle point; it is 4 feet above high water, and there are 40 fathoms half a cable south of it. Between White rock and Boyle islet a strong tide race usually prevails.

Nye rock, off the south end of Schooner passage, at the west part of the group, covers at high water; it lies W. $\frac{1}{2}$ N. $2\frac{1}{4}$ miles from White rock, and may be approached to 2 cables on the south side, but large vessels should not stand inside it to the northward.

Redfern island, the south-west of Walker group, is about half a mile long, and one quarter of a mile wide; half a mile south-east of it are some rocks just above high water, as also to the north-west; its south side ought not to be approached within 2 cables.

Prosser rock, 2 miles W. by N. $\frac{3}{4}$ N. of Redfern island, is small, about 2 feet above high water, and may be approached to 2 cables. Nearly a

mile farther in the same direction is Bright islet, 100 feet high, to the north and north-east of which are some reefs and small islets.

Pine island, at the north-west part of New channel, is about a mile in circumference, low, and wooded, and conspicuous from the westward; some small islets, named Tree islets, which are also wooded, lie half a mile N.E. of it.

Storm islands, in the centre of Queen Charlotte sound, $2\frac{1}{2}$ miles northward of Pine island, are a narrow chain of islets extending 2 miles east and west.

DIRECTIONS.—If using the New channel, and the wind be fair, a mid-channel course about W. by N. will take a vessel clear. If working through, when between the Walker and Gordon group, keep one-third to one half of a mile south of the southern shores of the former, and on nearing the Grey rock, when standing towards the southern shore, avoid opening the south part of Crane islets north of the Gordon group E. by S. $\frac{3}{4}$ S., until the east and west points of Christie passage come open S. $\frac{3}{4}$ W., when a vessel will be clear to the westward of the rock; and if going east, when Boyle islet bears South she will be east of it. In the vicinity of the Galiano and Hope islands, tack about half a mile off shore, and keep outside Shadwell passage and Roller bay; when west of Pine island, do not bring it east of E. by N.

The COAST from Cape Commerell (page 172), the north-west point of Vancouver island, takes a south-west direction for 16 miles to Cape Scott. It is rather low, but rises at a distance inland to hills 800 and 1,000 feet high; it is indented by several bays, which, however, are too open to afford any shelter, except in southerly winds; foul ground extends off in some places more than one mile.

HECATE ROCK, lying W. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles from Cape Commerell, and three-quarters of a mile off shore, covers at three-quarters flood, and the sea breaks heavily over it. Lemon point, Galiano island, just open of or touching Shingle point, Vancouver island, E. by N., leads three-quarters of a mile north of it.

CAPE SCOTT, the north-west point or extreme of Vancouver island, is about 500 feet high, and connected to the island by a low sandy neck about one cable wide; some rocks extend west of it for more than half a mile, and there is a bay on either side of the neck, which would afford anchorage to boats or small craft in fine weather only; close to its south-west extreme is a small creek among the rocks, difficult of access, but once within it, boats may get shelter in southerly gales; unless acquainted with the locality, it would be hardly prudent to venture for it in bad weather.

At Cape Scott the flood comes from the southward, and rounding the cape sets into the Goletas channel, its strength varying from 1 to 3 knots.

When navigating between Cape Commerell and Cape Scott, do not approach the shore within one mile, at which distance will be found from 15 to 20 fathoms.

SCOTT CHANNEL, between Cape Scott and the Scott islands to the westward, is $5\frac{1}{4}$ miles wide, with soundings in it varying from 25 to 40 fathoms. It is a safe navigable channel for any class of vessel, the only known dangers in it being the rocks extending nearly a mile west of Cape Scott; the tide runs through from one to 3 knots, the flood from the southward. There are some heavy tide rips near its east and west sides; a large vessel may beat through with safety, tacking when upwards of a mile off Cape Scott, or half a mile of Cox island.

SCOTT ISLANDS extend nearly 20 miles in an east and west direction; the principal ones are five in number, with some adjacent smaller islets. There are wide passages between the western islands, but as no soundings have been obtained in them, and strong tide ripples and overfalls have invariably been observed raging there, no vessel should venture among or through them, unless compelled to do so.

Westward of Cape Scott the tides set with considerable strength to the north and south across the entrance of Goletas channel, and a vessel passing out northward of the Scott islands must beware that she is not set down too near them with the ebb stream.

Along the north side of the Scott islands, at a distance of 2 miles, will be found from 30 to 50 fathoms; at 2 miles west of Triangle island are 45 fathoms, and from 5 to 6 miles southward of the group will be found from 80 to 100 fathoms.

COX ISLAND, the easternmost and largest of the group, is about $2\frac{1}{2}$ miles in extent, with iron bound rocky shores and several off lying dangers; its height is upwards of 1,000 feet. This island forms the western boundary of the Scott channel, and is upwards of 5 miles W. by S. from Cape Scott.

LANZ ISLAND, separated from Cox island by a passage half a mile wide, is upwards of 2 miles long in a westerly direction, and a mile broad; its shores, like Cox island, are rocky, and it rises near the centre to a summit 1,177 feet above the sea; both the islands are wooded.

There are 17 fathoms in the passage between Cox and Lanz islands, and in fine weather with southerly winds a vessel may drop an anchor northward of the former island in 14 fathoms, but at all times it is a neighbourhood to be avoided.

East Haycock, a small islet 80 feet high, is $2\frac{1}{2}$ miles south-west from Lanz island; it has a rugged outline, and is covered with a few stunted trees. Some small islets extend a short distance north-west of it.

West Haycock, 5 miles $W.\frac{1}{4}$ S. from East Haycock, is small and rocky, about 180 feet high. Some small islets extend upwards of a mile south-west of it, foul ground existing around them for half a mile.

TRIANGLE ISLAND, the westernmost of the group, is 26 miles W. by S. from Cape Scott; it is 680 feet high, about a mile in extent, and differs from the other islands in being very precipitous, and bare of trees, and has a remarkable gap in its summit; a ledge or reef extends one mile north-west of it; to the eastward are three low islets, the outermost of which, 40 feet high, is $1\frac{3}{4}$ miles from Triangle island.

In navigating near the Scott islands, it is recommended to give them a good offing, especially in a sailing vessel, as the tides set very strongly through the passages between them.

REMARKS ON THE NAVIGATION OF THE INNER WATERS BETWEEN CAPE MUDGE AND THE PACIFIC.

For steamers the navigation of these channels is very simple, the only caution required being to steer mid-channel; if the weather be fine, except in the vicinity of the Nimpkish river, Helmcken island, and Seymour narrows, these water may be navigated as well by night as during the day, the shores being so high on either side as to be easily defined.

If in a sailing vessel, unless the wind be fair and likely to remain so, it would be preferable to anchor for the night, as the wind usually falls after sunset, especially during summer months.

WATER.—It has not, as a rule, been stated where water is to be found, for it is generally so plentiful that at every valley or beach a stream will be seen.

SUPPLIES.—The natives, whenever a vessel stops, will generally bring alongside deer, grouse, salmon, rock cod, and other fish in moderate quantities, selling them at reasonable prices. Blankets, shirts of the most common description, knives, beads, powder, shot, tobacco, and red paint are very useful to barter with. To men-of-war they are usually very civil, but crews of coasters and merchant vessels should watch them vigilantly, as they are cunning and treacherous (especially near the northern parts of Vancouver island), having captured several small coasters and murdered their crews. Whiskey and the vices of civilization are, however, fast diminishing their numbers.

CHAPTER VII.

VANCOUVER ISLAND, WEST COAST; FROM JUAN DE FUCA STRAIT
TO SYDNEY INLET.

VARIATION, 22° 40' E. in 1864.

GENERAL DESCRIPTION.—The outer or western coast of Vancouver island is comprised between Bonilla point, at the entrance of Juan de Fuca strait, and Cape Scott, the north-west extreme of the island, a distance of upwards of 200 miles. Its general direction is W.N.W. and E.S.E., but the coast is broken into deep inlets, the principal of which, Barclay, Clayoquot, Nootka, Kyuquot, and Quatsino sounds, are large sheets of water, with features similar to the other great inlets on this part of the American continent, and a detailed description will be given of them in their regular order.

MAKING the LAND.—When first making the land, an unbroken range of mountains will be seen; on a nearer approach it appears thickly wooded, and apparently fertile, intersected with many deep openings and valleys, which in most cases are some of the inlets before mentioned. The coast is generally low and rocky, but rises immediately to mountains of considerable height. It is fringed by numerous rocks and hidden dangers, especially near the entrances of the sounds, and the exercise of great caution and vigilance will be necessary on the part of the navigator to avoid them, even with the present Admiralty charts. On no occasion, therefore, except where otherwise stated in the following pages, should a stranger attempt to enter any of the harbours or anchorages during night or thick weather, but rather keep a good offing until circumstances are favourable; and when about to make the coast, it cannot be too strongly impressed on the mariner to take every opportunity of ascertaining his vessel's position by astronomical observations, as fogs and thick weather come on very suddenly at all times of the year, more especially in summer and autumn months.

WINDS.—The remarks with regard to wind and weather given in the first part of this work apply generally to the outer coast of Vancouver island, and any farther notice on the subject is unnecessary, except, perhaps, that bad weather in winter months is more frequent there than to the southward.

TIDES.—All along the outer coast or west of Vancouver island it may be said to be high water at full and change when the moon crosses the meridian, viz., at noon and midnight, the tide showing considerable regularity as compared with the inner waters, the greatest rise and fall being everywhere about 12 feet. There are two high and low waters in the 24 hours all the year round. In summer months the superior high water is at midnight, and in winter months at noon.

The flood stream appears to set along the coast to the north-west, and the ebb to the south-east; neither are of great strength, except in the vicinity of Fuca strait and the Scott islands. In summer months a set is generally found to the southward, and in winter in the opposite direction, but as a rule the currents are irregular, and apparently influenced by prevailing winds.

SOUNDINGS.—At the entrance of the Fuca strait the 100-fathom edge of the bank extends upwards of 30 miles off shore; it then runs nearly straight in a N.W. by W. direction, gradually nearing the coast, and abreast Cape Cook or Woody point the depth of 100 fathoms will be obtained within 4 miles of the shore; to the north-west of Woody point the 100-fathom edge does not extend more than 10 miles off shore, and to the southward and westward of the Scott islands even less.

The nature of the bottom, when under 100 fathoms, appears to be generally composed of sand and gravel, and does not differ in one part from another sufficiently to afford any guide for ascertaining a vessel's exact position on the coast; the bank, however, extends far enough off shore to the south-east of Cape Cook, that if running for the coast in thick weather, the mariner, by sounding in time, will get due notice of his approach to the land, as the edge of 100 fathoms does not come within 18 miles of it, and the bank shoals very gradually.

NATIVES.—The west coast of the island is very thinly populated, the highest estimate of the natives not exceeding 4,000, divided into a number of very small tribes. As a rule they are harmless and inoffensive, though in a very few cases the crews of vessels wrecked on their coasts have been plundered and ill-treated: they are addicted to pilfering, especially in the vicinity of Nootka sound, and ought to be carefully watched; this is perhaps the worst charge that can be brought against them.

All the tribes speak a different dialect, and the Chinook jargon, which is used at Victoria in transactions with the settlers and natives, will not be generally understood on the west coast.

SUPPLIES, &c.—The natives live principally on fish, potatoes, and berries. Fish, salmon, halibut, rock cod, herring, and hulican, the

latter somewhat resembling a sardine, are found in great abundance. Deer, grouse, and wild fowl are also to be had, but not by any means so plentiful as along the north-east coast of the island.

Furs and fish oil are the only articles of trade with the natives, and the quantity of each procured is so small, that at the most it does not employ more than half a dozen small coasting vessels; the trade in furs may indeed almost be said to be at an end.

At the Alberni inlet in Barclay sound a large saw mill has been established by an English company, and a considerable lumber trade now goes on from that place.

At Forward inlet and Coal harbour, in Quatsino sound, seams of coal of considerable thickness have been seen, and there is no doubt that a quantity of that valuable article is to be met with in the north-west part of the island.

Indications of copper and iron are also plentiful, in Barclay sound especially. In Port San Juan, and in the Muchalat or Guaguina arm of Nootka sound, some traces of gold have been met with.

THE COAST from Port San Juan (page 15) runs 10 miles in a westerly direction to Bonilla point, rising gradually to elevations from 1,000 to 2,000 feet. Bonilla point, the north entrance point of Fuca strait, is 12 miles N.N.W. of Cape Flattery; the point slopes gradually to the sea, is not in any way remarkable, and may be approached within one mile; to the westward of it the coast becomes more broken, still keeping a westerly direction, being high a short distance inland.*

MITINAT LAKE, the entrance to which is narrow and shoal, is 7 miles westward of Bonilla point. The lake is of considerable size, extending to the northward. There are only 1 to 2 fathoms in the entrance, and the sea generally breaks heavily across it in bad weather. Four miles to the westward of the entrance is a remarkable waterfall, called by the natives Tsusiat, which may be seen at a good distance, even in thick weather, when it would help to identify a vessel's position, being the only waterfall on this part of the coast.

PACHENA BAY, 20 miles westward of Bonilla point, is nearly 2 miles deep in a northerly direction, and half a mile wide, with from 5 to 6 fathoms water, but as it is open to the southward and south-west, and there is usually a heavy swell setting into it, no vessel should anchor there. At its head, on the west side, is a stream where boats can get in and find shelter in bad weather. Sea-bird islet, off the entrance of the bay, is bare, about 10 feet above water, and of small extent.

* See Chart:—America, West Coast, No. 2,531; scale, $m = 0.1$ of an inch.

The coast between Pachena bay and the south-east point of entrance of Barclay sound, a distance of 3 miles, is rocky, forming an open bay that affords no shelter.

The soundings between Port San Juan and Barclay sound, at a distance of 2 miles off shore, vary from 50 to 18 fathoms, shoaling when to the westward of Nitinat lake, 10 miles to the southward of which will be found less than 50 fathoms.

BARCLAY SOUND is an extensive arm of the sea, 30 miles westward of the entrance of Fuca strait. It is upwards of 14 miles wide at entrance, and though encumbered by numerous islands it maintains this breadth for nearly 12 miles inland, when it separates into several narrow inlets or canals, the principal of which, the Alberni inlet, extends 23 miles in a northerly direction, its head reaching within 14 miles of the eastern or inner coast of Vancouver island. Off the entrance, and in the southern parts of the sound, are innumerable rocks and islands, with several navigable channels between them, which, however, ought to be used with great caution by a stranger. The shores are low, except in the northern part and among the canals, when they become high, rugged, and mountainous.*

TIDES.—It is high water, full and change, in Barclay sound at 12 h., and the rise and fall of tide is about 12 feet.

SOUNDINGS.—A bank of sand and gravel, with depths from 25 to 45 fathoms, extends 20 or 25 miles to the southward and westward of the entrance of Barclay sound. In the middle of this bank is a deep hole, the east part of which is 5 miles south-west from the entrance; from thence the hole extends 19 miles in a W.S.W. direction, with depths varying from 60 to 100 fathoms, so that if steering for Barclay sound from the south-west, and the weather be thick, by attention to soundings a vessel might ascertain her position within a few miles. To the south-east of the entrance the water becomes deeper, and at a distance of 10 miles off shore there are 60 to 70 fathoms, sand and mud.

There are three navigable ship channels into Barclay sound, viz., the Eastern, Middle, and Western, and all require great caution in navigating; they will be described in their regular order.

The EASTERN CHANNEL, on the eastern side of Barclay sound, between the main shore and Deer islands, is 12 miles long in a N.N.E. direction, and its breadth varies from 1 to $1\frac{1}{2}$ miles. Its shores are low and rugged, except in the north part, which becomes high. The soundings in the entrance vary from 18 to 22 fathoms, increasing gradually to 90 and 100 fathoms at the north part. There are several

* See Chart:—North America, West Coast, No. 584; scale, $m = 0.5$ of an inch.

dangers within it, the rocks off Cape Beale and Channel rocks at the southern part, and the Fog rock off the east side of Tzaartoos island.

CAPE BEALE, the south-east point of entrance of Barclay sound, and of the Eastern channel, is 30 miles N.W. by W. $\frac{1}{2}$ W. from Cape Flattery lighthouse. It is a bold rocky point, 120 feet high, and some rocks extend off it, from 2 to 4 cables. It is well adapted as a position for a lighthouse, which is much required for entering Barclay sound or Fuca strait from the westward.

BAMFIELD CREEK, 4 miles from Cape Beale, on the east side of the channel, runs in $1\frac{1}{4}$ miles in a southerly direction, with a breadth of from 1 to 2 cables; there is room for a vessel to moor at a short distance from its head in 6 fathoms. A narrow passage, 30 yards wide, with 6 feet at low water, runs from the head to an inner basin, which is one mile long, and has from 2 to 4 fathoms.

Grappler creek extends from the entrance of Bamfield creek two-thirds of a mile to the eastward, being about 40 yards wide, with from 8 to 10 fathoms, after which it takes a northerly direction for one mile, and becomes very shoal. Both these creeks afford good sheltered anchorage to small craft.

KELP BAY, $5\frac{3}{4}$ miles from Cape Beale, is two-thirds of a mile wide, a quarter of a mile deep, and affords a fairly-sheltered anchorage in 6 to 14 fathoms. Its shores are low, and a rock which covers at one-third flood lies one cable north of its south entrance point, and there is a small islet at its north point, which shows a conspicuous white mark; foul ground, marked by kelp, exists in the north part of the bay.

If intending to anchor in this bay, give the entrance points a berth of 2 cables, and anchor in its south part in 6 or 14 fathoms, with the entrance points bearing S.W. by W. and North. This anchorage is easy of access, but the bottom is irregular.

Mark islet, 8 miles from Cape Beale, and one cable off the east side of the channel, is small and wooded, and conspicuous from the entrance of the Middle channel; the shore between it and Kelp bay runs nearly straight, and may be approached to 2 cables.

NUMUKAMIS BAY, 9 miles from Cape Beale, at the north-east part of the Eastern channel, is of an oblong shape, 3 miles wide and $1\frac{1}{2}$ miles deep; its shores rise gradually to mountains from 1,000 to 2,000 feet high. From the centre of its head the Sarita valley extends away to the eastward, a stream of considerable size flowing from it into the bay. In the centre of the bay are the San José and Reef islets, of small extent, and low; from the south point of the latter islet a reef extends one cable,

The soundings in the bay are from 70 to 105 fathoms, and there is no anchorage; its shores are steep-to, except off Sarita valley, where a sand-bank extends out half a mile.

Poett Nook, in the south part of this bay, about one mile within its south-west point, is a landlocked basin, about 3 cables long and 2 cables wide, with 7 fathoms water. The entrance to it is nearly straight, one cable long, and 150 feet wide, with 7 fathoms in the shoalest part; it is difficult for large vessels to enter unless they warp in.

There are three small creeks on the north side of Numukamis bay, but the water is too deep for anchorage.

TURN ISLAND, at the north-east point of the Eastern channel, and dividing it from the Alberni channel, is small and wooded, and separated by a narrow boat pass from the east shore. At one-third of a mile south of it is a narrow creek, 3 cables long and half a cable wide, with from 9 to 12 fathoms, available for small craft.

SHIP ISLET, at the south-west point of the Eastern channel, N.W. $\frac{1}{2}$ N., 2 miles from Cape Beale, is 100 feet high, and rocky, with a few remarkable trees on its northern part, which at some distance seaward give the islet the appearance of a ship under sail, and form a good mark for identifying the channel; there are from 23 to 24 fathoms at 2 cables' distance from it.

DEER ISLANDS form the western boundary of the Eastern channel, and run N.N.E. and S.S.W. for 10 miles, with a breadth varying from one to 2 miles. They are low, and of inconsiderable size, except the northern one, which is 1,000 feet high in parts, and of considerable extent. There is only one navigable passage through them, the Satellite pass, between Helby and Hill islands.

KING ISLAND, the southernmost of these islands, is about one mile long and half a mile broad; its shores are very rugged and broken, with rocks extending from one to 2 cables off. This island is separated from Ship islet by a passage one-third of a mile wide, but there is a rock in the middle of it.

CHANNEL ROCKS, on the west side of the channel, 3 cables east of King island, and one mile E.N.E. from Ship islet, are about one cable in extent, and cover at half flood; there are 10 to 12 fathoms at the distance of a cable to the eastward of them, and the sea generally breaks over them; they must be carefully avoided.

Turn island, at the north-east point of the Eastern channel, shut in by leading bluff of Tzaartoos island N. by E. $\frac{3}{4}$ E., leads one cable east of the Channel rocks, and 4 cables west of the rocks off Cape Beale.*

* See View B. on Chart No. 584.

DIANA ISLAND, separated from King island by a passage full of rocks, is of triangular shape, about $1\frac{1}{4}$ miles wide, and three-quarters of a mile broad. Its shores are rocky, and at a distance of 2 cables from its east side is a rock awash at high water, with 16 fathoms close to it.

ENTRANCE ANCHORAGE.—Helby island, the next island northward of Diana, has off its north side a small, but well sheltered anchorage in from 6 to 9 fathoms, easy of access from either the Eastern or Middle channels, and very convenient as a stopping place for vessels entering or leaving Barclay sound.

Wizard islet, to the northward of the anchorage, is small, about 8 feet high, and bare. It is about 4 cables north of Helby island, and vessels intending to anchor should do so about one cable south-west of the islet in 6 fathoms.

HILL ISLAND, two-thirds of a mile north of Helby island, and separated from it by the Satellite pass, is small, with a summit of moderate height at its southern end. At a quarter of a mile south of it is a patch of $3\frac{1}{2}$ fathoms water, marked by kelp, and there are several small islets and rocks off its east and west sides.

ROBBERS ISLAND, separated from Hill island by a passage full of rocks, is 2 miles long and one mile broad at its widest part. It is low, and steep-to on the eastern side, and between it and Tzaartoos island is a small landlocked basin of 5 to 7 fathoms water, but almost inaccessible in consequence of the many rocks at its entrance.

TZAARTOOS or COPPER ISLAND, the northernmost of the Deer islands, is $4\frac{1}{2}$ miles long in a N.N.E. direction, and $1\frac{1}{2}$ miles broad. It is higher than the other islands, rising in many parts to 800 and 1,000 feet; its eastern side, except in the vicinity of Sproat bay, is steep-to, and may be approached to 2 cables. Limestone of a fine quality is to be found in its northern part, and there are several indications of copper and iron ores.

SPROAT BAY, on the east side of Tzaartoos island, is about half a mile wide and 2 cables deep. In its centre are two small islets, and between them and the southern side of bay a vessel may anchor in from 11 to 15 fathoms.

Leading bluff, situated just south of the bay, is a steep point 400 feet high, and conspicuous from the entrance of the Eastern channel.

FOG ROCK, lying about 2 cables east of Sproat bay, is of small extent, with only 9 feet over it, and steep-to all round. This danger is in the track of vessels using Sproat bay, and requires caution to avoid it, not being marked by kelp in the spring.

The east sides of Hill and Robbers island open of Leading bluff

S.W. $\frac{3}{4}$ S., lead south-east of Fog rock, and the west side of Nob point well open east of Limestone point N. $\frac{1}{4}$ W. leads well east of it.

NOB POINT, the south-west entrance point of Alberni inlet, and north-west point of Eastern channel, is about half a mile to the northward of Tzaartoos island, and nearly 13 miles from Cape Beale. It is a remarkable cliffy projecting point 476 feet high, steep-to on its south and east sides.

ALBERNI INLET, at the north-east part of Barclay sound, runs in a winding northerly direction for 22 miles, with a breadth varying from 2 cables to one mile, and terminates in a fine capacious anchorage at its head; the shores on either side are rocky and rugged, rising abruptly from the sea to mountains 2,000 and 3,000 feet high; at the head, however, the land becomes low and fertile, a large quantity being fit for cultivation. A settlement and large saw mills are established there, and quantities of timber exported to different parts of the world.

The soundings to within one mile of the head vary from 160 to 40 fathoms, and the shores of the inlet are everywhere free from danger. The entrance between Nob point and Turn island lies at the termination of the Eastern channel, 13 miles N.N.E. from Cape Beale.

San Mateo bay, on the east side of the inlet, $1\frac{1}{2}$ miles north of Turn point, is three-quarters of a mile wide, and one mile deep; its shores are high, and the soundings in it vary from 20 to 50 fathoms, being too deep for anchorage.

Mutine point midway between this bay and Turn island is rocky, and as at a short distance off it a rock is said to exist, a berth of 2 cables ought to be given in passing. Just south of this point is a small bay with irregular soundings from 11 to 17 fathoms, which might be used as a stopping place.

UCHUCKLESIT HARBOUR, on the west side of the inlet, 2 miles within Nob point, is 3 miles long in a westerly direction, and its average breadth is about half a mile; the north shore is high, rising gradually to mountains of 2,000 and 3,000 feet, but the south shores and head are low; all are free from danger at the distance of a cable. The soundings vary from 20 to 40 fathoms, and there are two secure anchorages, Green cove at the entrance, and Snug basin at the head, with from 9 to 15 fathoms water. Limestone of a very fine quality is to be procured at the head of the harbour.

Green cove, just within the entrance on the north side of harbour, affords a snug, well-sheltered anchorage in 9 to 14 fathoms. Harbour island, off its south side, and completely landlocking the anchorage in that direction, is of small extent, with a clear deep passage

on either side into the anchorage ; a rock lies half a cable off its south-east point.

This anchorage is convenient as a stopping place for vessels bound to or from Stamp harbour at the head of Alberni inlet, and the entrances to it, on either side of Harbour island, make it available to sailing vessels or steamers.

Steamer passage, on the east side of Harbour island, leads into Green cove ; it is 2 cables long, and about 150 yards wide in the narrowest part, with not less than 9 fathoms, but it should only be used by steamers, or sailing ships with a fair wind.

Ship passage, which leads into Green cove north of Harbour island, is 4 cables long, and 2 cables wide, clear of danger, with from 11 to 20 fathoms, and available for sailing ships unable to enter or leave Green cove by Steamer passage.

On the north shore, one mile from Green cove, is a large stream of fresh water, with a bank extending a short distance off it.

Snug basin on the north side of the head of Uchucklesit harbour, is half a mile long in a northerly direction, about 2 cables broad, is well adapted for refitting or repairing a ship, and affords anchorage in 12 to 14 fathoms, but the entrance, though deep, is only 150 feet wide.

From Uchucklesit harbour the Alberni inlet trends N.E. by E. for 3 miles, and is steep-to on both sides, after which it runs N. by W. to the head.

NAHMINT BAY, on the west side of Alberni inlet, 10 miles within its entrance, is about half a mile in extent, with from 19 to 20 fathoms water, and may be used as a stopping place, if working down the inlet ; a large stream disembogues at its head.

The Second narrows, 13 miles from the entrance of the inlet, are 3 cables wide at low water, steep-to on the west side, with 26 fathoms in mid-channel ; if passing through them at high water, keep well over to the western shore.

The First narrows, 18 miles from the entrance, are 2 cables wide at low water, steep-to on the east side ; the west side dries out one cable at low water. The depth in mid-channel is 40 fathoms ; and in going through them a vessel ought to keep well over on the eastern side.

STAMP HARBOUR, at the head of Alberni inlet, is a capacious and secure anchorage, 2 miles in length, and varying in breadth from 4 cables to one mile. Its western shore is high and rocky, but the eastern side and head are low and fertile, with a quantity of clear level land, almost fit for cultivation. A stream of considerable size, the Sumass river, flows into the harbour at the head, and is navigable for canoes several

miles ; it has its source in a chain of extensive lakes in the interior of Vancouver island, and the quantity of water discharged from it is so great that there is a constant current out of the inlet, often exceeding one knot in strength.

An extensive saw mill has been built on the east side of Stamp harbour, and a small settlement formed, composed mostly of the workmen connected with the establishment. Great quantities of the finest timber in the world for spars are exported from this place, and vessels of considerable size may lie close to the saw mill without grounding, as there are 4 fathoms almost alongside it. The anchorage in the harbour is in 8 to 12 fathoms, at the distance of three-quarters of a mile from the head, with Observatory islet S.W. and the saw mill North.

Observatory inlet, in the centre of the harbour, is a small bare rock about 6 feet above high water ; some rocks extend half a cable north of it, but it may be approached within one cable. It is in lat. $49^{\circ} 13' 46''$ N., long. $124^{\circ} 50'$ W.

Sheep islet, in the north-west part of harbour, and 6 cables from Observatory islet, is wooded, and connected to the head of the harbour at low water by a sand-bank.

DIRECTIONS.—In entering Barclay sound through the Eastern channel, the south-east entrance point, Cape Beale, may be easily recognized from the south-east, by the islands west of it, Ship islet being also very conspicuous from the trees on its north part. In approaching or rounding the cape do not come nearer than half a mile to avoid the rocks off it, until Turn island at the north part of Eastern channel is well shut in by Leading bluff, Tzaartoos island, N. by E. $\frac{3}{4}$ E.,* when steer up the Eastern channel with that mark on, which will lead clear of the rocks off the west side of Cape Beale, and east of Channel rocks. When Ship island bears W.S.W., the vessel will be well north of the latter, and may then steer up mid-channel about N.N.E. ; on nearing Leading bluff, keep the east side of Hill island open south of it S.W. $\frac{1}{2}$ S., to pass east of the Fog rock, until the west side of Nob point comes open east of Limestone point N. $\frac{1}{2}$ W., when steer up within 2 cables of either shore, or in mid-channel. If bound to Stamp harbour, after entering the Alberni inlet the only direction required is to keep mid-channel, and anchor on the eastern side of the harbour with the bearings already given.

After entering the Alberni, a strong southerly wind will generally be experienced, blowing home to the head ; it however usually falls a little during the night.

A steam-tug is attached to the saw mill establishment, for the purpose of

* See View B. on Chart No. 584.

towing vessels through the Eastern channel ; when a vessel is expected the tug generally lies in Dodger cove, at the entrance of Middle channel, where a good look-out can be kept.

If beating into the Eastern channel, which ought only to be done by small or quick working vessels, when standing towards Cape Beale, tack before the passage between Turn island and the main comes open of Leading bluff N.N.E. Ship islet may be approached to a quarter of a mile ; when nearing King island, or the Channel rocks, tack when Turn island comes shut in with Leading bluff. As a rule, in standing towards the east shore do not come within 2 cables, and after passing the Channel rocks, keep outside of the line of Deer islands. On nearing Leading bluff and Fog rock, keep Hill island open of the former S.W. $\frac{1}{2}$ S., till Nob point comes well open of Limestone point N. $\frac{1}{2}$ W., which clears the Fog rock to the south and north-east ; in standing into Numukamis bay, give Reef and San José islands a berth of about 2 cables, after which the shore on either side may be approached to about a cable, except near the centre of Numukamis bay, which should not be approached closer than half a mile.

If necessary to anchor for the night, or from other causes, Entrance anchorage, in the Deer group, just north of Helby island, is recommended, being secure, and easy of access from either Eastern or Middle channels. Kelp, Sproat, and Nahmint bays, also Green cove, are easy of access, and may be used as stopping places.

MIDDLE CHANNEL, the largest passage into Barclay sound, is adjacent to the Eastern channel, and separated from it by the Deer islands. It is upwards of 12 miles long in a north-north-east direction, and 3 miles wide in the narrowest part, being bounded on either side by numerous small islands and rocks. The soundings within it vary from 30 to 54 fathoms, and off its entrance are three dangers, named, Western reef, Channel reef, and Danger rock, which only break in heavy weather, and require great caution to avoid. In southerly or south-westerly gales there is generally a very heavy sea in this channel.

DANGER ROCK, in the south-east part of entrance of Middle channel, $3\frac{1}{2}$ miles W. $\frac{1}{2}$ N. from Cape Beale, and S.W. by W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from Ship islet, is of small extent, and only breaks in heavy weather. There are from 22 to 40 fathoms at a distance of 2 cables around it.

Swiss Boy island just open west of Entrance island N.N.E. leads half a mile east of Danger rock ; Mark islet open north of Ragged island N.E. leads the same distance west of it, and east of Channel reef ;*

* See View C. on Chart No. 584.

and Sail rock in sight west of Storm island N.W. by W. $\frac{1}{2}$ W. leads south of it and Channel reef.

CHANNEL REEF lies near the centre of the entrance of Middle channel, $3\frac{1}{2}$ miles W. $\frac{3}{4}$ S. from Ship islet, and $1\frac{1}{2}$ miles W.N.W. from Danger rock. It is about a cable in extent, uncovers at low water, and has 27 fathoms close-to on the eastern side; there are from 19 to 50 fathoms in the channel between it and Danger rock, and the same marks clear both of them.

WESTERN REEF lies in the south-west part of entrance of Middle channel, $5\frac{1}{2}$ miles W. $\frac{3}{4}$ S. from Ship islet, and one mile south of the Broken group. It is about a cable in extent, awash at low water, and should not be approached within half a mile.

In bad weather the sea breaks heavily over all these reefs.

ENTRANCE ISLAND, at the south-east point of Middle channel, and nearly one mile W.N.W. from Ship islet, is of small extent, and wooded. It is steep-to and cliffy on the south and west sides; one quarter of a mile north-east of it is a small islet and some off-lying rocks.

Hecate passage, leading into Middle channel between Entrance island and Danger rock, is 2 miles wide, with from 33 to 74 fathoms water, and the best way to enter Middle channel in thick weather, or from the south or east. Shark pass, between Entrance and Ship islands, is two-thirds of a mile wide, with from 14 to 25 fathoms in the middle, and may be used by steamers or sailing vessels with a fair wind.

DODGER COVE, on the east side of Middle channel, between Diana and King islands, is a narrow creek about two-thirds of a mile long and a cable wide, with several rocks and small islets off its entrance. It affords good shelter to coasters or small craft at its head, where are from $2\frac{1}{2}$ to 3 fathoms water, but it should not be attempted by a stranger, as the entrance along the south side of Diana island is rather intricate.

Ragged island, a quarter of a mile west of Helby island on east side of the channel, is rocky and of small extent, with a few trees on its summit; the west side may be approached to about 2 cables, but between it and Helby island are several rocks, and no vessel should attempt to go through.

SATELLITE PASS, 3 miles from Entrance island, lies between Helby and Hill islands, connecting the Eastern and Middle channels. Its length is about a mile, and breadth half a mile; the soundings in the middle vary from 9 to 22 fathoms, and the south side is clear of danger, but 3 cables south of Hill island on the north side of the pass is a shoal patch with $3\frac{1}{2}$ fathoms, marked by kelp; Leading bluff open of east side of Hill island N.E. by N. leads to the south-east of this shoal.

A vessel bound to Alberni inlet, after having entered Middle channel, should proceed through this pass into the Eastern channel, and on to the inlet through the latter, keeping about one or 2 cables north of Ragged, Helby, and Wizard islands.

VILLAGE ROCKS, lying on the east side of Middle channel, 6 miles from Entrance island, and one-third of a mile from the north-west point of Robbers island, are 2 cables in extent, nearly awash at low water, and usually break in heavy weather; they should not be approached within a quarter of a mile. Between Robbers and Tzaartoo islands is a small landlocked basin about 2 cables in extent (mentioned in page 187), with from 5 to 7 fathoms, but the entrance to it from the Middle channel, though deep, is very intricate.

CHAIN ISLANDS, on the east side of Middle channel, are a chain of small islets and rocks nearly 4 miles long in a northerly direction. They run parallel to the west side of Tzaartoo island, being separated from it by a passage three-quarters of a mile wide, but filled with rocks, and among which no vessel should enter.

Swiss-boy island, the southernmost of this group, is small and clifty; and 2 cables west of it is Bull rock, of small extent, with less than 2 fathoms water, which breaks in bad weather.

A vessel ought not to approach the west side of these islands within half a mile, except when rounding their north part.

JUNCTION PASSAGE, at the north-east part of Middle channel, connecting it with the Alberni inlet and Eastern channel, lies north of the Chain and Tzaartoo islands, between them and the main. It is 2 miles long in an easterly direction, about one-third of a mile wide, its shores are clear of danger, and the soundings in mid-channel vary from 50 to 84 fathoms. On the north side of the passage is Rainy bay, about $1\frac{1}{2}$ miles in extent; but there are several rocks and small islets within it, the shores are rugged and broken, and the water too deep to afford anchorage. Northward of this bay, and connected to it by a very narrow boat pass, is Useless inlet, a large sheet of water with from 9 to 20 fathoms, which no vessel can enter.

BROKEN GROUP, which forms the boundary of Middle channel along the west side, is composed of a number of small islands and rocks, covering a space upwards of 6 miles long and 4 wide. They are low, and the principal ones wooded, the largest being about a mile in extent; there are several passages through them, and a good anchorage, called Island harbour, in their north-east part, but as a rule no stranger should venture among them or approach within half a mile, as the soundings are irregular, and there may exist rocks besides those marked on the Admiralty charts.

Redonda, the south-east island of this group, lies at the south-west entrance point of Middle channel, $4\frac{1}{2}$ miles W. $\frac{1}{2}$ N. from Ship islet. It is small, wooded, and of a round shape ; some rocks extend 3 cables off its south-east point, and half a mile E.N.E. of it is a reef which covers at half-flood. Between Redonda island and Channel reef is a passage one mile wide, with from 19 to 33 fathoms, but it should not be attempted by a stranger.

Village island, the largest of the group, is $1\frac{1}{4}$ miles north of Redonda, and upwards of a mile in extent ; the east side is bold and cliffy, with 24 fathoms at a cable's distance. On its north side is a village of considerable size, and where landing may be effected in almost all weather. Off its west side are several rocks, and a small bay, where a vessel may anchor in from 7 to 10 fathoms, but it is difficult of access.

COASTER CHANNEL, which runs in a westerly direction through the Broken group, north of Village island, is about 4 miles long, and from half a mile to 1 mile wide, with from 10 to 24 fathoms ; but as there are several rocks within it, this channel should not be attempted by a stranger.

Village reef, in the east part of Coaster channel, half a mile north of Village island, is small, and 4 feet above high water ; there are 34 fathoms at 3 cables east of it.

ISLAND HARBOUR, in the north-east part of Broken group, and 5 miles from the entrance of Middle channel, is a good, well-sheltered anchorage, about half a mile in extent, with from 10 to 14 fathoms water ; it is formed by several rocks and islands, and there are two good passages into it from the Middle channel.

Protection island, off its east side, and protecting it in that direction, is two-thirds of a mile long, and narrow ; its shore is rugged and broken, but may be approached to a cable ; there are two small bare islets one cable from its south shore, and almost connected with it at low water.

Elbow islet, 3 cables S.S.W. from Protection island, is small and rugged, with a notch in the centre ; there are a few trees on it, and the islet is conspicuous from the southward.

Elbow rocks, which cover at two-thirds flood, lie $1\frac{1}{2}$ cables N.N.E. of Elbow islet, between it and Protection island, and are steep-to on all sides.

Pinnacle rock, 3 cables East of Elbow islet, almost in the fairway of the South entrance, only breaks in heavy weather, and is dangerous to vessels entering the harbour by that passage.

DIRECTIONS.—Island harbour may be entered either by the South or by the Harbour entrance. The South entrance, between the Elbow rocks and Protection island, is $1\frac{1}{2}$ cables wide at its south part, with from

9 to 14 fathoms water. Harbour entrance, along the north side of Protection island, between it and Gibraltar island, is nearly a mile long, and its breadth averages about 2 cables ; the soundings within it vary from 15 to 18 fathoms, and in the middle, 4 cables from its east end, lies the Channel rock, of small extent, with only 9 feet on it at low water.

The best anchorage is near the centre of the harbour, about 2 cables west of the north-west end of Protection island, in from 10 to 12 fathoms, protected by Puzzle and Mullins islands from the westward.

Entering the harbour by the South entrance, steer for the south-east point of Protection island, on a W. by N. bearing, to avoid Pinnacle rock ; if the Elbow rocks are covered, keep along the south side of Protection island, about half a cable distant, till past them, when steer to the westward for the anchorage, passing about a cable south of the islets off Protection island, and anchor as above. Coming in through Harbour entrance, after entering it in mid-channel keep about half a cable from the north side of Protection island till clear of Channel rock, when anchor as before directed.

No one should attempt to enter this harbour without the chart,* unless thoroughly acquainted with the place ; and it only ought to be entered by sailing vessels with a fair wind.

NETTLE ISLAND, the north-east island of Broken group, is nearly one mile in extent, steep to off its north side, but east and west of it some islets and rocks extend out half a mile. At half a mile east of its east point is a small bare rock 8 feet above high water, named Swale rock, which is very conspicuous from the Middle channel, and marks the east entrance of Seshart channel.

SESHART CHANNEL is north of Broken group between it and the main, and connects the Western and Middle channels. It is a winding channel 5 miles long in a westerly direction, and about half a mile wide; the soundings in it vary from 16 to 35 fathoms, and a mid-channel course through is free of danger.

Capstan island, 3 miles from the east entrance and nearly in the middle of this channel, is small, and the southernmost of a number of small islands extending nearly one mile from the north shore ; a rock lies half a cable south of it, but the island may be rounded at one quarter of a mile. Westward of these islets is an extensive village called Seshart, to the southward of which a vessel may anchor a quarter of a mile off shore in 14 fathoms, open however to the south-west.

Northward of Seshart channel the west side of Middle channel is bounded by two narrow islands about 2 miles in length, and separated

* See Plan of Island harbour on Chart No. 584.

from the main by a narrow boat pass; they should not be approached nearer than half a mile.

BIRD ISLETS are two small, bare, conspicuous rocks lying almost in the centre of the north part of Middle channel, 9 miles from the entrance; the southern islet is 35 feet, and the northern 30 feet above high water; some rocks, which cover, extend one cable north and west of them.

EFFINGHAM INLET, the entrance to which is in the north-west part of Middle channel, is narrow, and about 8 miles long in a curved direction to the north-west, terminating in a low swamp; its shores on both sides are high and rocky, the western one indented by several bays. The soundings in it vary from 35 to 70 fathoms, and there is no anchorage; off its south entrance point are some small islets and rocks extending one mile to the eastward.

Vernon bay, one mile east of Effingham inlet, at the head of Middle channel, is upwards of a mile in extent, open to the southward, and too deep to afford anchorage; its shores are high and rocky. At 3 cables off Palmer point, its south-west extreme, is a rock 3 feet above high water, and 2 cables off its east shore, just within the entrance, is a reef awash at high water.

The north shore of Middle channel is rocky and bold, rising in some places to mountains upwards of 3,000 feet high; it is steep-to and clear of danger; in southerly winds the sea breaks violently along it.

DIRECTIONS.—Entering Barclay sound by the Middle channel with a fair wind, and coming from the west or south-west, keep well clear of the western part of the sound, and 3 miles south of Broken group. Steer towards Ship islet on an E.N.E. bearing, until Mark islet comes open north of Ragged island N.E.,* when haul into the Middle channel with that mark on, which will lead midway between Channel reef and Danger rock; when Ship islet bears E. by N. the vessel will be clear north of them, and may then steer up mid-channel. If bound to the Alberni inlet, a sailing vessel ought to proceed through Satellite pass into the Eastern channel, (as the wind is generally unsteady in Junction passage,) proceeding according to the directions given in page 190 for the latter channel. Should it, however, be requisite to go through Junction passage, give the Chain islands a berth of nearly half a mile to avoid the rocks off them, and steer in mid-channel through the passage into Alberni inlet.

Unless intending to go through Satellite passage, do not approach the Deer islands within half a mile.

* See View C. on Chart No. 584.

If entering Middle channel from the eastward, or in thick weather and not able to see the marks for clearing the reefs, keep well out until Entrance island bears North, when steer through Hecate passage so as to pass 2 or 3 cables west of the island, which will lead well eastward of all danger, then proceed as directed in page 196.

Beating into Middle channel, when south of Danger rock and Channel reef, keep Sail rock (which lies off the south-west side of Broken group, and is very conspicuous) open south of Storm island, the southernmost of the group, N.W. by W. $\frac{1}{2}$ W., until Mark islet comes nearly on with the south-east point of Hill island N.E. $\frac{1}{2}$ E., when, if standing to the westward, tack ; in standing to the eastward avoid shutting in the passage between Hill and Ragged islands ; tacking when these latter marks are on will lead between Danger and Channel reefs, and clear of them ; when Ship islet bears East, a vessel will be northward of them, and may stand over to about half a mile of the Deer islands and a mile of the Broken group. If bound to Alberni inlet, when able to lay through the Satellite pass do so, keeping nearer to its south shore, and beat up to the former through the Eastern channel. No vessel should attempt to beat through Middle channel unless the weather be clear and the marks well made out.

A vessel may go between Entrance island and Danger rock, to the northward of the latter and Channel reef, by keeping Sea-bird islet at the entrance of Pachena bay well shut in by Cape Beale E.S.E.

WESTERN CHANNEL leads into Barclay sound westward of the Broken group, between it and Great bank. Its length is about 4 miles in a northerly direction, its breadth from one to 2 miles, and except in the vicinity of Broken group it is clear of danger, and the soundings vary from 20 to 35 fathoms. Sail rock, lying off the south-west part of Broken group, is a bare rock like a sail, rising 100 feet above the sea, and very conspicuous ; to the northward of it are some low islets and rocks extending from the south-west island of the group ; and on the west side of this channel foul ground projects in some places as far as half a mile off the west side of the group.

Shag rock, 8 feet above high water, on the east side of the channel, $2\frac{3}{4}$ miles N. $\frac{3}{4}$ W. from Sail rock, and half a mile west of the Broken group, is small and bare, and foul ground exists one cable from it.

Round island, near the middle of the north part of the channel, is small, but 200 feet high ; it lies $3\frac{1}{4}$ miles N. by W. from Sail rock.

BLACK ROCK, at the south-west entrance point of the Western channel, $3\frac{1}{3}$ miles S.W. by W. $\frac{1}{3}$ W. from Sail rock, is 10 feet above high water, and small ; some rocks which break extend 2 cables east of it.

Channel rock lies at the south-east extreme of the Great bank, on the

west side of the channel. It is bare, 15 feet above high water, and steep-to on its eastern side.

GREAT BANK is, within the 10-fathom edge, $2\frac{1}{3}$ miles long in a northerly direction, and its greatest breadth is $1\frac{1}{2}$ miles; on the shoalest parts, near the north and south-west ends, are from 3 to 4 fathoms, marked by kelp, over which in heavy gales the sea breaks.

DIRECTIONS.—The Western channel, though clear of danger and wide, ought only to be used by steamers, or sailing vessels with a fair wind, and not then unless bound to Toquart harbour, in the north-western part of Barclay sound. In entering give the Sail and Black rocks a berth of half a mile, and steer up mid-channel, passing half a mile west of Round island.

GOWLLAND, TABLE, and CASTLE ISLETS, at the termination of Western channel, are small, but steep-to on their south sides. At one cable north-west of Table islet is a rock, awash at high water, and half a mile north-east from it is a patch 3 cables in extent, with from 4 to 7 fathoms; the best passage into Toquart harbour appears to be to the eastward of them.

PEACOCK CHANNEL runs through the north-west part of Broken group in a north-east direction from the Western to Seshart channel. It is about 3 miles long, and nearly a mile wide, with from 20 to 30 fathoms; its west side is clear of danger, but on its east side, $1\frac{2}{3}$ miles within the west entrance, and 2 cables west of Puzzle island, lies Galley rock, which uncovers at low water, and has 22 fathoms one cable south-west of it. This channel is fit for steamers, or sailing vessels with a fair wind; the only caution required in navigating it is to keep the west shore aboard till past Galley rock.

HAND ISLAND, the north-west of the Broken group, and at the south-west entrance point of Seshart channel, is small and rugged; foul ground exists off its east and west sides, which should not be approached within 3 cables.

Lyll point, at the north-west extreme of Seshart channel, on the main, and a mile N.W. by N. from Hand island, is a low sharp point, with a sandy beach round it; there are 18 fathoms within a cable of it.

MAYNE BAY, northward of Lyll point, is of an oblong shape, 2 miles long and one mile deep. Its shores, except near the north part, are low and steep-to, the soundings vary from 20 to 25 fathoms, and there is no anchorage except in its south-east corner, where there is a limited spot with 14 fathoms about 2 cables off shore; the group of small islets, the Sisters, extending south 5 cables off the north-west point, may be approached to a cable.

Stopper island, lying half a mile west of Mayne bay, are about $1\frac{1}{2}$ miles in extent, wooded, and 200 feet high; rocks extend from 2 to 3 cables off their east and west sides.

DAVID CHANNEL, leading into Toquart harbour between Mayne bay and the Stopper islands, is about 2 miles long in a northerly direction, 3 cables wide in its narrowest part, and the soundings in it vary from 17 to 22 fathoms. The Richard rock, on its west side, 4 cables from the Stopper islands, is steep-to on the east side, and may be approached to a cable's distance; a vessel should not go between this rock and the islands.

Hermit islet, 3 cables north of the Stopper islands, at the north-west point of David channel, is low, with 20 fathoms close-to; at 2 cables N.N.W. of it is a small rock, 2 feet above high water.

TOQUART HARBOUR, in the north-west corner of Barclay sound, 9 miles from the entrance of Western channel, is about $1\frac{1}{2}$ miles in extent, and well sheltered by the Stopper islands from all winds. Its shores are low and steep-to, except from the head, where a shoal called Black patch, with 9 feet on its outer part, extends out nearly half a mile. The anchorage is of considerable extent, in from 12 to 14 fathoms, muddy bottom.

Image island, lying 3 cables off shore in the north-east part of the harbour, is small, and may be approached pretty close; to the north-west of it is an excellent anchorage in from 11 to 12 fathoms.

Village passage leads into the harbour westward of Stopper islands; it is upwards of a mile long, and 3 cables wide in its narrowest part, clear in mid-channel, and with from 15 to 21 fathoms; some rocks awash at high water lie on its east side, 2 cables north-west of the west Stopper island.

Pipestem inlet is a long narrow inlet extending upwards of 5 miles nearly straight in a north-easterly direction from the north-east part of Toquart harbour. It has 19 to 37 fathoms water, but affords no anchorage whatever; its shores are rocky, and rise abruptly to 1,000 and 2,000 feet above the sea; at its head is a small patch of swampy ground, some fresh-water streams flowing through it.

DIRECTIONS.—Entering Toquart harbour by David channel, after passing Lyall point, steer well into Mayne bay to avoid Richard rock; when Hermit islet comes open of the Stopper islands N.W. $\frac{1}{2}$ W. a vessel will be clear eastward of it, and may steer for the harbour, passing midway between the Sisters and Stopper islands, and eastward of Hermit islet; anchor in 14 fathoms, with Image island bearing N.E. by N., and Hermit islet S.E., or proceed farther north, keeping one cable off the west side of Image island, and anchor north-west of it in 11 or 12 fathoms.

Entering by Village passage, keep in mid-channel, or well over to the west shore, to avoid the rocks off the Stopper islands.

The west coast of Barclay sound from Toquart harbour to Ucluelet arm runs nearly straight about S.S.W. and N.N.E., and rises gradually to high land 2,000 feet above the sea. For $2\frac{1}{2}$ miles from the Stopper islands a chain of small islands run parallel to the coast at a distance of about three-quarters of a mile off, with from 5 to 7 fathoms between them and the shore ; Forbes island, the southernmost of them, is moderately high, steep-to on its south side ; nearly a mile south-west from it, and extending from the opposite shore, are a number of rocks above high water.

SHIP CHANNEL, between the Vancouver shore and the Great bank, southward of Forbes island, leads into the Ucluelet arm, and is clear of danger. It is 4 miles long N.N.E. and S.S.W., two-thirds of a mile broad in its narrowest part, and the soundings vary from 26 to 38 fathoms.

Double island, at its south-east point, is of small extent, steep-to on the west side, but from the south and east sides foul ground extends upwards of a mile.

Kelp islet, 6 cables north-west of Double island, on the opposite side of the channel, is low and bare ; kelp extends 2 cables south of it, and there are 38 fathoms midway between it and Double island.

UGLY CHANNEL, to the eastward of Shelter islands, connects Ship channel with the ocean. It is bounded on both sides by rocks and reefs, and though probably deep, it has not been sufficiently examined to recommend its being used by a stranger ; the soundings in the north part vary from 28 to 36 fathoms.

Starlight reefs, at its south-east part, are a cluster of rocks about 7 cables in extent, some above high water ; in bad weather the sea breaks heavily over them.

Look-out island, on the west side, is nearly bare, of small extent, and about 150 feet high ; at 3 cables south of it is a patch of rocks 2 cables in extent, and 6 cables north of it lies a bare rock 6 feet above high water.

UCLUELET ARM, just within the south-west entrance point of Barclay sound, is narrow, and extends $5\frac{1}{2}$ miles in a N.W. by W. direction, running parallel to the outer coast, and separated from it by a narrow peninsula. Its south shore is low, and indented by several small creeks and bays ; the northern shore is nearly straight, and, at a short distance inland, rises gradually to a flat-top range of considerable height, the south-east shoulder of which, mount Ozzard, is 2,275 feet high, and conspicuous from the south-east.

The soundings in this arm vary from 4 to 8 fathoms, and there is secure and well-sheltered anchorage from one mile inside the entrance to the head.

SHELTER ISLANDS, upwards of half a mile south-east of the entrance of the Ucluelet arm, are an irregular cluster of small islets and rocks, about a mile long in a north-westerly direction, and 3 cables wide, which completely shelter the arm from the sea ; at a cable's distance from their north and west sides are from 7 to 15 fathoms.

Centre reef, 3 cables westward of their northern part, is of small extent, and about 3 feet above high water ; between it and Shelter islands is Alpha passage, 2 cables wide in its narrowest part, with from 11 to 14 fathoms, and fit for steamers or coasting vessels bound to the Ucluelet arm.

CAROLINA CHANNEL, west of Centre reef, between it and Amphitrite point, the south-west point of entrance to Barclay sound, is the westernmost passage into the latter and the Ucluelet arm. It is nearly straight, one mile long in an E.N.E. direction, and a quarter of a mile wide in its narrowest part, with from 11 to 15 fathoms. This channel appears to be the best for a stranger to use if entering the Ucluelet arm from seaward.

Round island, at the north part of this channel, is the south entrance point to the Ucluelet arm ; it lies nearly one mile E.N.E. from Amphitrite point, is high, and connected by a sandy beach at low water to the main ; the east side is steep-to, and may be approached to a cable ; 4 cables east of it on the opposite side of entrance are some rocks extending one cable off the north shore, and awash at high water.

LEADING POINT, on the south side of the Ucluelet arm, 6 cables within the entrance, is bold, steep-to, and may be approached to 50 yards ; between it and Round island is a narrow creek, with 2 fathoms water, but the entrance is blocked up by kelp. At Leading point the breadth of the arm contracts to a cable.

Stewart bay, on the north side, half a mile within the entrance, is 2 cables deep, and half a mile wide. In its centre is a rock awash at high water, and the bay is too shallow to afford anchorage except to a coaster ; there is a native village of considerable size in its west part, off which some small rocks extend about half a cable.

Channel islet, in the middle of the arm about 2 miles within the entrance, and a mile past Leading point, is small ; between it and the latter is good anchorage in from 6 to 9 fathoms. There is a clear passage north of the islet with 7 fathoms water, but only 2 fathoms on its south side ; at 2 cables N.W. by W. from it lies a small rock above high water, steep-to on either side.

To the westward of Channel islet the arm becomes wider, affording good anchorage in 4 to 7 fathoms, over a space one mile long and half a mile wide.

Staples island, half a mile from the head on the south side of the arm, and connected to the latter at low water, is about a mile in circumference, and low; there is no anchorage, except for small craft to the westward of it.

A sandy beach borders the north shore of the Ucluelet arm from its head to Stewart bay.

DIRECTIONS.—There are several channels leading into the Ucluelet arm, with apparently deep water through them, but there are so many rocks and dangers in their vicinity, that even with the chart great vigilance on the part of a stranger is recommended, and it would hardly be advisable to enter without a pilot; should it, however, be necessary to do so, a vessel ought to steer for Amphitrite point the south-west extreme of Barclay sound, and when about 2 cables from it, proceed to the eastward through the Carolina channel, keeping about 2 cables off its west shore to avoid Centre reef. Pass Round island at the distance of a cable, and rounding it sharply steer about W.N.W. up the arm, keeping well over to the south shore; pass Leading point within half a cable to avoid the rocks abreast of it on the north side, and anchor midway between it and Channel islet, in 6 to 9 fathoms; or proceed farther to the westward, where a more extended anchorage will be found, taking care to pass north of Channel islet.

Channel islet kept open between the sides of the inlet N.W. by W. $\frac{3}{4}$ W. leads into the Ucluelet arm from the eastward off the entrance of the Western channel, to the northward of the Shelter islands, and between the Great Bear and Black rocks; but as there are few soundings in the track, it ought to be used with great caution.

Entering the arm from the northward through Ship channel, keep about half a mile off the west shore, and passing about 2 cables north of Shelter islands, steer up the arm as before directed.

The COAST from Amphitrite point takes a W. by N. direction for 17 miles to point Cox; it is low and indented by two large sandy bays, which afford no shelter; the soundings at a distance of 4 miles off it are from 20 to 27 fathoms.

Wreck bay, 4 miles westward of Amphitrite point, is nearly 3 miles wide, and one mile deep, with a small islet in the centre; there are several rocks within the bay, and it is totally unfit for anchorage. A Peruvian vessel, the *Florentia*, was wrecked here in December 1860.

LONG BAY, 8 miles westward of Amphitrite point, is 7 miles wide, and upwards of a mile deep, with from 8 to 11 fathoms between the

entrance points ; there are several rocks within it, and no vessel ought to anchor here ; at its south-east point, just within the reefs, good shelter for boats will be found in all weather.

Schooner cove, in the north-west part of the bay, is of small extent, with 2 fathoms water inside ; it would afford good shelter to a coaster or small vessel.

Portland point, the north-west extreme of Long bay, is high and abrupt, with some small rocks and islets around it, at a distance of half a mile ; Gowlland rocks, $1\frac{1}{2}$ miles W.S.W. from it, are of small extent, bare, and from 10 to 15 feet above high water ; they ought not to be approached nearer than a mile.

When navigating between Barclay and Clayoquot sound do not approach the shore within 2 miles, nor stand within a mile of the entrance to Wreck and Long bays.

CLAYOQUOT SOUND comprises a number of inlets, islands, and rocks, covering an area 30 miles long in a westerly direction, and 16 broad. The entrance to it is fringed by numerous dangerous rocks, which require due caution to avoid ; it lies between Cox and Sharp points, bearing from each other W. by N. $\frac{3}{4}$ N. 21 miles, and is distant 20 miles W. by N. from Barclay sound, and 66 miles W.N.W. from Cape Flattery light-house.

There are several channels into the inner waters of this sound, but with the exception of Ship channel they ought not to be attempted by a stranger.

The soundings at a distance of a mile outside the outer rocks vary from 20 to 30 fathoms, but in the channels and inside the bottom is irregular.

TIDES.—It is high water, full and change, in Clayoquot sound at 12 hours, the rise and fall being about 12 feet.

POINT COX, at the south-east extreme of Clayoquot sound, is rocky, and may be approached to half a mile ; a remarkable summit, Vargas-cone, 438 feet high, rises just within the point, and is very conspicuous from the westward.

TEMPLAR CHANNEL, the eastern entrance of the sound between Low peninsula on the east, and Lennard, Wakenenish, and Stubbs islands on the west, is a winding passage about 4 miles long, in a N.N.W. direction, with an average breadth of half a mile. The soundings in its entrance vary from 8 to 10 fathoms, and in its shoalest part near the north end are $3\frac{1}{2}$ fathoms, and a shoal bank lies in the middle abreast Wakenenish island ; in heavy weather the sea breaks right across the channel. No vessel drawing more than 12 feet water ought to attempt to enter this sound by this channel, and not even then without a pilot,

as it is very intricate, and no directions can be given; coasters however generally use it.

False bay, just northward of Cox point at the south-east extreme of the channel, is about half a mile in extent, with from 3 to 4 fathoms, but open to the south-west, and unfit for anchorage; its shores are low and sandy.

Lennard island, $1\frac{1}{2}$ miles west of Cox point, is of small extent and wooded, steep-to on the east side, but west of it are some rocks and small islets.

Wakennenish island, on the west side of the channel, a mile from Lennard island, is about 200 feet high, $1\frac{1}{2}$ miles long, and half a mile wide; at its south point is a large Indian village, E-cha-chets, generally occupied by the natives during the summer season when fishing.

Round island, at the north part of the channel, 4 miles N.W. from Cox point, is small, but with a clear, but narrow passage on either side of it; a bank, dry at low water, extends 7 cables northward from it. Stubbs island, 2 cables west of Round island, is about a mile in circumference; a sand-bank, which dries at low water, extends a mile north from it.

BROKEN CHANNEL, between Wakennenish and Vargas islands, to the westward of the former, is upwards of 2 miles long in a northerly direction, and half a mile wide in its narrowest part, with from 6 to 15 fathoms water; several rocks lie off its entrance, and on both sides; the tide runs through from 2 to 5 knots, and no vessel ought to use it without a pilot.

McKay reef, lying off the entrance, 4 miles W. by N. from Cox point, is of small extent, and 5 to 10 feet above high water; the sea generally breaks heavily over it. Two-thirds of a mile north of this reef is the Passage rock, which covers at high water.

VARGAS ISLAND, on the west side of Broken channel, is $4\frac{1}{2}$ miles long, $4\frac{1}{4}$ at its broadest part, and its surface is low and undulating; on the eastern side, near the middle, is a native village called Kelsemart; and at half a mile from the south shore, running parallel to it, is a chain of small islets and rocks called the Rugged group.

Open bay, on the west side of Vargas, is about a mile in extent, with from 6 to 7 fathoms water, and apparently a clear passage into it from the north-west, which has not, however, been sounded. To the westward of the bay are the Blunden and Bare islands of small size, and numerous reefs.

SHIP CHANNEL, to the westward of Vargas island, between it and a number of small islands and rocks, is the only passage into Clayoquot sound which ought to be attempted by a stranger. Its entrance lies

nearly 11 miles westward of Cox point, and the channel is 5 miles long in a N.N.E. direction, with a breadth varying from three-quarters to $1\frac{1}{2}$ miles. The soundings in the south part vary from 20 to 22 fathoms, decreasing to $5\frac{1}{2}$ fathoms in the shoalest part near the north end; the tide runs through it from one to 2 knots.

Bare islet, at the south-east entrance point of the channel, is small, rising to a summit 40 feet high in the centre, and forms a good mark for identifying Ship channel; a rock which breaks lies 5 cables E. by S. from it, but there are 20 fathoms within half a mile of its south-west side.

Plover reefs, on the east side of the channel half a mile north-west of Bare island, are of considerable extent, stretching one mile from the west side of Blunden island, and some parts are 6 feet above high water; there are 5 fathoms at 2 cables west of them.

Hobbs and Burgess islets lie at the north-east part of the channel, 2 cables from the west side of Vargas island, and nearly connected with it at low water; they are small, and may be approached to 2 cables, where are from 7 to 8 fathoms water.

Sea Otter rock lies at the south-west entrance point of Ship channel, 2 miles W. by N. from Bare islet; it is very small, only 6 feet above high water, and there are 5 fathoms close to off its east side.

Shark reefs, some of which cover, others 6 and 10 feet above high water, lie on the west side, 2 miles N.E. by N. of Sea Otter rock; they are about 3 cables in extent, and should not be approached nearer than 2 cables on their south and east sides; between them and Sea Otter rock there are from 14 to 24 fathoms.

Lawrence islets, on the west side, nearly 3 miles from Sea Otter rock, are small, low, and wooded, but steep-to on the east side.

Bartlett island, half a mile to the westward of the Lawrence islets, is low and wooded; its shores are much broken, and a number of rocks extend from a quarter to half a mile on all sides of it, and the island ought not to be approached within the latter distance.

Twins islands, at the north-west point of Ship channel, 4 miles from Sea Otter rock, are low, but wooded, and connected at low water; kelp extends one cable south of them.

HECATE PASSAGE, to the north-east of and connecting Ship channel with the inner waters of the sound, is 3 miles long in an E.N.E. direction between Vargas island and the main shore of Vancouver, and upwards of a mile wide; there are several rocks on both its shores, and a sand-bank in its centre, but to the southward of the bank along the north shore of Vargas is a clear passage with not less than $5\frac{1}{2}$ fathoms.

Half-tide rock, off the south-west point of Hecate passage and 2 cables from Vargas island, is of small extent, covers at half flood,

and may be approached to one cable on the outside. Hobbs islet open west of Burgess islet S. by W. $\frac{1}{4}$ W. leads 2 cables west of it ; and the Twins in line with the north-west Whaler island W. by S. leads 2 cables north of it, and south of North bank.

North bank, lying in the centre of the passage, is of considerable extent, is composed of sand, and has 5 feet water on its shoalest part ; there are 4 to 5 fathoms north of it, but the passage south is the best ; the Twins in line with the north Whaler island W. by S. leads 2 cables south of it, in the deepest water.

White islet, to the north-west of the North bank and $1\frac{1}{4}$ miles from the south-west point of Hecate passage, is small, bare, and conspicuous from the entrance of Ship channel ; there are several rocks between it and the north shore.

The Cat-face Mountains, rising on the main shore of Vancouver and fronting the Ship channel, are a remarkable flat-top range nearly 3,000 feet high, with some patches of cliff and bare rock on their south side. They are very conspicuous from seaward.

DEEP PASS, between two islands at the north-east part of Hecate passage, is about 3 cables long and $1\frac{1}{2}$ cables wide, with 9 fathoms water, and is the best channel leading from Hecate passage into the inner waters. The tide runs from 2 to 3 knots through it.

HECATE BAY, 2 miles north of Deep pass, on the west shore, is 6 cables wide and 3 cables deep, with from 9 to 10 fathoms ; it is clear of danger, and one of the best anchorages within the sound, being easy of access and well sheltered. There is a stream of fresh water in the middle of the bay, very convenient for watering.

Observatory islet, at its north point, is 35 feet high, and bare. It is in lat. $49^{\circ} 15' 22''$ N., long. $125^{\circ} 56' 10''$ W. Two cables north-east of it is a small rock, 2 feet above high water.

CYPRESS BAY, on the main shore of Vancouver and 4 miles north of Deep pass, is nearly 2 miles in extent, with from 12 to 26 fathoms. There is good anchorage in 12 fathoms near its north part, at a distance of half a mile from the shore ; it is open to the southward, but no sea rises. On the east and west sides the shores are low, but high on the north. There is a large stream, with some swampy land, on its west side ; on the east is Calm creek with a narrow entrance, to the southward of which are some off-lying rocks and small islands.

Mussel rock lies 4 cables off the east shore of the bay and half a mile N.N.W. $\frac{3}{4}$ W. of the east extreme. It is of small extent, and covers at three-quarters flood ; half a cable north-west from it are 11 fathoms.

Calm creek, in the north-east part, is 6 cables long in the same direc-

tion, with from 4 to 6 fathoms, but the entrance to it being narrow, with only 2 fathoms water, it is useless for anchorage, except to small craft.

MEARES ISLAND, within the eastern part of Clayoquot sound, adjacent to and north-east of Vargas island, is 6 miles extent in a northerly and 7 miles in an easterly direction. Its shores, except on the north side, are high and rugged, and there are several summits on the east and west sides upwards of 2,000 feet above the sea ; one on the latter side, named Lone cone, is 2,331 feet high and very conspicuous from seaward near the entrance of Ship channel. An extensive inlet runs nearly through the island from the south side to north, and there are several other bights and bays.

DECEPTION CHANNEL, between Meares and Vargas islands, is about 3 miles long north and south, and half a mile wide, with irregular soundings from 5 to 20 fathoms. There are several rocks in its north-west part ; and a large sand-bank, which partly dries at low water, extends from Vargas island along its west side for nearly 2 miles, reducing the deep part of the passage to about 3 cables. The tide runs from 2 to 5 knots through this channel, and a stranger should not attempt its navigation.

RITCHIE BAY, on the north-west side of Meares island, 2 miles eastward of Deep pass, is a mile wide, half a mile deep, and affords anchorage in $5\frac{1}{2}$ to 10 fathoms at 2 cables off its eastern shore. The shores of the bay are rocky, but have no outlying dangers ; Robert point, its south-west extreme, slopes gradually to the sea, and may be approached to a cable. Yellow bank, which lies almost athwart its entrance, is about three-quarters of a mile in extent and has 3 feet on the shoalest part ; there is deep water around it, and the channel between it and Robert point is 2 cables wide, with from 6 to 10 fathoms.

Saranac island, near the north-west part of the bay, is about half a mile long in a northerly direction, and narrow ; it is about 200 feet high, and wooded, steep-to on the east side ; some small islets extend 3 cables off its west side, and there is a narrow but deep passage between it and Yellow bank ; between the island and the north point of Ritchie bay are 30 fathoms in mid-channel.

If wishing to anchor in Ritchie bay, and coming from Deep pass, proceed to the eastward so as to pass about one cable north of Robert point, and keeping the same distance off the south shore, steer into the bay, anchoring in 5 or 7 fathoms about 2 cables from its east side, with the extremes bearing North and S.W. $\frac{3}{4}$ W. ; entering from the northward, steer midway between Saranac island and the north point of the bay.

The north shore of Meares island is low, nearly straight, and steep-to ;

it takes an E. by N. direction for nearly 4 miles, and then turns sharply to the south-east.

BEDWELL SOUND, the entrance to which is $1\frac{1}{2}$ miles west of Cypress bay and northward of Meares island, is 7 miles long in a northerly direction, and one mile broad till within 2 miles of its head, when it contracts to 3 cables; the shores are high and rugged, rising on the east side to sharp jagged peaks from 2,000 to 4,300 feet above the sea. At its head is a small patch of low swampy land, and a valley from which a stream of considerable size, the Bear river, flows into the sound. The soundings in the sound vary from 35 to 45 fathoms, and there is no anchorage whatever within it.

RACE NARROWS, east of Bedwell sound, between the north side of Meares island and the main, are $1\frac{1}{2}$ miles long, and about 2 cables wide in the narrowest part; the tides run through them from 3 to 4 knots, the flood from the westward, and there are 10 fathoms in the shoalest part of mid-channel.

Ripple islets, off the east entrance to these narrows, are about 20 feet high, small and covered with bushes; there are some strong ripples around them, but they may be approached to about a cable's distance.

WARN BAY, to the eastward of Race narrows and one mile from the north-east part of Meares island, is upwards of 2 miles long in a northerly direction, and about three-quarters of a mile wide; the shores on both sides are high, but low at the head, from whence issue several streams, and a sand-bank dries out upwards of a cable. The soundings in the bay are irregular, varying from 50 to 8 fathoms, but a vessel may anchor about 3 cables off shore near the west side of the head in 14 to 16 fathoms.

FORTUNE CHANNEL, between the east side of Meares island and the main, is 5 miles long, north and south, and varies in breadth from 3 cables to $1\frac{1}{4}$ miles; its shores are high, and there are several off-lying rocks on its west side near the middle; the soundings vary from 30 to 75 fathoms.

The east shore of the channel from Warn bay to Deception pass is rocky, and indented by several slight bays which afford no anchorage.

MOSQUITO HARBOUR, on the east side of Meares island, is narrow, and about 2 miles long in a north-westerly direction; there are several rocks and small islets off its entrance, but it affords good anchorage inside in from 4 to 7 fathoms; the entrance is $1\frac{1}{2}$ cables wide, with 11 fathoms, and the harbour is well adapted for a steamer.

Plover point, at the south-east side of entrance, is rocky, with some small islets a short distance off it, and there are 20 fathoms one cable

to the southward of it. Hankin rock lies $2\frac{1}{2}$ cables south-west of point, and in the track of vessels entering Mosquito harbour; it is marked by kelp, and there are 23 fathoms midway between it and the point.

Wood islands, in the middle of the entrance, nearly half a mile west of Plover point, are small and extend in a northerly direction for half a mile; some rocks lie a short distance off their south part, but there is a clear passage into the harbour on either side of them, with 7 fathoms water.

Blackberry islets, in the centre of the harbour and three-quarters of a mile from the entrance, are small, but steep-to, there being 4 fathoms within a cable of them. The best anchorage is a short distance to the southward of these islets, where are from 5 to 7 fathoms; northward of them are from 3 to 4 fathoms.

In entering Mosquito harbour, round Plover point at a cable's distance to avoid the Hankin rock, and keep midway between Wood islands and the east shore, anchoring in about 7 fathoms, one-third of a mile south of the Blackberry islets; a vessel may enter westward of the Wood islets by keeping midway between them and the shore.

DARK ISLAND, 7 cables south of Plover point, on the west side of Fortune channel, is small; some rocks extend a short distance off its west side, but there is a clear passage between it and the west shore.

Double island, 5 cables south of Dark island, is small, and steep-to; there are 24 fathoms in the passage between it and Meares island.

DECEPTION PASS, at the south extreme of Fortune channel and connecting it with Tofino inlet and Browning passage, is a winding channel to the S.S.E., about $1\frac{1}{2}$ miles long and 2 cables wide; it is free from danger in mid-channel, the soundings vary from 10 to 20 fathoms, and the tide sets with considerable strength through it. On its west side is a narrow creek half a mile long with from 8 to 9 fathoms, and in the middle of the pass is a small islet.

TOFINO INLET, in the eastern part of Clayoquot sound, is about 10 miles long in a northerly direction, and varies in breadth from one half to $1\frac{1}{2}$ miles; its shores are high and rocky, indented on the west side by some large creeks; there are several islands within the inlet and along either shore, but none of any considerable size. The soundings vary from 22 to 68 fathoms, and there is no anchorage, except near the entrance on the west side.

Indian island, on the south side of entrance and half a mile south-east from Deception pass, is about a mile in extent, and steep-to on the north side; a bank extends 2 cables from its west point, with $3\frac{1}{4}$ fathoms close to the edge.

Warn island, nearly one mile north of Indian island, off the west side of the inlet just within the entrance, is upwards of half a mile in extent, and steep-to on all sides.

Island cove, half a mile west of Warn island, is of small extent, with from 8 to 10 fathoms in the middle, and completely landlocked ; a small island lies off the entrance, with a clear passage a cable wide on either side of it unto the cove.

Gunner harbour, on the west side of the inlet, just north of Warn island, is $1\frac{1}{2}$ miles long in a N.N.W. direction, but narrow ; a small islet lies in its centre, about half a mile north of the entrance, and between them a vessel may find good anchorage in about 10 fathoms ; the harbour becomes shoal towards the head.

Tranquil creek, on the west side of the the inlet and 4 miles north of Warn island, is narrow, and upwards of a mile long ; its shores are high and rocky, and the creek is too deep for anchorage.

Between Tranquil creek and Warn island, along the west shore, are several small rocky islets, extending from 2 to 3 cables off.

Flat-top islets, 5 miles from the entrance of the inlet and $2\frac{1}{2}$ cables from its west shore, are steep-to on the east side, there being 47 fathoms at a cable's distance from them. Northward of these islets the inlet takes a winding direction to the northward, narrowing gradually towards the head, and terminating in Deer creek, a mile long, and a quarter of a mile broad, but it is too deep for anchorage, there being from 22 to 29 fathoms inside it.

On the east side of Tofino inlet, 4 miles from the entrance, is a stream of considerable size, said to communicate with an extensive lake.

BROWNING PASSAGE, on the south side of Meares island, connecting Tofino inlet with Templar channel, is 5 miles long in a westerly direction, and less than half a mile broad. Its east end is only $1\frac{1}{2}$ cables wide, there are several rocks off the west entrance, and no stranger, except with a small vessel, should attempt it. The soundings in it vary from 4 to 12 fathoms, and the tide runs through at a rate of 3 to 5 knots, the flood stream coming from the westward.

NORTH CHANNEL, to the westward of Ship channel, and separated from it by a number of small islands and rocks, runs along the south-east side of Flores island in a north-easterly direction. It is 4 miles long, half a mile wide in the narrowest part, and the soundings in it vary from 7 to 17 fathoms ; both sides of the channel are bordered by innumerable rocks, and it is not recommended for a stranger to use it, as it has not been sufficiently examined to give directions ; the sea generally breaks heavily along both sides of its outer part.

FLORES ISLAND, in the western part of Clayoquot sound, between North channel and Sydney inlet, is nearly 7 miles in extent, and of a square shape; it is low on the south and east sides, but high on the north and west, rising in some places to 3,000 feet; the shores are rugged and broken, and there are several off-lying rocks along its south and west sides; as a rule its outer part ought not to be approached nearer than 2 miles.

Rafael point, the south extreme of Flores, is clifty and of moderate height; some rocks extend 2 cables off it, and the point ought not to be rounded within half a mile. From thence the west coast of the island turns suddenly to the N.N.W., and continues in that direction for 7 miles, being indented by several small bays; some rocks and small islets extend 2 or 3 cables off in many parts.

SYDNEY INLET, at the west end of Clayoquot sound, is 10 miles long in a N.W. by N. direction, and varies in breadth from a half to one mile. Its entrance is $3\frac{1}{2}$ miles N.W. by N. from Rafael point, between the west side of Flores island and the main of Vancouver; at 4 miles from the head are two small branches about 2 miles in length, one extending north the other south-west; the shores are high and rugged, rising abruptly from the sea to 2,000 and 3,000 feet. The depth in the entrance is 15 fathoms, increasing gradually towards the head, and there is no anchorage.

Sharp point, the south-west point of entrance to Sydney inlet and south-west extreme of Clayoquot sound, is low and rocky, but may be approached to a cable's distance.

REFUGE COVE is just west of Sharp point, and separated from Sydney inlet by a narrow peninsula. It runs in $1\frac{1}{2}$ miles in a N.N.W. direction, is from one to 2 cables wide, and affords good anchorage in 4 to 5 fathoms at half a mile within the entrance, well sheltered and secure from all winds, though apparently open to the S.S.E.; the entrance though narrow is clear of danger.

Canoe reef, lying just south-west of the entrance and three-quarters of a mile westward of Sharp point, is 2 feet above high water, but steep to on the south and west sides.

Entering Refuge cove from seaward, bring the entrance or Sharp point to bear N.N.W. $\frac{1}{2}$ W., and steer for it, so as to pass one cable west of the point; then keep close to the eastern shore and anchor in $4\frac{1}{2}$ or 5 fathoms, about 7 or 8 cables within the entrance.

A sailing vessel if embayed near this part of the coast, would find safety and shelter in Refuge cove.

SHELTER ARM branches off from the east side of Sydney inlet to the north-east, along the north side of Flores island for 5 miles, and

then takes a N.E. by N. direction into the main for nearly the same distance, terminating in a narrow creek at the head. It is upwards of half a mile wide, 10 miles long, and the soundings vary from 40 to 90 fathoms in the south part. There is only one indifferent anchorage in it, just 2 miles within the entrance on the north side of Flores island, in a small place named Steamer cove, where a vessel may anchor in 17 to 19 fathoms, passing on either side of the islet at its entrance.

The shores of Shelter arm are high, precipitous, and steep-to ; the tide runs from 1 to 2 knots through it, the flood stream from the westward.

Obstruction island, on the east side of Shelter arm, and separated from the north point of Flores island by a narrow pass, is about 2 miles in extent and 700 feet high. Its shores are rocky and broken, and the passages along its south and east sides are blocked up with rocks. Rocky pass, on its south side, is narrow, about $1\frac{3}{4}$ miles long, in an east and west direction, and filled with rocks, so that no vessel could get through it ; the tide runs irregularly through, but its greatest strength does not exceed 4 knots.

NORTH ARM, between the east side of Flores island and the main, is about 8 miles long in a S.E. by S. direction, and its breadth is nearly one mile. Its shores are high in the south part, but decrease gradually to the southward ; the soundings are of great depth in the north part, but they shoal rapidly to the southward, where a vessel may anchor in from 5 to 8 fathoms abreast Base point.

Matilda cove, on the west side of North arm, abreast the entrance to Herbert arm, is a very narrow creek $1\frac{1}{4}$ miles long in a S.S.E. direction, with from 10 to 25 fathoms, but useless as an anchorage.

Base point, the south-west entrance point to North arm, is low and sandy, and there are from 2 to 3 fathoms at a cable's distance from it. A vessel may anchor in from 5 to 8 fathoms midway between this point and the east shore.

HERBERT ARM, the entrance to which is on the east side of North arm, about 2 miles from the south entrance of the latter, is 9 miles long, in a northerly direction, and its average breadth is about one mile. The shores are high, mountainous, and much broken ; and there is no anchorage, except at the south part of its entrance.

Cone island, lying at the entrance of this arm, is about one mile in extent, 1,000 feet high, and steep-to on the south and west sides, but the passage into Herbert arm north of it is blocked up by rocks and small islets ; the one south of it is nearly a mile wide, with from 26 to 50 fathoms.

Bawden bay, on the south side of entrance of Herbert arm, and

about $1\frac{1}{2}$ miles south-east of Cone island, is of small extent, and affords anchorage in 15 fathoms, near the centre; enter it in mid-channel.

White Pine cove, on the east side of Herbert arm, nearly 3 miles from the entrance, is small, with a bank running off the head; a small vessel may anchor close to the edge of this bank in about 10 fathoms.

DIRECTIONS.—Entering Clayoquot sound by Ship channel, (which latter will easily be recognized by Bare islet, Sea Otter rock, and a remarkable summit inland, the Lone cone,*) round either Bare islet or Sea Otter rock at the distance of half a mile, and steer up the channel with the Twins islands in line with the north summit of the Cat-face mountains bearing N.N.E. $\frac{1}{4}$ E.* Keep the above-mentioned mark on till within half a mile of the Shark reefs, when haul more to the eastward for the west extreme of Vargas island, which may be rounded at a distance of 3 cables. If going on through Hecate passage (page 205) into Hecate bay, to clear Half-tide rock keep Hobbs islet open west of Burgess islet S. by W. $\frac{1}{4}$ W. until the Twins come in line with the west Whaler island W. by S., when steer up the passage with that mark on astern, which will lead north of Half-tide rock and south of the North bank. When past the latter, steer through Deep pass, and anchor in Hecate bay midway between its entrance points in 9 or 10 fathoms.

During heavy south-westerly gales the sea is said to break right across Ship channel, between Lawrence and Hobbs islands.

Although there are several apparently deep channels into Clayoquot sound, they are, with the exception of Ship channel, so tortuous, and filled with rocks, that no stranger should attempt to enter by any except the latter, and not by it unless having the present Admiralty chart of the sound. If the weather be clear, it will be easy to recognize Ship channel, but if in doubt, there will be little difficulty found in procuring a native off the entrance of sufficient intelligence to pilot a vessel in.

Intending to navigate the inner waters of the sound, which can only be done by a steamer or small craft, the chart will be found the best guide.

* See View D. on Chart No. 584.

CHAPTER VIII.

VANCOUVER ISLAND, WEST COAST; FROM CLAYOQUOT SOUND TO
CAPE SCOTT.

VARIATION 23° 30' E. in 18

HESQUIAT HARBOUR, 8 miles westward of the west part of Clayoquot sound, is formed at the bottom of the bay on the east side of Estevan point. It is 4 miles long in a N.N.W. direction, and its breadth at the entrance is upwards of 2 miles, opening out a little inside, but on nearing the head it contracts to less than a mile. The soundings within the harbour vary from 4 to 8 fathoms, and there is a good secure anchorage in 7 or 8 fathoms at the distance of half a mile from the head; across the entrance, between Hesquiat bluff and Estevan point, is a sort of bar or ledge, about 3 cables wide, with 4 fathoms water over it, which in a great measure prevents the sea from setting home into the harbour. Kelp grows more or less all over the anchorage in a depth of 5 fathoms.

Hesquiat bluff, the east entrance point of the harbour, is a remarkable low wooded point with a shingle beach around it; a reef, which covers at a quarter flood, lies half a mile south-west of it.

The shores of the harbour are generally low and wooded, and within the entrance at a distance of 2 cables clear of danger. At the head on the east side is Boat basin, a small cove with 4 fathoms; there is a large fresh-water stream there, and vessels may wood and water with great facility.

On the west side of the bay near Estevan point are several indications of coal, and the land is apparently fertile.

DIRECTIONS.—Hesquiat harbour is easy of access to sailing vessels even with a foul wind. In entering either from the east, or west, give the outer shores of the harbour a berth of more than half a mile, till past the bar, after which they may be approached to 2 cables; anchor in 7 or 8 fathoms near the centre of the harbour, about half a mile from the head.

In strong south or south-westerly gales the sea breaks heavily over the bar, but the anchorage is always safe, and landing is at all times practicable in Boat basin.

The natives though friendly are much inclined to pilfering, and should be carefully watched.

ESTEVAN POINT, 15 miles W. $\frac{1}{4}$ N. from Rafael point, and 92 miles W. by N. from Cape Flattery, is a low wooded and projecting point bordered by a sandy beach, strewn with huge boulders. A ledge a mile wide extends nearly one mile off its south-west side; and $1\frac{1}{4}$ miles off shore, and nearly 3 miles west of the pitch of the point, is the Sunday rock; within the ledge good shelter will be found for boats in all weathers. Hole in the wall, the south part of the point, may be easily known by a remarkable gap in the trees at its extreme, which is conspicuous from the south-west.

In rounding the west part of Estevan point, it would not be prudent to approach the shore within 2 miles.

From this point the coast takes a N.N.W. direction for 8 miles to Escalante point at the entrance of Nootka sound, being low, and foul ground exists off it for some distance.

NOOTKA SOUND, of considerable political importance in former years, is a large sheet of water upwards of 6 miles in extent, containing several islands, and from its north side three long narrow arms penetrate the land for distances of 18, 7, and 14 miles respectively. Its entrance is between Maquinna and Escalante points, W. by N. $\frac{1}{2}$ N. and E. by S. $\frac{1}{2}$ S. from each other and distant 4 miles; at the entrance the shores are low, and have several off-lying dangers, but within they become high, rugged, and precipitous, and are everywhere free from danger.

The soundings at the entrance vary from 40 to 60 fathoms, deepening within the sound to upwards of 100 fathoms in many places; to the southward of the entrance, and extending 6 miles west of Estevan and Escalante points, is a bank of 22 to 30 fathoms water, deepening gradually to the south-west. In the vicinity of the Bajo reef, and to the westward of it, are from 20 to 27 fathoms; but at a distance of 7 miles south of Nootka island 40 to 60 fathoms will be found. In fine weather, the natives will be met with in canoes in considerable numbers on these banks fishing for halibut, which are very plentiful along this coast.

There are four anchorages in the sound, two of which, Friendly cove and Plumper harbour on the east side of Nootka island, are small, though easy of access to steamers; the former is one, and the latter 7 miles within the entrance; the others in the Tlupana arm, though well sheltered, are more inconvenient, being 13 and 16 miles from the entrance.

From seaward the appearance of the land near the entrance of the sound offers to the navigator, many striking features which in fine weather render it almost impossible to be mistaken; the low land of Estevan and Maquinna points at the entrance, with the breakers off them, the Nootka cone at the east point of Nootka island, and if coming from the South or S.S.W.,

Conuma peak, a remarkable steeple-shaped mountain, nearly 5,000 feet high (page 219), is a most conspicuous feature.

TIDES.—It is high water, full and change, in Nootka sound at 12 hours, and the rise and fall is about 12 feet ; the tidal streams are everywhere inconsiderable.

ESCALANTE POINT, the east point of entrance of the sound, is low and rocky ; some small islets, and rocks generally above high water, extend off it in a westerly direction for upwards of a mile, but they are steep-to on their outer edge.

From Escalante point to Burdwood point at the narrowest part of entrance on the east side, the coast, which still keeps a N.N.W. direction for 3 miles, is bordered by several off-lying rocks, and should not be approached within a mile until close to the latter point, which is steep-to, and may be neared to a cable.

MAQUINNA POINT, the west entrance point of the sound, is $13\frac{1}{2}$ miles north-west of Estevan point, and 4 miles W. by N. $\frac{1}{2}$ N. from Escalante point ; it is low and wooded, and at its extreme is a remarkable bare-topped conical rock about 60 or 70 feet high ; some rocks extend 3 cables off it in an easterly direction, also along the coast from it to the eastward nearly as far as the entrance of Friendly cove, and the shore ought not to be approached nearer than three-quarters of a mile till near the latter place.

BAJO REEF, 6 miles S.W. by W. $\frac{1}{2}$ W. from Maquinna point and $2\frac{3}{4}$ miles off shore, is about 2 cables in extent, and only breaks in heavy weather.

This reef is the only hidden danger outside the sound, and is dangerous to vessels entering it from the westward. Yu-quot point, the east extreme of Nootka island, kept open east of Maquinna point N.E. $\frac{1}{4}$ E., leads $1\frac{1}{2}$ miles south-east of it ; and Bight cone, a remarkable summit on the south side of Nootka island, kept well open west of Bajo point N. by W. leads $1\frac{3}{4}$ miles west.

FRIENDLY COVE, at the east extreme of Nootka island, just within the narrowest part of the entrance to the sound and about $2\frac{1}{2}$ miles north-east of Maquinna point, is about 2 cables in extent and sheltered from the sea by a small rocky high-water island on its east side. The entrance to it is from the north-east, and a cable wide, and the anchorage within is in from 5 to 9 fathoms, of small extent, affording room only for one vessel of moderate size to lie moored in the middle, though several small ones would find shelter. The shores on both sides of the cove are rocky and about 60 feet high on the north side, but at the head

is a small space of clear cultivated flat land, around which in the summer the natives build an extensive village.

If desiring to anchor in this cove, round Observatory islet, the east entrance point, close to, and if in a large vessel moor with anchors S.S.W. and N.N.E., letting go the first immediately on entering the cove. Sailing vessels, unless with a fair wind, would find some difficulty in entering; and if unable to shoot in, it would be preferable to warp or proceed further up the sound to Plumper harbour.

When the Spaniards were in possession of this coast in 1792, Friendly cove was their principal establishment; and when Captain Vancouver visited it in that year, no less than eight vessels were in it, most of them small, and secured to the shore by hawsers. At the present date no vestige whatever of the settlement remains.

No fresh water in any quantity can be procured at Friendly cove, or nearer than Marvinas bay; but fish and deer may generally be obtained in large quantities from the natives.

MARVINAS BAY.—The west shore of the sound from Friendly cove runs in a N.N.W. direction for about 6 miles to the entrance of the Kendrick arm and Tah-sis canal; it is rocky, and some islets run parallel to it, near the south part for nearly 2 miles, extending about 3 cables off shore. There are two small creeks with entrances too narrow for a vessel to enter; the northernmost of them, called by the Spaniards Boca del Inferno, lies abreast the north part of the above-mentioned islands, and $1\frac{3}{4}$ miles from Friendly cove.

Marvinas bay, 4 miles N.N.W. from Friendly cove, on the east side of Nootka island, is of small extent and open to the southward; it only affords anchorage to a coaster, but there is a large fresh-water stream at the head and just south of it, convenient for watering.

KENDRICK ARM, at the west end of Nootka sound between Nootka and Narrow islands, is about 5 miles long in a north-westerly direction, and half a mile wide, connected at the north part by a narrow boat pass to the Tah-sis canal; on the west side, one mile from its south part, is Plumper harbour, easy of access, and well sheltered. Northward of this harbour the shores of the arm on both sides are rocky, terminating in two narrow creeks at the head, useless for purposes of navigation.

PLUMPER HARBOUR, on the west side of Kendrick arm, and 6 miles from Friendly cove, is a small bay indenting the east side of Nootka island, about 3 cables in extent and affording good anchorage in 12 fathoms. It is protected on the east side by two small wooded islets from 30 to 40 feet high; on the west side the shore is rather swampy, and there are several fresh-water streams.

There is a clear passage into the harbour between the two islets, or to the northward of the north one, which may be rounded at a cable, and there is room for a vessel to lie at single anchor inside ; it is the best anchorage in the sound, the only drawback being its distance from the entrance.

TAH-SIS CANAL, the entrance to which is at the north-west part of Nootka sound about 6 miles from Friendly cove, is a long narrow arm of the sea, nearly straight, and 14 miles long in a N.W. by N. direction ; the shores are mountainous, rocky, and steep-to, and there is no anchorage within it. In many parts this canal is only 2 cables wide, but it becomes gradually broader at the head, where is a large stream, and also a considerable village, to which the natives resort during the season for salmon, which are caught here in great plenty.

At $10\frac{1}{2}$ miles from the entrance of the canal on the west side, and separating the north point of Nootka island from the main of Vancouver island, are the Tah-sis narrows, a cable wide, with 28 fathoms in the centre ; they connect Esperanza inlet with the Tah-sis canal ; but little tide runs weakly through them, flood from the westward.

At the entrance of Tah-sis canal is a small island with a clear passage about one cable wide on either side of it.

BLIGH ISLAND, lying in the centre of the sound, is the largest island within it, being about 4 miles long in a northerly direction, and 2 miles wide in the northern part ; its shores are rocky, and indented by some creeks on the southern side. Its south extreme is a long narrow point about 3 miles north-east of the entrance of the sound, and off its south and west sides are a number of islands extending upwards of a mile from it, all steep-to on their outer edges, but among which no vessel should venture. The south part of the island is rather low, but it rises in the north and west parts to 1,000 and 1,200 feet.

Resolution cove, at the south-east point of this island, just within the entrance of the Zuciarde channel, is only deserving of notice as the spot where Captain Cook refitted his ships in April 1778 ; it is only a slight bend in the coast, with a deep and rocky bottom, and inconvenient for an anchorage, being also open to the south-west.

ZUCIARTE CHANNEL, between the east shore of Nootka sound and Bligh island, is about 5 miles long in a northerly direction, and upwards of half a mile wide in the narrowest part ; its shores are high and clear of danger, the soundings within the channel varying from 80 to 100 fathoms.

GUAQUINA, or **MUCHALAT ARM** extends 17 miles in an E.N.E. direction from the north-east part of Nootka sound, and varies in breadth from a quarter to upwards of a mile. It is bounded on both sides by

mountains from 2,000 to 4,000 feet high, and presents similar features to the inlets before described along this coast, terminating in low land at the head, through which a small stream flows into the inlet; there is no anchorage whatever within this arm except for coasters.

One and a half miles within the entrance lies Gore island, which is narrow, and about 3 miles long, in an east-north-east direction; there is a clear deep passage on either side of it, the southern one being less than a cable wide at the east part. The island rises in the centre to 1,200 feet, sloping gradually to each end; its shores are rocky.

On the north side of this arm, 14 miles within the entrance, is an extensive valley, through which flows a large stream, named the Gold river, indications of that metal having been there discovered; the land in the vicinity of this stream is lightly timbered and very fertile; a small vessel may enter it at high water.

TLUPANA ARM, the entrance to which is in the north part of Nootka sound, is about 7 miles long in a northerly direction, branching off at the head in two smaller arms extending to the north-west and north-east, the former about 3 miles, the latter 2 miles long, and each terminating in low land. Its shores are high and rocky, and the soundings in it vary from 80 to upwards of 100 fathoms; there are two anchorages, one at Deserted creek on the west side, and the other at Head bay, the termination of the north-west branch.

The mountains at the north part of this arm are the highest in the sound, many being from 4,000 to 5,000 feet above the sea; Conuma peak, rising 7 miles north-east from the head, is 4,889 feet high, and of a steeple shape.

DESERTED CREEK, on the west side of the arm 3 miles within the entrance, is 2 miles long in a westerly direction and about 2 or 3 cables wide; a vessel may anchor in 12 to 14 fathoms at a third of a mile from its head. There is a small cove on its north side, just within the entrance, having an islet in the centre, to the westward of which is room for a vessel to anchor in 12 fathoms.

At the southern extreme of the promontory separating the two branches at the head of Tlupana arm is Perpendicular bluff, a remarkable precipice of considerable height.

HEAD BAY, the termination of the western branch of the Tlupana arm, is nearly one mile long in a westerly direction, about 4 cables wide, and affords anchorage in from 14 to 16 fathoms at the distance of 3 or 4 cables from its head. At the entrance on the north side are three small islets about 3 or 4 feet above high water, the inner one connected to the

shore by a beach at low water ; between these islets and Perpendicular bluff is a small bay, where a vessel may anchor in from 16' to 18 fathoms.

DIRECTIONS.—Entering Nootka sound from the southward, after rounding Estevan point steer about N.N.W. for the entrance, which will be easily made out by the rocks off Escalante and Maquinna points ; keep about 2 miles off the eastern shore till past Escalante point, when steer up mid-channel into the sound. If bound to Friendly cove haul over to the west side of entrance for Yu-quot point, which may be approached to a cable, and rounding it sharply, anchor or moor, as most convenient, in Friendly cove in from 5 to 9 fathoms.

If bound to Plumper harbour, after passing Yu-quot point keep about half a mile from the north-east side of Nootka island, on a N.N.W. or N. by W. course for a distance of 5 miles to the entrance of the Kendrick arm, when steer up the latter in mid-channel till abreast Plumper harbour, which may be entered by passing between Bold and Pass islets on its east side, or going to the northward of the former ; anchor in 11 to 12 fathoms near the centre of the harbour.

Should it be desired to anchor in any of the anchorages within the Tlupana arm, steer as before directed till within half a mile of the entrance to the Kendrick arm, when haul to the north-east, pass to the westward of Junction and Bligh islands, and steer up the Tlupana arm in mid-channel, or close to on either shore. Deserted creek and Head bay are clear of danger and may be entered without difficulty ; if provided with the chart no directions whatever are necessary.

Entering Nootka sound from the westward, on nearing Bajo point do not approach the south shore of Nootka island within 4 miles, or shut in Bight cone with Bajo point N. by W. until Yu-quot point comes open east of Maquinna point N.E. $\frac{1}{4}$ E., which will clear the Bajo reef ; a vessel may then steer for the entrance of the sound, about N.E. by E., not approaching the shore between Maquinna and Yu-quot points nearer than a mile, until abreast the latter, which may be rounded close to, when proceed up the sound as before directed.

If beating into Nootka sound, when standing to the westward, keep Yu-quot point open east of Maquinna point N.E. $\frac{1}{4}$ E., this will keep a vessel well clear to the eastward of Bajo reef ; in standing to the eastward do not approach Escalante point within $1\frac{1}{2}$ miles, or bring Burdwood point to the northward of N. by E. until abreast it, when the shore may be approached close to ; when standing towards Maquinna and Yu-quot points on the west side, avoid bringing the latter to bear to the eastward of N.N.E. until abreast it, when it may be approached close to.

Nootka sound is the easiest place of access on the whole of the west

coast of Vancouver island, the entrance being nearly 2 miles wide in the narrowest part; and by attending to the above directions any sailing vessel may beat in or out of the sound. If the night be clear, and provided with a chart, it may be entered without risk by bringing the entrance to bear N.N.E., and in a steamer but little difficulty would be experienced in picking up the anchorages of Friendly cove and Plumper harbour.

NOOTKA ISLAND, which bounds the west side of Nootka sound, is of considerable extent, being 15 miles long in a northerly and 20 miles in a westerly direction. Its south, or outer shore is low, rising gradually inland to summits 1,500 and 2,500 feet above the sea, and has a beautiful and fertile appearance; it is bordered by a sandy beach nearly the whole distance, and the sea breaks heavily along it.

Bajo point, 6 miles west of Maquinna point, is low and rocky. A ledge named the Inner Bajo reef extends $1\frac{1}{4}$ miles off it in a southerly direction; and the Bajo reef, described in page 216, lies $2\frac{3}{4}$ miles to the S.E. by S.

Westward of Bajo point the coast takes a west-north-west direction for 10 miles to Ferrer point, and is slightly indented. A remarkable summit, Bight cone, 540 feet high, rises 3 miles N.W. by N. from Bajo point, and is about one mile inland.

In navigating along the south side of Nootka island, when west of the Bajo reef, it would not be prudent to approach the shore within 2 miles, until near Ferrer point, though there are no known outlying dangers.

NUCHATLITZ INLET, on the north-west side of Nootka island, about 18 miles W. by N. $\frac{1}{2}$ N. from the entrance of Nootka sound, is 6 miles long in a north-easterly direction, and 3 miles wide at entrance, narrowing towards the head; its shores are high, and rocky, and much broken into creeks and small bays: off the entrance, and within are several dangers. The soundings in the inlet vary from 5 to 17 fathoms, and there are two good anchorages, Port Langford on the north side, and Mary basin at the head; but both are, from the dangers off the entrance of the inlet, rather difficult of access.

Ferrer point, the south entrance point of the inlet, is low and rocky; at a distance of 2 cables from it are 14 fathoms, and just within the point to the eastward is a very remarkable conical summit 350 feet high called the North-west cone, which is of great use in making out this locality from the westward.

DANGER ROCK, lying in the south part of the entrance, upwards of a mile N.W. $\frac{1}{2}$ W. from Ferrer point, is the worst danger in entering, as it is of very small extent, and only breaks in heavy weather; it is steep-

to on all sides, there being 11 fathoms close to it. The best passage into the inlet is between this rock and Ferrer point.

Mark hill, at the head of inlet, on with the north part of Fitz island bearing N.E. $\frac{1}{2}$ E., leads south of this rock midway between it and Ferrer point, and through the fairway into the inlet.

NUCHATLITZ REEF, in the centre of the entrance and a third of a mile north of the Danger rock, is about three-quarters of a mile long in an E.N.E. and W.S.W. direction, and a cable wide. This reef generally breaks, and at its inner extremity is a small rock awash at high water; there is a clear deep passage between it and Danger rock, and also apparently to the northward of it, but neither ought to be attempted by a stranger, as no leading marks can be given for going through them.

SOUTH REEF, which lies just within the entrance on the south side, is one mile N.E. by N. from Ferrer point and about 3 cables off shore; it is nearly 2 cables in extent, and covers at half flood.

Mark hill, on with the north summit of Fitz island bearing N.E. $\frac{1}{2}$ E., leads 2 cables north of this reef.

Louier creek, just inside South reef, is shoal, and nearly a mile in extent; there are several rocks off its entrance, and no vessel should enter it: to the eastward of the creek the south shore of the inlet is rocky, but appears to be clear of danger at a cable's distance.

FITZ ISLAND, in the centre of the inlet, and 3 miles from the entrance, is of small extent, low, rugged, and covered with a few stunted pine trees, the tops of which are about 100 feet above the sea. At half a mile west of it is a small bare rock 20 feet high, and steep to on the west side, but between the rock and Fitz island foul ground exists.

A bare rock of small extent, and 12 feet above high water, lies three-quarters of a mile to the south-west of Fitz island, and there is a clear passage between them.

MARY BASIN, the termination of this inlet, is of considerable extent, and completely land-locked by Lord island, which lies across the inlet at the south-west part of the basin. The soundings within the basin vary from 5 to 9 fathoms, and the entrance on the north side of Lord island appears clear of danger, but it has not been sufficiently examined to recommend its being used by a stranger.

To the eastward of Mary basin, and connected to it by a narrow pass 50 yards wide, with from 7 to 9 fathoms, is a sheet of water upwards of 3 miles long in an easterly direction, with from 20 to 39 fathoms, and apparently useless as an anchorage.

PORT LANGFORD, on the north side of Nuchatlitz inlet, 2 miles within the entrance, is about $1\frac{3}{4}$ miles long in a northerly direction,

and varies in breadth from a quarter to one mile. The soundings in it vary from 5 to 8 fathoms, and it affords a secure and well sheltered anchorage in about 6 fathoms, muddy bottom, at the distance of half a mile from the head.

The east shore of the port is high, rising to a summit nearly 2,600 feet above the sea, but the western shore is much lower; both are rocky, but within the entrance clear of danger.

Colwood islet, at the south-west extreme of the entrance, is small, and bare, 20 feet above water, and nearly half a mile off shore; it may be approached to a cable on the east side, but inside it, and to the westward round the north entrance point of Nuchatlitz inlet, are innumerable rocks and small islets, among which no vessel should venture.

Belmont, the east entrance point into Port Langford, lies two-thirds of a mile N.E. $\frac{1}{2}$ E. from Colwood islet; it is low, and a rock uncovers one cable west of it.

DIRECTIONS.—Entering Nuchatlitz inlet from the southward, bring Ferrer point on a N. by W. bearing, and steer to pass half a mile west of it; and when Mark hill comes on with the north part of Fitz island N.E. $\frac{1}{2}$ E., haul in for the entrance on that mark, which will lead in clear of Danger rock. When Ferrer point bears South, a vessel will be inside the rock, and may steer N. by E. $\frac{3}{4}$ E. or N.N.E. for the entrance Port Langford; pass midway between Colwood islet and Belmont point, and proceed up the port in mid-channel, anchoring in 5 or 6 fathoms, at a distance of half a mile from the head.

Approaching the port from the westward, keep an offing of 4 or 5 miles till Ferrer point bears East, when steer for it on that bearing till the leading mark for the channel comes on, Mark hill in line with the north part of Fitz island N.E. $\frac{1}{2}$ E., when proceed as before directed to the anchorage in Port Langford.

Intending to enter Mary basin (which is not however recommended), when past Ferrer point keep the leading mark on till abreast Louier creek, then steer a little to the eastward, passing about a cable south of Fitz island and the bare rock south-west of it; when past the former, borrow a little towards the north shore and enter Mary basin to the westward of Lord island and the small islet north-west of it; when abreast the latter haul more to the eastward and anchor in from 5 to 6 fathoms near the middle of the basin.

No vessel of any size should attempt to beat into this inlet, as there is generally a heavy sea at the entrance, and no stranger should attempt to enter unless the leading mark is well made out.

TIDES.—It is high water, full and change, in Nuchatlitz inlet at 12 hours; and the rise and fall of tide is about 12 feet.

ESPERANZA INLET, the entrance of which lies between the north-west side of Nootka island and the main of Vancouver, and is 122 miles W. by N. $\frac{3}{4}$ N. from Cape Flattery lighthouse, is about 16 miles long in a winding north-easterly direction, and its average breadth is about one mile, narrowing at the head, which is connected by a narrow pass, Tah-sis narrows, to the Tah-sis canal in Nootka sound.

The entrance, though wide, contains several dangers; but within the shores are nearly everywhere steep-to, rising on both sides to mountains of considerable height. The southern shore is indented by three bays of moderate extent, which however afford no anchorage; and from the northern one three arms of considerable length penetrate the Vancouver shore for several miles in a N.N.W. direction. In the western arm, named Port Eliza, is the only anchorage within the inlet.

The soundings in the entrance vary from 12 to 20 fathoms, deepening within to upwards of 100 fathoms in many parts.

MIDDLE CHANNEL, the widest and best into Esperanza inlet, is 3 miles long in a northerly direction, and upwards of a mile wide in the narrowest part. Its entrance lies 3 miles W.N.W. from Ferrer point, and the channel is bounded on the east side by the Blind reef, Needle rock, and a number of small islets extending off the north-west point of Nootka island; the west side is clear except at the south part, where lies the Middle reef, a part of which is always above water.

Blind Reef, which lies at the south-east extreme of the channel, and 3 miles N.W. $\frac{1}{2}$ W. from Ferrer point, is about 2 cables in extent, and only breaks in bad weather; one cable north of it is a small rock, and at a distance of 2 cables from its south and west sides are from 13 to 19 fathoms.

Needle Rock, which is of small extent, lies two-thirds of a mile north of the Middle reef, and has from 14 to 15 fathoms at a distance of 2 cables west of it.

Middle Reef, at the south-west entrance point of Middle channel and separating it from the North channel, is about 3 cables long in a northerly direction, and a cable wide. This reef generally breaks, and at its south extreme is a small rock 4 feet above high water; there are from 5 to 20 fathoms, at the distance of a cable on all sides of it; its south part lies 4 miles N.W. by W. $\frac{1}{2}$ W. from Ferrer point.

Leading hill in line with Black rock N. by W. leads two-thirds of a mile west of Blind reef, one mile west of Needle rock, half a mile east of Middle reef, and through the fairway of Middle channel.

NORTH CHANNEL leads into Esperanza inlet west of Middle reef, between it and the dangers off the south-east point of Catala island. It

is about a third of a mile wide, and upwards of 2 miles long, merging at the north part into Middle channel ; the soundings in it vary from 17 to 22 fathoms, and the dangers on its west side are all above water.

Black rock in line with Double island N. by E. $\frac{3}{4}$ E., leads in through the fairway of North channel clear of all danger.

CATALA ISLAND, $5\frac{1}{2}$ miles N.W. $\frac{1}{2}$ W. from Ferrer point, on the west side of the entrance to Esperanza inlet, is about $1\frac{3}{4}$ miles long, in a westerly direction, and a mile wide in its broadest part. This island is wooded and from 150 to 200 feet high ; its shores are rocky, and several dangers exist at a considerable distance off it on all sides ; its north side is separated from the Vancouver shore by a passage half a mile wide, named Rolling roadstead, and a vessel may find a tolerably secure anchorage there in from 4 to 6 fathoms, though generally a swell prevails in it.

Foul ground exists at $1\frac{1}{2}$ miles south of the south point of Catala island, also the Low rock, 6 feet above high water, the latter forming the south-west entrance point of the North channel.

Black rock, which lies one-third of a mile east of the east point of Catala, is a small bare rock 20 feet above high water ; foul ground exists between it and Catala, and also one cable south of it ; a vessel should not approach nearer its eastern side than 2 cables, nor go west of it.

ROLLING ROADSTEAD.— Entrance reef, about 3 cables north of the east point of Catala island at the eastern part of Rolling roadstead, is of small extent, and covers at half flood : at half a mile north of it, and about 2 cables off the opposite shore, lies the Arnold rock, which is awash at high water ; midway between these rocks are $6\frac{1}{2}$ fathoms, and in the roadstead from 4 to 6 fathoms.

The outer rocks off the north-west part of Catala island, open north of the low grassy point at the north side of the latter, bearing W. by S., lead into Rolling roadstead, midway between the Arnold rock and Entrance reef.

Half a mile inshore, and overlooking the north-east part of Rolling roadstead, is Leading mountain, 1,104 feet above the sea ; it is of conical shape, and conspicuous from the entrance of the Middle channel.

DOUBLE ISLAND lies half a mile off the west shore at the inner and narrowest part of the entrance to Esperanza inlet, and $3\frac{1}{2}$ miles within the outer part of the North and Middle channels. It is of small extent, and wooded ; a number of rocks exists between it and the shore, but 2 cables off the east side are from 25 to 45 fathoms.

Flower islet, on the opposite shore, one mile E.S.E. of Double island, and half a mile off the north-west point of Nootka island, is small and

bare, and the northernmost of the islets off Nootka island, between the entrances of Nuchatlitz and Esperanza islets. At 2 cables south-west of it is a small rock 2 feet above high water, and 3 cables west of it are 50 fathoms.

Eastward of Flower islet the south shore of Esperanza inlet takes a winding irregular outline to the E.N.E., is everywhere steep-to, and rises gradually to summits 2,000 and 3,000 feet high. There are three bays, all too deep for anchorage; in the western one, which is just within the entrance, are several small islets. Centre island, two-thirds of a mile off the south shore, and about $1\frac{1}{2}$ miles north-east of Flower islet, is of small extent, and moderate height; its shores are rocky, and may be approached to a cable.

HECATE CHANNEL, near the head of the inlet, is 5 miles long in a winding direction to the eastward, and its average breadth is about 6 cables. The western end is 8 miles from the entrance of Esperanza inlet; and the eastern one, named Tah-sis narrows, is about a cable wide, with 28 fathoms, and connects this channel with the Tah-sis canal in Nootka sound; the shores are high and rocky, and may be approached close to.

PORT ELIZA, the entrance to which is on the north side of inlet, one mile north-east of Double island, is a narrow arm $5\frac{1}{2}$ miles long in a N.W. direction, and its breadth varies from 2 to 4 cables; the shores are high, and there are some rocks and small islands in the entrance, and along the eastern shore. There is good anchorage in from 14 to 15 fathoms at the distance of half a mile from the head, and also in Queens cove, which is upwards of a mile within the entrance on the east side.

The head terminates in a small patch of low swampy land, through which flow two fresh-water streams, and off it a bank dries one cable at low water.

Harbour island, in the centre of the entrance, is about 4 cables in extent, wooded, and of moderate height. The passage into Port Eliza on its east side, through Birthday channel, is 2 cables wide in the narrowest part, and clear of danger. Between Harbour island and the west shore lies False channel, which has irregular soundings, and in its south part are two rocks which cover at half flood.

Fairway island, on the east side of Birthday channel, and 4 cables east of Harbour island, is of small extent, and covered with a few stunted trees; some rocks extend a short distance off around it, the eastern ones being about 5 feet above high water.

Channel reef, half a mile N.N.W. of Harbour island, in the middle of Port Eliza, is about a cable in extent, and covers at three-quarters

flood; at a cable from its eastern side, are from 16 to 26 fathoms; beyond this reef there are no dangers in the port at more than a cable off shore.

Queens cove on the east side of the port, about $1\frac{1}{2}$ miles from the entrance, is 4 cables long, and 2 cables wide, with from 6 to 7 fathoms water, and affords room for a large vessel to lie moored in the centre; its shores are high, and rocky. The cove is completely land-locked, and only half a cable wide at the entrance; it is easy of access for a steamer, but a large sailing vessel would be most likely obliged to warp in; there is a fresh-water stream of considerable size on the west side of its head, very convenient for watering.

ESPINOZA ARM, the entrance to which is 2 miles north-east of Port Eliza, is 8 miles long in a N.N.W. direction, and its average breadth is half a mile. The soundings within it are deep, and it affords no anchorage; at the entrance, on the west side, are some small islets, and a rock which uncovers. This inlet presents similar features to the other inlets along the coast, being bounded by high, rocky, rugged shores, and terminating in low land at the head. At the distance of 4 miles within the entrance, on the east side, is a narrow branch or fork extending 3 miles north-east to its head, which is separated by a narrow neck 3 cables wide from the Zeballos arm, forming a peninsula of considerable size to the southward. The entrance to this narrow branch is choked up with rocks.

ZEBALLOS ARM, the entrance to which lies 10 miles within the inlet, at the west end of Hecate channel, is about 6 miles long in a winding direction to the north-west, and about two-thirds of a mile wide; similar to the Espinoza arm, it offers no anchorage whatever, and is of no use to the navigator.

DIRECTIONS.—A stranger entering Esperanza inlet from the southward, through the Middle channel, and intending to anchor in Port Eliza, should pass Ferrer point at a distance of about 3 miles, and keep on a northerly course till nearing the entrance of Middle channel, when steer to bring Leading hill in line with Black rock N. by W., which will lead through the fairway, and clear of the dangers on both sides of the channel. When the south point of Catala island bears W.N.W., the vessel will be inside the dangers at entrance, and should keep about N.N.E. for the entrance of Port Eliza, passing from 2 to 3 cables east of Double island. In entering the port steer through Birthday channel, passing a cable east of Harbour island; when past the east point of the latter, keep about N.W. by N. for the entrance of Queens cove, or further over to the eastern shore, to avoid Channel reef; in entering the cove,

pass to the west of the island at its entrance, and moor immediately the vessel is inside, anchors N.W. and S.E.

If going to the head of Port Eliza, keep on as before directed till within a cable of Queens cove, when haul sharply to the westward, keeping about one cable off the east shore, till Fairway island comes on with the east point of Harbour island S.E. by E., when the vessel will be west of Channel reef, and may steer up the port in mid-channel, anchoring near the centre, about 4 or 5 cables from the head, in 15 or 16 fathoms.

No sailing vessel of any size should attempt to enter Port Eliza unless with a steady fair wind.

If bound to Rolling roadstead, enter the Middle channel as before directed, but instead of steering for the entrance of Port Eliza, keep on a N. by W. or N. $\frac{1}{2}$ W. course, (passing about a quarter of a mile east of Black rock,) until the outer extreme of the islets off the north-west part of Catala island come open north of the low grassy point on its north side bearing W. by S., when haul in for the roadstead on that mark, which will lead midway between Arnold and Entrance reefs; anchor in 6 fathoms, with the extremes of Catala island bearing W.S.W. and S.E. by S.

Entering Esperanza inlet from the westward, keep an offing of $2\frac{1}{2}$ or 3 miles from Catala island (if Kyuquot hill be made out, by keeping it open west of Tat-chu point N.W. by W., a vessel will be well clear of any dangers off Catala island), till Double island comes in line with Black rock N. by E. $\frac{3}{4}$ E., and entering the inlet through the North channel with this mark on, which lead in clear of danger. When the Twins islands bear W. by N., haul more to the eastward, passing a quarter of a mile outside the Mid and Black rocks, and steer for Rolling roadstead or Port Eliza as before directed.

If the weather be clear and the marks can be made out, both North and Middle channels are equally good, the latter being wide enough for a vessel to beat through, though it would be a hazardous thing for a stranger to attempt, as no turning marks can be given.

Generally a heavy swell prevails off the entrance of the Nuchatlitz and Esperanza inlets, and no sailing vessel should attempt to enter, or leave either of them, unless with a steady fair or leading wind.

Soundings from 20 to 40 fathoms will be found extending for nearly 20 miles westward from the entrances of Nuchatlitz and Esperanza inlets; to the S.S.W., at a distance of 10 miles off shore, are from 70 to 80 fathoms.

The COAST, westward of Catala island to Tat-chu point, runs in a westerly direction for upwards of 3 miles, is indented by two small sandy bays, and bordered by a number of rocks, some of which extend

nearly 2 miles of shore. Tat-chu point is clifty ; some rocks lie a short distance to the southward of it, and there is a native village of considerable size at half a mile east of it. Eliza dome, a remarkable summit, 2,812 feet above the sea, rises $1\frac{1}{2}$ miles within the point, and is very conspicuous from seaward.

From Tat-chu point the coast turns to the W.N.W. for 7 miles to the entrance of Kyuquot sound, and is indented by several small bays, in some parts of which boats may find shelter.

BARRIER ISLANDS.—At 2 miles westward of Tat-chu point is the commencement of a chain of small islands and reefs bordering the coast of Vancouver island for nearly 20 miles in a westerly direction to the entrance of Ou-ou-Kinsh inlet. They extend in some parts as far as 5 miles off shore, and through them are two known navigable channels, the Kyuquot and Halibut, leading to anchorages ; the former channel leads into Kyuquot sound, and the latter into Clan-ninick harbour, but as a rule no stranger should venture into them, or among these islands, unless the weather be clear, and provided with the chart, or having a pilot on board.

Highest island, one of the Barrier group, lying 2 miles south of Union island, is a remarkable bare rock 98 feet high, and useful in identifying the Kyuquot channel.

In thick weather no vessel should stand nearer the Barrier islands than the depth of 40 fathoms.

KYUQUOT SOUND, the eastern entrance of which is 12 miles from Esperanza inlet, is a large broken sheet of water penetrating from the coast to a distance of 14 or 15 miles inland in two large arms, and several smaller ones. There is a large island at the entrance, and on either side of it is a channel into the sound, the eastern one only being fit for large vessels ; there are also several islands within, mostly small ; its shores are generally rocky, and very much broken, rising within to high mountains, 2,000 and 4,000 feet above the sea.

The soundings outside vary from 20 to 40 fathoms, generally sandy bottom ; at the entrance are from 40 to 60 fathoms, but within the sound the depths increase in many places to upwards of a 100 fathoms. There are three anchorages, Narrowgut and Easy creeks and Fair harbour, the two latter being of considerable size but at a distance of 13 and 10 miles from the entrance ; the former is very small, but only 5 miles within the sound.

KYUQUOT CHANNEL, leads into the sound through the Barrier islands, and to the eastward of Union island. It is nearly straight, about 5 miles long in a N.N.E. direction, and its breadth is little less than a mile ; past the Barrier islands it is bounded on the west by Union island, and on the east by the main of Vancouver ; the soundings within it vary from

30 to upwards of 40 fathoms, increasing gradually to the inner part, and a mid-channel course through is clear of danger.

East Entrance Reef, one of the Barrier group lying at the south-east extreme of the channel, $6\frac{1}{2}$ miles W. by N. $\frac{1}{4}$ N. from Tat-chu point, is about 2 cables in extent and 4 feet above high water: no vessel should stand inside it, or, in entering the channel, round the reef nearer than half a mile.

Rugged Point, the south-east entrance point of Kyuquot sound, is upwards of 2 miles north of East Entrance reef on the east side of the channel; it is rugged and rocky, but steep-to on the west side; between it and East Entrance reef are a number of rocks, among which no vessel should venture. The east side of the channel to the northward of this point is formed by the Vancouver shore, and is slightly indented and steep-to, to the termination of the channel.

West Rocks, at the south-west extreme of Kyuquot channel and 2 miles N.W. $\frac{1}{2}$ W. from East Entrance reef, are two in number, and 50 feet above high water; some rocks which cover at a quarter flood extend half a mile south-east of them, with 20 fathoms close to their outer edge. In navigating the channel do not approach West rocks within two-thirds of a mile.

White Cliff Head, the south-east extreme of Union island, is one mile N.N.E. of the West rocks, and abreast Rugged point; it is about 70 feet high, faced to the southward by a remarkable white cliff; there are 35 fathoms within one cable of it. Half a mile within the head is Kyuquot hill, a remarkable summit 740 feet high, bare of trees on its east side, and very conspicuous from seaward.

Northward of White Cliff head, the east coast of Union island runs in an irregular outline to the N.N.E., for $2\frac{1}{2}$ miles, to Chat-channel point; it is generally rocky, and rises gradually to summits 800 or 900 feet high.

Chat-Channel Point, the north-west extreme of Kyuquot channel and the east point of Union island, is a low rocky point with a remarkable nob just inside it; a rock which uncovers at a quarter flood lies 2 cables east of it, and the point ought not to be rounded nearer than half a mile.

LEADING ISLAND, just northward of Kyuquot channel, and nearly $3\frac{1}{2}$ miles from White Cliff head, is about $1\frac{1}{4}$ miles long in an east and west direction, and half a mile wide; its shores are steep-to, and the island rises near the centre to a summit 400 feet high, which kept midway between White Cliff head and Rugged point, N. by E. $\frac{3}{4}$ E., leads into the sound through the fairway of Kyuquot channel.

UNION ISLAND, in the entrance of the sound, and protecting it from the ocean, is of square shape, and upwards of 3 miles in extent; its surface is undulating, rising in the north-west part to nearly 1,500 feet; the shores are rocky and much broken on the south and west sides.

BLIND ENTRANCE leads into the sound westward of Union island, between it and the Vancouver shore, forming a narrow tortuous channel with some rocks in the outer part, and which should not be entered by a stranger; coasters however often enter the sound by this channel, but no directions can be given for navigating it.

NARROWGUT CREEK, in the south-east part of the sound, about $1\frac{1}{2}$ miles from the termination of the Kyuquot channel, is very narrow, and one mile long in a north-easterly direction. The soundings in it vary from 16 to 8 fathoms, and there is only just room for a vessel to moor, as its breadth is less than a cable; the shores are high, the entrance is clear of danger, and the creek easy of access to a steamer. A stream of considerable size empties itself into the head of the creek, from which a bank extends off 3 cables.

Shingle point, at the entrance of the creek on the north side, is bordered by a sandy beach, and has 9 fathoms close to. It was the observation spot used in the sound, and is in lat. $49^{\circ} 59' 55.5''$ N., long. $127^{\circ} 09' 30''$ W.; the variation in 1862 was $23^{\circ} 40'$ East.

DEEP INLET, at $1\frac{1}{2}$ miles north-west of Narrowgut creek, is about 3 miles long in a north-easterly direction, but affords no anchorage; on its north side, at the entrance, is a remarkable high precipice.

HO-HOAE ISLAND, nearly in the centre of the sound and half a mile north of Union island, is about 2 miles long in a north-easterly direction; upwards of a mile wide, and its greatest height is about 600 feet; its shores are rocky, and steep-to. On its north-east side is Dixie cove, where a small craft may anchor in 6 fathoms completely land-locked.

PINNACE CRANNEL, between Ho-Hoae island and the east shore of the sound, is about 3 miles long in a northerly direction, and half a mile wide, clear of danger, the soundings in it varying from 46 to upwards of 100 fathoms.

TAH-SISH ARM, in the north part of the sound, has its entrance 5 miles from the termination of the Kyuquot channel. It is 6 miles long in a winding direction to the northward, and its shores, except at the head, are high, rugged, and generally steep-to: the head terminates in low swampy land, through which flows a considerable stream, and a bank dries off a cable; on the east side, 2 miles below the head, is a similar stream, off which a bank extends about 2 cables.

There is one anchorage one mile within the entrance, on the east side, called Fair harbour.

FAIR HARBOUR is of an oblong shape, $2\frac{1}{2}$ miles in length in a N.E. direction, from 3 to 4 cables wide, and affords anchorage near either end in from 13 to 11 fathoms; its shores, generally, are high, and steep. From the east end a bank dries off a cable, and the western one is a low narrow neck about a cable wide at low water, and separates the harbour from Pinnacle channel: the entrance to it, which lies on the north side near the middle, is nearly a mile long, and from one to 2 cables wide, with some small islets on its north side, the soundings in it being very irregular, varying from 5 to 20 fathoms; in entering keep the south shore close on board. This harbour can be entered by steamers, or sailing vessels with a fair wind.

Some rocks, the outer one of which covers, lie 3 cables south-west of the entrance to Fair harbour, and about a cable off shore.

MOKE-TAS ISLAND, in the north part of the sound, between the entrance to the Tah-sish and Kok-shittle arms, is about 2 miles long, and one mile wide, rocky, and about 400 feet high; its east and west sides are steep to. At one cable off its north shore, near the centre, is a rock under water, and to the south-east of it lie the Channel rocks, a small patch, about 3 feet above high water; they however are steep-to.

The passage between Moke-tas island and the north shore of the sound, is 3 cables wide in the narrowest part, with from 14 to 38 fathoms in mid-channel; if using it a vessel ought to keep well over to the north side.

KOK-SHITTLE ARM, the entrance of which is in the north-west part of the sound, about 6 miles from Kyuquot channel, is upwards of 8 miles long in a north-westerly direction and about a mile wide at the entrance, narrowing gradually towards the head; its shores are rocky, and of a broken outline, with several small islets off them. The soundings vary from 20 to 80 fathoms, shoaling gradually towards the head; there are no dangers, and a very good anchorage, the best in the sound, on its west side at a distance of 4 miles from the entrance. The head of the arm terminates in low swampy land, through which flows a small stream, and a bank extends off about 2 cables.

Just within the entrance, on the east side, is a small cove with 4 fathoms in the centre, and available for small craft.

EASY CREEK, on the west side of Kok-shittle arm, and 13 miles from the entrance of the sound, is about 2 miles long in an E.S.E direction, turning sharply round from its entrance to the southward, and running parallel to the inlet, being separated from it by a narrow rocky

peninsula. Its breadth at the entrance is 4 cables, narrowing gradually to the head ; the soundings in it vary from 12 to 20 fathoms, and there is good anchorage from half a mile within the entrance to the head. The shores are rocky, of moderate height, steep to on the north side, but from the south a sand-bank dries off in some parts nearly a cable. The best anchorage is a mile within the entrance, in from 13 to 16 fathoms, about one or 2 cables off the north shore ; it ought to be entered in mid-channel.

On the opposite side of the arm, abreast Easy creek, is a village and a stream of considerable size, off which a bank dries out about 2 cables.

CHAMIS BAY, formed in the west side Kyuquot sound, about one mile from the north part of Blind entrance, is nearly half a mile in extent, but affords no anchorage, the water being too deep.

DIRECTIONS.—No sailing vessel should attempt to enter Kyuquot sound, unless with a steady fair, or leading wind, as generally a heavy swell prevails outside, which in a light wind would render her position critical ; and no stranger should attempt to venture in, unless provided with the chart, the weather clear, and the leading mark for the channel well made out.

Entering the sound by the Kyuquot channel, which is the only one a stranger ought to use, keep a good offing, till the entrance of the channel is made out, (White cliff head, and Kyuquot hill at the south-east point of Union island, which have been before described, are very conspicuous, and will identify the channel,) when bring the summit of Leading island midway between Chat-channel and Rugged points N. by E. $\frac{3}{4}$ E., and steer up the channel with that mark on ; in nearing Chat-channel point, give it a berth of at least 4 cables to avoid the rock which lies off it. If bound to Narrowgut creek pass eastward of Leading island, and keeping about a cable off the south shore, enter the creek in mid-channel, and moor, if in a large vessel, when inside.

If bound to Fair harbour, keep as before directed till near Leading island ; pass to the westward of this island, and proceed up to the northward through Pinnacle channel, keeping about a cable or so off either shore, on to the entrance of Tah-sish arm. In nearing Fair harbour keep from 2 to 3 cables off the east side of the arm till the entrance bears E.S.E., when steer for it on that bearing, keeping close over to the south shore till inside, and anchor in the middle, about half a mile from the east end, in 11 fathoms.

Bound to Easy creek, pass to the westward of Leading, Ho-Hoae, and Moke-tas islands ; enter the Kok-shittle arm in mid-channel, and proceeding up it for a distance of 4 miles will bring a vessel abreast the creek, which may be entered in mid-channel ; anchor in from 13 to 16 fathoms, about a mile within the entrance, and from one to 2 cables off shore.

CLAN-NINICK HARBOUR, on the Vancouver shore, 3 miles to the westward of Kyuquot sound, is about one mile long in a westerly direction, half a mile wide, and affords good anchorage, in from 7 to 10 fathoms, at the distance of half a mile from the head, from which a sand-bank extends 2 cables; its shores are generally low, and there are some rocks on either side of the entrance.

The harbour is protected by some islands of the Barrier group from the ocean, and there is only one channel, the Halibut, into it through them, which, though clear of danger, ought not, except under unavoidable circumstances, to be attempted by a stranger.

HALIBUT CHANNEL, which runs through the Barrier group from the ocean to the entrance of Clan-ninick harbour, lies westward of Table, and Village islands, and east of Look-out island. It is about 3 miles long in a northerly direction, and half a mile wide in the narrowest part; the soundings in it vary from 16 to 6 fathoms, being somewhat irregular, but a mid-channel course through, except in the northern part, is clear of danger.

Table island, on the east side of the channel, is the largest of the Barrier group, being nearly half a mile in extent, and about 150 feet high; some rocks, mostly above water, extend half a mile from its south side, the outer one being 50 feet high, with 15 fathoms 2 cables west of it. Trap bluff on the west side of the island is conspicuous.

Half a mile east of Table island is an anchorage with from 4 to 6 fathoms, tolerably sheltered by some islands from seaward, and much used by coasters in summer months; the entrance to it is rather intricate, and no stranger, or any except a small vessel, should attempt to enter.

Village island, on the east side of Halibut channel, just north of Table island, is small, and about 150 feet high; on its east side is a large native village, much frequented in summer; off it a bank dries nearly 3 cables. To the eastward of this island is a small cove among the Barrier islands, called Barter cove, with from 1 to 3 fathoms; it is well sheltered in all weather, and much frequented by coasters when fur trading; the entrance to it is very narrow, and almost choked up with rocks.

Two cables north of Village island is a rock awash at high water springs, but there are from 5 to 6 fathoms at a distance of a cable off the west side.

Look-out island, at the south entrance point of Halibut channel, lies nearly one mile south-west of Table island; it is small, covered with a few trees, and about 150 feet high; its east side may be approached to 2 cables, but half a mile south-west of it are some rocks, which always break.

Granite island, which forms the south side of Clan-ninick harbour, is about half a mile in extent, and joined by a sandy beach at low water to the Vancouver shore; 3 cables east of its east point, is a very dangerous rock, Chief rock, which lies at the termination of the Halibut channel, and only uncovers at low water springs.

Trap bluff, on the west side Table island in line with the east high water part of Look-out island S.S.W. $\frac{1}{2}$ W., leads $1\frac{1}{2}$ cables east of Chief rock.

DIRECTIONS.—Bound into Clan-ninick harbour by the Halibut channel (which is the only passage by which a stranger can enter it); keep about 2 miles off the Barrier islands till Look-out island bears N.W. by N., when steer for the entrance of the channel, passing about 2 cables east of Look-out island. When the north-west end of Table island bears N.E., steer about N.N.E., or more easterly, so as to pass 2 or 3 cables north-west of Trap bluff on its west side; on nearing Granite island, bring Trap bluff in line with the east high water part of Look-out island S.S.W. $\frac{1}{2}$ W., and steer N.N.E. $\frac{1}{2}$ E. for the entrance of the harbour, with the above-mentioned mark on astern, till the north side of Granite island bears West, or the harbour comes well open, when a vessel will be clear of the Chief rock, and may haul in to the westward for the anchorage, anchoring in from 7 to 10 fathoms, with the extremes of the harbour bearing East and S.E. or S.E. by S.

As before noticed, no stranger should attempt to enter this harbour without a pilot, unless from absolute necessity, and if in a sailing vessel, only with a steady fair wind.

OU-OU-KINSH INLET, 10 miles W.N.W. from Kyuquot sound, is 7 miles long in a north-easterly direction, and $1\frac{1}{2}$ miles wide at the entrance, narrowing gradually towards the head; the shores within are high, rising from 2,000 to upwards of 3,000 feet.

The soundings in the inlet vary from 40 to 60 fathoms, and there is only one indifferent anchorage, Battle bay, just within the entrance, on the west side. The entrance lies west of the Barrier islands, is a mile wide in the narrowest part, and the soundings in it varying from 14 to 48 fathoms.

Clara islet, at the south-east extreme of the entrance, is small, bare and 20 feet above high water; no vessel ought to go eastward of, or approach it within half a mile. This islet is the westernmost of the Barrier islands, and lies $21\frac{1}{2}$ miles W. by N. from Tat-chu point, where they may be almost said to commence.

Bunsby islands, on the east side of entrance, close in shore, are about 2 miles in extent, and from 200 to 300 feet high; the passages between them and the shore are clogged up with rocks, but their west side is

steep-to : Pinnacle point and Green head at their south-west extreme are remarkable. To the northward of these islands is Malksope inlet, 4 miles long in a north-easterly direction, but the entrance is intricate, and there is no anchorage within it.

Cuttle Group, lying at the south-west entrance point of Ou-ou-Kinsh inlet, and $1\frac{1}{2}$ miles north-west of Clara islet, is comprised of a number of small islets and rocks, some of the former being wooded ; nearly one mile south-west of them is a rock which breaks in fine weather. On the Vancouver shore, just north-west of them, is a remarkable summit the Lone cone, 356 feet high, and useful in identifying the entrance.

A vessel should not go to the westward of these islets, or approach their east side nearer than 2 cables.

Sullivan reefs are a very dangerous patch of rocks lying nearly 3 miles outside the entrance of Ou-ou-Kinsh inlet, $2\frac{1}{2}$ miles W. by S. from Clara islet, and nearly 4 miles S.S.E. of Hat island in Nasperti inlet ; they are about half a mile in extent east and west, and only break occasionally ; there are from 10 to 11 fathoms close around them.

The entrance of Ou-ou-Kinsh inlet open N.N.E. leads $1\frac{1}{4}$ miles east of these reefs ; Solander island off Cape Cook just open or shut in by the land east of the cape bearing West, leads $1\frac{1}{2}$ miles south ; Hat island, in the entrance of Nasperti inlet, in line with a summit on the west side of the latter bearing North, leads $1\frac{1}{4}$ miles west ; and Hat island seen between the Haystacks N.W. by N., leads three-quarters of a mile north-east of them.

Battle bay, which is just within the entrance of Ou-ou-Kinsh inlet on the west side, is upwards of a mile wide, and half a mile deep, with several islets and rocks inside it near the middle ; near the north part there is anchorage in from 6 to 9 fathoms, which may be used in fine weather.

DIRECTIONS.—A vessel intending to enter Ou-ou-Kinsh inlet, and anchor in Battle bay, should keep an offing of 4 or 5 miles from the main, till Clara islet at the west extreme of the Barrier islands is made out, when steer for it on a N.E. by N. bearing, passing about half a mile west of the islet, which will take a vessel well clear of the Sullivan reefs. When abreast the islet steer for the centre of the entrance about N.N.E., round the Skirmish islets, which lie in the middle of Battle bay, at a distance of 2 cables, and anchor in 7 fathoms, midway between them and the north side of the bay.

It is not recommended to use this anchorage, unless embayed, as it affords but indifferent shelter in southerly gales, and no sailing vessel should attempt to enter unless with a steady fair wind.

NASPARTI INLET, $3\frac{1}{2}$ miles west of Ou-ou-Kinsh inlet, on the east side of a large peninsula of which Cape Cook is the south-west extreme, and in the head of an open bight or bay, is about 4 miles long, in a northerly direction, and about half a mile wide at the entrance, decreasing in some places to less than 3 cables. Its shores are high, and rocky, indented by some slight bays; there is a freshwater stream at the head, from which a bank extends about 3 cables. The soundings vary from 13 to 30 fathoms, and there is a secure though rather limited anchorage, in from 13 to 16 fathoms, at the distance of half a mile from the head. Outside the entrance are several dangers, but none within, and the projecting points may be approached to a cable's distance.

The Sullivan reefs, just described, lie $3\frac{1}{2}$ miles S.S.E. of the entrance, and appear to be pretty steep to on the west side.

Haystacks, off the east side of the entrance, and $1\frac{2}{3}$ miles north of the Sullivan reefs, are two bare sharp-topped cliffy rocks 65 feet high, and about 3 cables apart; at a distance of 2 cables off their west side are from 25 to 26 fathoms, and there is a clear deep passage between them and the Sullivan reefs; northward of them, rocks and foul ground exist.

East rock, 3 cables off the east entrance point, is of small extent, has 17 fathoms at a cable's distance to the westward of it, and covers at half flood; the Haystacks open south of Yule islet, S.E. by E., lead from 2 to 3 cables west of it.

Yule islet, about 40 feet high, lies midway between the Haystacks and East rock.

Mile Rock breaker lies $1\frac{3}{4}$ miles off the west shore of entrance to the inlet, and 2 miles W. by N. $\frac{1}{2}$ N. from Sullivan reefs. It is very dangerous to vessels entering the inlet, as it is of small extent and only breaks in heavy weather; the soundings around it are irregular, there being from 13 to 32 fathoms at 2 cables' distance off it.

Hat island, in the entrance of inlet, in line with a summit on the west side bearing North, leads 3 cables east of it, and well clear of the Sullivan reefs, into the inlet.

No vessel should stand to the westward of this danger.

Mile rock, nearly a mile north of the above-mentioned danger, is a small bare rock, 12 feet above high water; there are 29 fathoms one cable east of it, and a deep clear passage between it and the west shore.

Hat island, lying in the centre of the inlet just within the entrance, is small, and has a few stunted trees on the summit; from the southward it is very conspicuous, and appears somewhat like a hat. It is steep to on the east side, but nearly midway between it and the west shore is a

shoal patch of $2\frac{1}{4}$ fathoms, marked by kelp : in entering the inlet pass eastward of the island.

DIRECTIONS.—Nasparti inlet should not be used by a stranger unless unavoidably necessary, as in thick or cloudy weather it might be difficult to make out the leading marks, and no one should attempt to enter unless they are well made out, especially as the outlying dangers only break in heavy weather, and are seldom seen. A sailing vessel ought, in passing the entrance of this and Ou-ou-Kinsh inlet, to keep Solander island open south of the land east of Cape Cook bearing West.

If entering Nasparti inlet, keep Solander island, off Cape Cook, in line with the land eastward of it bearing West, until Hat island comes in line with a summit on the west side of the inlet bearing North,* when steer in for the entrance on that bearing, which will lead 3 cables east of the Mile Rock breaker, well clear of the Sullivan reefs, and half a mile west of East rock ; pass one or two cables east of Hat island, and steer up the inlet in mid-channel, anchoring in 13 fathoms, about a third of a mile from the head.

BROOKS PENINSULA.—To the westward of Nasparti inlet is a peninsula of an oblong shape, 9 miles long, and about 5 miles wide, projecting into the ocean in a south-south-west direction ; its shores are generally very rocky, and rise almost abruptly from the sea to upwards of 2,000 feet ; there are several off-lying dangers around it, some of which extend upwards of a mile off shore.

Cape Cook, or Woody point, the south-west extreme of this peninsula, and the most projecting point of the outer coast of Vancouver island, 163 miles W. by N. $\frac{1}{2}$ N. from Cape Flattery lighthouse, and 69 miles W. by N. $\frac{1}{2}$ N. from Estevan point. The cape rises abruptly from the sea to a summit 1,200 feet high ; nearly one mile west of it, lies Solander island, which is bare, 580 feet high, and has two sharp summits ; between it and the cape the passage is choked up with rocks, and no vessel or even boat should go inside the island.

At a distance of 2 miles off Cape Cook and the south side of the peninsula, the soundings are from 20 to 90 fathoms, and as a rule no vessel should approach nearer.

BROOKS BAY, on the west side of the peninsula, is a large open bay about 12 miles wide, and 6 miles deep ; there are several dangers within it, and two inlets, Klaskish and Klaskino, which afford anchorage, but are very difficult of access, and no vessel should attempt to enter either unless embayed and unable to get out of Brooks bay : the soundings

* See View on Chart No. 583 ; scale, $m = \frac{1}{2}$ inch.

are irregular, varying from 17 to 48 fathoms, shoaling generally to the northward.

CLERKE REEFS, lie in the south-east part of the bay, and 5 miles north of Cape Cook; their outer part is 2 miles off the east shore of the bay. They cover an extent of upwards of 2 miles, some are under water, others uncover, and no vessel should venture among them.

Cape Cook kept on a S.S.E. $\frac{1}{2}$ E. bearing, leads one mile west of these reefs; and Small islet at the entrance of Klaskish inlet, in line with Leading cone at its head, bearing N.E. by E. $\frac{1}{2}$ E., leads $1\frac{1}{2}$ miles north.

KLASKISH INLET, at the head of Brooks bay on the west side of the peninsula, and 10 miles N.N.E. of Cape Cook, is about 2 miles long in a north-easterly direction, and one mile wide at entrance; at its head is a long narrow basin, the entrance of which is too contracted for a vessel to enter. There is an anchorage just within the entrance of the inlet on the south side, to the eastward of Shelter island, but it is difficult of access to a sailing vessel.

Surge islets, on the south side of the entrance, about a mile off shore, are small, rocky, and about 40 feet high; foul ground exists among them, and in entering the inlet a vessel should not approach their west side nearer than 2 or 3 cables.

Shelter island, just within the entrance of the inlet on its south side, is about half a mile in extent, 300 feet high, with a summit at each end covered with a few stunted trees; some rocks extend a short distance off its east and west sides, but the north shore is steep to. The anchorage on its east side is about a third of a mile in extent, with from 10 to 13 fathoms, well sheltered, but the bottom is irregular; the entrance to it, round the north-east side of the island, is less than a cable wide in the narrowest part. About one cable from the north-east point of Shelter is a small bare islet, which in entering the anchorage should be passed close to on its east side.

Between Shelter island and the north entrance point of the inlet is a heavy confused sea, which would be dangerous for sailing vessels, as the wind generally fails there.

DIRECTIONS.—Entering the anchorage on the east side of Shelter island, do not bring Cape Cook to the southward of S.S.E. $\frac{1}{2}$ E., till Leading cone, a remarkable summit at the head of the inlet about 500 feet high, comes in line with Small islet on the north side of entrance bearing N.E. by E. $\frac{1}{2}$ E., which mark will lead into the inlet well north of the Clerke reefs and Surge islets; when abreast the latter, haul a little to the eastward, so as to enter midway between Small islet and Shelter island; pass within a cable east of the bare islet off the latter's north-

east point, and anchor in 13 fathoms with the extremes of Shelter bearing N.W. by W. $\frac{1}{2}$ W. and S.W. $\frac{1}{2}$ W.

CAUTION.—The entrance of this anchorage is intricate and narrow ; and unless unavoidably necessary, no vessel larger than a coaster should attempt it, as a furious sea rages all around the outer parts.

SHIP ROCK, lying nearly 8 miles N. by W. of Cape Cook, 2 miles off the shore in the centre of Brooks bay, and midway between Klaskish and Klaskino inlets, is of small extent, and has from 17 to 20 fathoms close on its south and east sides ; the sea generally breaks very heavily over it.

Small islet in line with Leading cone N.E. by E. $\frac{1}{2}$ E. leads nearly three-quarters of a mile south of it ; and Twenty-foot rock at the entrance of Klaskino inlet, in line with lower part of the stripe on Red Stripe mountain on the north shore of that inlet, N.N.E. $\frac{3}{4}$ E., leads nearly 2 miles north-west of it.

KLASKINO INLET, the entrance to which is in the north part of Brooks bay and 10 miles N. $\frac{3}{4}$ W. from Cape Cook, is nearly 6 miles long in a winding direction to the E.N.E. ; there are numerous rocks off the entrance, but a safe though intricate passage through them ; and there is also a good anchorage on the south side, 2 miles within the inlet. The soundings vary from 12 to 40 fathoms, increasing gradually inside, which becomes narrow with high and rocky shores, terminating in low land at the head.

Nob point, the south entrance point of the inlet, is rocky, and covered with a few stunted trees ; some rocks extend 3 or 4 cables off it, and close to its outer part is a rocky nob about 100 feet high.

Anchorage island, in the middle of the inlet, about 2 miles within the entrance, is of small extent and rocky ; some small islets extend a cable off its north-west and south-east points. The anchorage or harbour is between the east side of this island and the shore ; it is from 3 to 4 cables in extent, and well sheltered, with from 9 to 10 fathoms water : the entrance to it, round the south-east point of Anchorage island, is about a cable wide in the narrowest part, with from 13 to 17 fathoms in the middle.

Inside Anchorage island some rocks extend nearly across the inlet, rendering it almost impossible for a vessel to go beyond them.

Red Stripe mountain, rising on the north side of entrance, abreast Anchorage island, is a remarkable conical-shaped summit 2,200 feet high, with a valley on either side of it ; on its south part facing seaward is a conspicuous red clifty stripe or landslip, easily distinguished from the outside ; the lower part of it in line with Twenty-foot rock, bearing

N.N.E. $\frac{3}{4}$ E., leads into the entrance south of Channel reefs, and well north-west of Ship rock.

Twenty-foot Rock, 4 cables west-north-west of Nob point, is bare and 20 feet above high water. It is conspicuous from the outside, and there are 19 fathoms close to its north and west sides, but between it and Nob point the passage is choked up with rocks; the only channel into the inlet being to the westward of the rock, between it and the Channel reefs.

Channel Reefs, the south-east part of which is $3\frac{1}{2}$ cables W. by S. of Twenty-foot rock, are an irregular cluster of rocks, mostly under water, extending in a westerly direction to the north-west shore of Brooks bay. There is deep water between them in many places, but the only safe passage into Klaskino inlet is upwards of 3 cables wide with deep water between their south-east part and Twenty-foot rock.

DIRECTIONS.—If obliged to enter Klaskino inlet, when outside Ship rock, bring Twenty-foot rock in line with the lower part of the red stripe on Red Stripe mountain bearing N.N.E. $\frac{3}{4}$ E., and run boldly for the entrance with that mark on, which will lead $2\frac{1}{2}$ cables south of the Channel reefs; keep on this course till within 2 cables of Twenty-foot rock, when haul a little to the northward, and pass it on its north side at a cable's distance, after which steer about N.E. by E. $\frac{1}{2}$ E. for the centre or south part of Anchorage island, passing a cable or so north of the rocks off the south side of the inlet; when abreast the south-west point of the island, haul quickly to the eastward, round the rocks off its south-east point within half a cable, and anchor in from 9 to 10 fathoms midway between the east side of the island and the main, with the extremes of the former bearing N.W. and S.W. by W. : a large vessel should moor.

The entrance to Klaskino anchorage is even more intricate than that of Klaskish, and should not be attempted by a stranger unless absolutely necessary for safety. Fresh water may be procured in both these anchorages.

Three miles from Klaskino, in the north-west part of Brooks bay, is a large rivulet where boats may enter and find shelter in bad weather.

LAWN POINT, the north-west extreme of Brooks bay, lies 12 miles N.W. by N. from Cape Cook; it is low, and some rocks extend more than half a mile in an easterly direction from it, inside of which a boat may find shelter: the sea breaks violently about this point, and everywhere along the shores of Brooks bay.

The land in the vicinity of Lawn point appears very fertile, and lightly timbered; it rises gradually from the sea to a height of 1,900 feet. At

a distance of 3 miles from the point are from 24 to 30 fathoms, and a vessel ought to keep a good offing.

QUATSINO SOUND, the north-westernmost of the deep inlets on the outer coast of Vancouver island, is an extensive arm of the sea, which penetrates the island in a north-easterly direction for upwards of 25 miles. The breadth at the entrance is nearly 6 miles, narrowing to less than a mile at a distance of 5 miles within; the sound then runs in a north-easterly direction, nearly straight for 13 miles, when it branches off in two arms, one extending to the south-east for 12 miles, and terminating in low land. The other arm lies to the northward of, and is connected with the sound by a straight narrow pass about 2 miles long; its length is 22 miles in an east and west direction, and the eastern extreme, Rupert arm, is only 6 miles distant from Hardy bay on the north-east side of Vancouver island; the western part terminates within 12 miles of San Josef bay on the outer coast. Just within the entrance of the sound on the north side is Forward inlet, a much smaller arm, about 6 miles long in a northerly direction, in which are the best anchorages of the sound.

The shores of Quatsino sound are generally high, and near the entrance very much broken; there are several islands within and along its shores, but they are mostly small.

From the outside the entrance of Quatsino sound presents several remarkable features, which render it easy to be made out. The entrance is nearly 6 miles wide, and along its south side are several rocks and small islands; on both sides of, and within the sound the land is high, and some of the summits are very conspicuous, among others the Flattop and Entrance mountains to the northward of the entrance, and the Nose peak and Gap mountains inside, the Nose peak being easily distinguished from its sharp rocky summit.

The soundings in the entrance, and from 3 to 5 miles outside, vary from 30 to 70 fathoms, but within they deepen in many places to upwards of 100 fathoms. There are several dangers along the south shore at the entrance; in the fairway are two very dangerous rocks, which only break in heavy weather, and it requires great caution on the part of the navigator to avoid them, when entering or leaving the sound.

TIDES.—It is high water, full and change, in Quatsino sound at 11 hours, the rise and fall of tide being about 11 feet.

REEF POINT, the south-east entrance point of the sound, is 14 miles N.W. by N. from Cape Cook, and $1\frac{1}{2}$ miles from Lawn point the north-west extreme of Brooks bay; it is low and rocky, but rises gradually to a well-defined summit, 1,900 feet above the sea: the coast

between it and Lawn point forms a slight bay filled with a number of rocks extending a considerable distance off shore.

Boat river, which runs into a small bight on the south shore of the sound, $5\frac{1}{2}$ miles within Reef point, is merely a small stream which a boat can enter, and find shelter in bad weather; the coast between the two places is indented by several bays, and fringed by a barrier of reefs, which extend off in many places nearly a mile, and over which the sea usually breaks very heavily.

BOLD BLUFF, 7 miles north of Reef point, on the south side of the sound, is, as its name implies, a bold rocky salient bluff rising suddenly to upwards of 200 feet, when it slopes gradually to a summit upwards of 1,600 feet high; it may be safely approached to a cable. At this spot the sound contracts in breadth to less than a mile.

The shore between Boat river and Bold bluff is rocky, but apparently steep-to, and clear of danger.

SURF ISLANDS, upwards of a mile S.S.W. of Bold bluff, and 3 miles within the entrance of the sound, are a chain of small islands, about one mile long in a north-west and south-east direction, some of which are covered with a few stunted trees, and are about 40 feet above high water; a short distance from them are a number of breaking rocks, but 3 cables from their south and west sides are from 10 to 30 fathoms. Although there appears to be deep water between these islands and the east side of the sound, it is not advisable to go through that passage, as it has not been sufficiently examined.

ENTRANCE ISLAND, $5\frac{1}{2}$ miles N.W. $\frac{1}{2}$ N. from Reef point, at the north-west entrance point of the sound, is small and rocky, about 140 feet high, and covered with a few stunted trees. It is steep-to on its south-east side, which may be approached to 2 cables distance; to the northward of it is a narrow boat pass into the sound, about a cable wide, but filled with rocks.

DANGER ROCKS, a mile within the entrance, nearly in the fairway, are two very dangerous pinnacle rocks, of small extent, and steep-to on all sides; as they very seldom break, great caution is required, on entering or leaving the sound, to avoid them.

The north Danger lies 7 cables E.N.E. from Entrance island, and breaks at low water. The south Danger is half a mile S.E. of the north rock, and is awash at low water spring tides; there is deep water between them.

Pinnacle islet on with the east point of Low islands in Forward inlet, bearing N.N.W. $\frac{3}{4}$ W., leads nearly 4 cables west of Danger rocks, and midway between the north rock and Entrance island.

Robson island in Forward inlet, open north of Entrance Mount point N.W. by W. $\frac{1}{2}$ W., leads 3 to 4 cables east of Danger rocks; and Village islet, on the east side of Forward inlet, just touching Brown point N.W., leads about three-quarters of a mile east of them, and midway between them and the Surf islands.*

Bedwell islets, within the sound on the north side, open north of Bold bluff bearing N.E., leads a quarter of a mile north of the north Danger rock; and Bold bluff in line with the gap in the centre of Surf islands, bearing N. by E. $\frac{3}{4}$ E., leads nearly a mile south-east of the south Danger.*

Between the Danger rocks and Surf islands the passage is $1\frac{1}{2}$ miles wide, and clear of danger.

FORWARD INLET, on the north side of the sound one mile within the entrance, is about 6 miles long, first taking a north-westerly direction for 2 miles from its outer part, then turning to the N.N.E. for 4 miles and contracting in breadth; it becomes shoal at the head, and terminates in large salt-water lagoons; the breadth at the entrance is about a mile, but in the upper part it contracts to less than a quarter of a mile in some places: there are two anchorages within it, North and Winter harbours, the former easy of access to sailing vessels; both are very secure and well sheltered.

Entrance and Flattop mountains, on the west side of inlet near the entrance, are very conspicuous objects from seaward; the former is 1,275, and the latter nearly 1,000 feet high.

Pinnacle islet, three-quarters of a mile north of Entrance island, at the south-west entrance point to Forward inlet, is a small jagged rock about 40 feet high, with a few trees on its summit. It is 2 cables off shore, and there are 15 fathoms at a cable's distance from its east side.

Shoal patch, which lies in the fairway to the inlet, 6 cables E.N.E. of Pinnacle islet, has not less than 8 fathoms water, and any vessel may go over it.

Robson island, in the bend of Forward inlet on the west side, $1\frac{1}{2}$ miles from Pinnacle islet, is about half a mile in extent, and 400 feet high; its shores are rocky, but, at a distance of a cable, free of danger on the north and east sides. Between it and the west shore is a narrow passage of 2 to 5 fathoms water; and 4 cables south-east of it are some small wooded islands called the Low islets, which are steep-to on all sides.

A small village stands on the east side of Forward inlet abreast Robson island, and close off it is Village islet, a small bare islet about 40 feet high, which is rather conspicuous.

* See Views on Admiralty Chart No. 582.

Bare islet, lying off the north-east entrance point to the inlet, is about 12 feet high, and steep-to on the outside ; it is $1\frac{1}{2}$ cables off shore, but the passage inside is only fit for a boat.

Burnt hill, 1,095 feet high, just over the north-east entrance point of Forward inlet, is remarkable from the southward, being bare of trees and cliffy on its south side ; one mile north-east of it is another conspicuous summit, named Nose peak, 1,730 feet high, with a bare rocky top.

NORTH HARBOUR, which lies to the north-west of Robson island, in a bight on the west side of Forward inlet, is a snug and secure anchorage, about 4 cables in extent, with from 4 to 6 fathoms. The entrance is 3 cables wide, rendering the harbour easy of access to sailing vessels ; it is perhaps the best anchorage within the sound, and from being only 4 miles within the entrance is very convenient. Browning creek, in its west part, is $1\frac{1}{4}$ miles long, but very narrow, with from 2 to 5 fathoms water, and terminates in a shallow basin, dry at low water.

Observatory islet, which lies on the north side of the entrance to the harbour, is a small bare rock connected at low water to the main ; variation in 1862, 23' 40" East.

WINTER HARBOUR comprises that part of Forward inlet which runs in a N.N.E. direction, and is a capacious anchorage with from 8 to 11 fathoms. Its shores are low and bordered by a sandy beach, and the harbour becomes shoal at a distance of a mile from the head ; its breadth varies from 2 to 6 cables.

Log point, just outside the entrance of this harbour on the east side, is low, and bordered by a sandy beach ; to the southward of it, and extending 4 cables off shore, is the New bank, with $3\frac{1}{2}$ fathoms on the shoalest part, and contracting the breadth of the entrance passage to the harbour to less than a cable ; but by keeping a little over to the west side when abreast North harbour, a vessel of the largest size may avoid this bank, and enter Winter harbour without danger.

At the narrowest part of the entrance to Winter harbour, on the west side, is a low grassy point bordered by a sandy beach and steep-to, there being 16 fathoms within half a cable of it.

PILLEY SHOAL, of 3 fathoms, on the north side of the sound, is of small extent, steep-to on the outside, and marked by kelp. It lies $1\frac{1}{2}$ cables off shore, and one mile west from Bold bluff.

Boat cove, 5 miles within the entrance on the north side of the sound, is of small extent, with 5 fathoms inside ; it would afford good shelter for a small craft ; the north shore of sound between it and Bare islet is rocky and very much broken.

Bedwell islets, lying $5\frac{1}{2}$ miles within the entrance, off a projecting

point on the north side of the sound, are of small extent, wooded, and separated from the shore by a very narrow boat pass, which is conspicuous from the entrance; at 3 cables north-east of them is the Monday shoal, with 4 fathoms, which is marked by kelp, and steep-to on the outside: eastward of these islets no sea is ever experienced in the sound.

KOPRINO HARBOUR, 8 miles within the entrance, in the centre of a bay on the north side of the sound, is a perfectly landlocked but small anchorage, affording room for one or two ships to lie moored within. It lies to the northward of Plumper island, which is about half a mile in extent, low, wooded, and steep-to on all sides, there being a good passage on either side of it into the harbour.

Dockyard island, in the west part of the harbour, mid-way between Plumper island and the north shore, is small, but may be approached close to; the least water between it and Plumper island is 4 fathoms; about $1\frac{1}{2}$ cables north-east of it, in the middle of the harbour, is a small patch of 15 feet, the Mud bank; there is good anchorage one cable south of Dockyard island, in 14 fathoms.

Wedge island lies at the eastern limit of the anchorage, about one cable north of Plumper island; it is very small, and covered with a few bushes; there is a deep passage close to on either side of it into the harbour.

Observatory islet, at the north-east extreme of the harbour, is bare, and about 12 feet high; it is 2 cables north of Plumper island, and 3 cables from the north shore, connected to the latter by a bank which dries at low water; the variation in 1860 was $23^{\circ} 00'$ East.

East passage leads into Koprino harbour, eastward of Plumper island. It is half a mile wide at entrance, narrowing to 2 cables at its termination, is clear of danger, and the soundings in it vary from 15 to 30 fathoms. East cove, in its north-east part, appears to afford a good anchorage in 6 to 10 fathoms; but the entrance to it has hardly been sufficiently examined to recommend its being used by a large vessel. Prideaux point, the east entrance point of East passage, is low, bordered by a sandy beach, and may be approached to a cable's distance.

The north shore of the sound from Prideaux point takes a general north-easterly direction for 9 miles to Coffin islet, at the entrance of Hecate cove. It is bordered by a sandy beach, and is clear of danger at a cable's distance, except in the vicinity of the Percy ledge, which lies 6 miles from Prideaux point, is 2 cables off shore, and has 4 fathoms on its outer edge.

From Bold bluff the south shore of the sound runs nearly parallel to the northern one for 13 miles in a north-easterly direction. It is high, and indented by two bays of considerable size, and some small creeks,

none of which afford anchorage. In Koskeemo bay, at 2 miles within Bold bluff, is a native village of considerable size.

Village islands, at the east extreme of Koskeemo bay, are of small extent and low; their outer part is steep-to.

Brockton island, lying 2 cables from a projecting point on the south side of the sound, 7 miles within Bold bluff, is nearly half a mile long, but narrow; its west side is steep-to.

LIMESTONE ISLAND, 15 miles within the entrance, and in the centre of the sound, is the largest island in the sound, and shaped somewhat like a crescent, nearly 3 miles long, and about three-quarters of a mile wide in the broadest part. Its shores are rocky, but clear of danger, and the island is of moderate height; Quiet cove, on its north-west side, is small, and affords anchorage for small craft.

Midway between Holloway point, the south-west extreme of Limestone island, and the south shore of the sound, lie the Foul islets, which are small, and about 3 cables in extent in an east and west direction. There is a clear deep passage, about 2 cables wide, on either side of them; the south passage is to be preferred.

Single islet, half a mile north-eastward of Holloway point, and 3 cables north of the Foul islets, is low and bare, but may be approached to a cable's distance.

Kultus cove, abreast Limestone island, on the south side of the sound, is about half a mile in extent, with irregular soundings of from 12 to 25 fathoms; it affords no anchorage, except for small craft.

SOUTH-EAST ARM, the entrance of which is a mile east of Limestone island and 18 miles within the entrance of the sound, is 10 miles long in a south-easterly direction, and varies in breadth from 3 cables to one mile. Its shores are generally high and rugged, but terminate in low land at the head; the soundings in it vary from 30 to 70 fathoms, and there is no anchorage, except for small craft; a bank dries off 2 cables from the head, and close to its edge is 15 fathoms.

Mist rock, 5 miles within the entrance, and 4 cables off the east shore, is of small extent, and covers at half flood; it is the only danger in the south-east arm, but by keeping in mid-channel, or well over to the west shore, a vessel will clear it.

Atkins cove, on the east side of entrance to the south-east arm, is 4 cables long in a northerly direction, and a cable wide, with from 5 to 7 fathoms; there is room for a small vessel to anchor in it, but the cove is open to the south-east.

WHITESTONE POINT, at the separation of the two arms at the head of Quatsino sound, is a rocky point of moderate height, and lies three-

quarters north-east of Limestone island, abreast Coffin islet. Bull rock, which covers, and is marked by kelp, lies 3 cables south of it, and 2 cables off shore. Between Atkins cove and Whitestone point the coast is rocky, and should not be approached nearer than 3 cables.

HECATE COVE, on the north shore about one mile north-east of Coffin islet, runs in about two-thirds of a mile in a north-westerly direction, is from 2 to 3 cables wide, and affords good anchorage near the centre in 9 to 11 fathoms. The entrance is clear of danger, but in the inner part of the cove, near the north side, are some shoal patches, marked by kelp, with only 11 feet water in some parts; the shores of the cove are moderately high, and bordered by a sandy beach. Kitten island, at the east side of entrance, is steep-to on the outside.

This cove is convenient for steamers or small craft, and a vessel ought to anchor in about 11 fathoms, with the entrance points bearing South and S.E.; a large vessel should moor.

ROUND ISLAND, nearly in mid-channel about a mile east of Hecate cove and just south of Quatsino narrows, is small, and of moderate height; there is a clear passage between it and the north shore, but the one south of it is filled with rocks. At 3 cables south-east from it is Bight cove, of moderate extent, with from 8 to 10 fathoms inside, but as the tide runs strong off the entrance, and there are also some rocks, it is only recommended for small craft.

QUATSINO NARROWS, 20 miles inside the sound and connecting it with the Rupert and West arms, are 2 miles long in a northerly direction, and $1\frac{1}{2}$ cables wide in the narrowest part; the soundings in it vary from 12 to 20 fathoms, its shores are high and rocky, but at half a cable's distance clear of danger. The tide runs through these narrows at a rate of from 4 to 6 knots, and the streams turn shortly after high and low water. Turn point, at their south-west extreme, is bold and cliffy, the coast turning sharply round it to the northward; a short distance off it are some strong tide rippings. Between this point and Hecate cove the coast is broken, but clear of danger at a cable's distance.

Philip and James points, at the north extreme of the narrows, are bold and steep-to; off the latter, which lies on the east side, is a small island.

RUPERT ARM, to the north-east of Quatsino narrows, is 5 miles long in a north-easterly direction, and nearly a mile wide; its shores are high and clear of danger; its head terminates in low land, and a bank dries off it for 2 cables. The soundings in this arm vary from 80 to 30 fathoms, shoaling gradually to the head, off which a vessel may anchor, in 14 to 17 fathoms, a short distance from the edge of the bank.

Marble creek, which lies half a mile east of the narrows, at the entrance of Rupert arm, is of small extent, and affords anchorage in from 5 to 6 fathoms ; off its head a sand-bank extends 4 cables, and midway up the creek are some small islets on either side : if intending to anchor, pass between and go just inside them.

From Rupert arm to Hardy bay, on the north-east side of Vancouver island, is a distance of only 6 miles, and a trail exists between the two places, much frequented by the natives for trading purposes to Fort Rupert, the Hudson Bay Company's station.

Hankin point, across Quatsino narrows on the north side, is bold and rocky ; it separates the Rupert from the West arm.

WEST ARM trends in a westerly direction nearly 18 miles from the the north part of Quatsino narrows, and varies in breadth from 2 cables to a mile. Its shores are generally high and rocky ; the northern one is indented by several small bays, and off it are some rocks and small islands. The soundings vary from 15 to 96 fathoms, shoaling gradually to the head, and there are two anchorages, one at Coal harbour on the north side, and the other at the edge of the bank extending from the head ; the former is of moderate extent, and the best anchorage northward of the narrows.

Coal harbour, 2 miles from the narrows, on the north side of West arm, is of square shape, from 3 to 4 cables in extent, and affords good anchorage near the middle in from 12 to 14 fathoms. The shore is bordered by a sandy beach, and at the head are some fresh-water streams. This anchorage is easy of access for any vessel ; indications of coal have been met in its vicinity.

Pot rocks, which lie 2 miles west of Coal harbour, and 3 cables off the north shore, are of small extent, and cover at three-quarters flood ; there are 64 fathoms 3 cables south of them.

Stragglng islands, about 5 miles from the narrows, are an irregular group of small islands and rocks extending upwards of half a mile from the north shore ; the soundings among them and to the northward are irregular, and a vessel in passing should not approach their south side nearer than 2 cables ; just west of them is a small patch of swampy ground, through which flow some fresh-water streams, and a bank extends a cable off it.

The West arm gradually decreases in breadth to the westward of the Stragglng islands, and the shores on both sides at a cable's distance are clear of danger ; the head terminates in low land, and a bank extends upwards of 2 cables from it ; close to the outer edge of the latter are from 12 to 14 fathoms, where a vessel may anchor.

DIRECTIONS.—Entering Quatsino sound from the southward, give Reef point, its south-east entrance point, an offing of about 2 miles, and

steer North, till Bold bluff comes in line with the gap in the centre of the Surf islands, N. by E. $\frac{3}{4}$ E.,* which mark kept on will lead south-east of Danger rocks; when the west side of Robson island comes open north of Entrance mount point in Forward inlet,* N.W. by W. $\frac{1}{2}$ W., or Village islet, on the east side of that inlet, is just touching Brown point, bearing N.W.,* a vessel will be well east of these rocks. If bound up the sound, round the north end of Surf islands at a distance of about half a mile, or if going to Forward inlet, steer about N.W. by W., taking care not to shut in the south side of Robson island with Entrance mount point, until Bedwell islets come open north of Bold bluff, bearing N.E., when she will be well north of the Danger rocks. Pass from one to 2 cables off the east sides of the Low and Robson islands, and rounding the north point of the latter, at the same distance, enter North harbour, and anchor in from 4 to 6 fathoms near its centre.

If intending to anchor in Winter harbour, when abreast the north part of Robson island, steer N.N.W., keeping well over to the west shore to avoid the New bank, and when past it enter the harbour in mid-channel, anchoring in 11 fathoms about half a mile north of Grass point. Winter and North harbours are the best anchorages in the sound, and easily available for sailing vessels, which could beat into the latter one, and from being situated near the entrance their position is very advantageous.

Bound to Koprino harbour, which can only be entered by steamers or sailing vessels with a fair wind, round the north-west point of Surf islands at about half a mile distance, and steer up the sound in mid-channel until abreast the harbour. If in a large vessel, go through the East passage, keeping from one to 2 cables off Plumper island; enter the anchorage close to on either side of Wedge island, and moor immediately the vessel is west of it, anchors north and south; a vessel may also enter by West passage, and anchor in 14 fathoms south of Dockyard island.

In navigating the sound to the eastward of Koprino harbour the chart is the best guide, and a mid-channel course is everywhere free of danger; sailing vessels of any size should not, however, go eastward of that harbour, as the anchorages beyond are rather difficult of access for them. If wishing to anchor in Hecate cove, enter it in mid-channel, passing north of Limestone island, and moor immediately the vessel is inside the entrance points; the tide runs from one to 3 knots abreast the entrance, and should be guarded against.

Going through the Quatsino narrows, keep well over to the north shore, pass north of Round island, round Turn point close to, and guarding

* See Views on Chart No. 582.

against tide, steer up the narrows in mid-channel; these narrows ought not to be attempted except at slack water or with a favourable tide, unless in a full-powered steamer. The best anchorage north of the narrows is Coal harbour, and if wishing to go there, a north-west course for 2 miles from the narrows will lead to its entrance, and a vessel may anchor near the centre in from 12 to 14 fathoms. In navigating the West arm keep well over to the south shore, when in the vicinity of the Pot rock and Stragging islands.

Entering Quatsino sound from the westward, keep an offing of about 2 miles, till Entrance island bears N.E. or N.E. by N., when steer to pass about 2 cables east of it, but not further off. When abreast it haul to the northward, bringing Pinnacle islet in line with the east side of Low islets, bearing N.N.W. $\frac{3}{4}$ W., and steer up with that mark on till Bedwell islets come well open north of Bold bluff, bearing N.E., when enter Forward inlet, or proceed further up the sound, as before directed.

If, when coming from the southward, Pinnacle and Low islets can be well made out, a vessel by keeping the former in line with the east part of the latter, bearing N.N.W. $\frac{3}{4}$ W., will pass 3 cables west of the Danger rocks; but as a rule it would be more prudent to go east of them.

If the weather be so thick that the marks for clearing the Danger rocks cannot well be made out, a vessel, if able to distinguish Entrance island, may enter the sound by steering for it on a N. by E. or north-easterly bearing; pass close to its east side, and haul to the northward when abreast it; by keeping half a mile on that course, she will be well clear north-west of the Danger rocks, and may proceed anywhere up the sound. On a clear night in fine weather a vessel may also enter in the above manner.

There is room, with a steady breeze, for a smart working vessel to beat into the sound to the southward and eastward of Danger rocks, though without previous knowledge of the place it would be rather hazardous to attempt it. If obliged to do so, when standing to the northward towards the Danger rocks, tack when Bold bluff comes in line with the centre of the northernmost (wooded) Surf island, bearing N.N.E. $\frac{1}{2}$ E.; and in standing to the south shore, tack when Bold bluff comes in line with the south-east extreme of the Surf islands bearing N. $\frac{3}{4}$ E. or N. by E. When the south side of Robson island comes open north of Entrance mount point, N.W. by W. $\frac{1}{2}$ W., she will be eastward of the Danger rocks, and may stand further to the northward.*

Beating between Surf islands and Danger rocks, tack at about 3 cables of the former; and in standing towards the latter, keep Robson

* See Views on Chart No. 582.

island open as before directed, till Bedwell islets come open north of Bold bluff, N.E. ; if going to North harbour, when inside Forward inlet, guard against the New bank.

The COAST of Vancouver island from Quatsino sound to Cape Scott, the north-west extreme of the island, runs in a general W.N.W. direction ; it is generally rocky and iron-bound, indented by several bays, mostly small, and from the projecting points some rocks extend in parts nearly a mile off shore. At a distance of 2 miles off are from 20 to 30 fathoms, sand and rock, deepening to 100 fathoms at 10 to 11 miles off shore ; to the southward of the Scott islands the 100-fathoms line does not appear to extend more than 6 miles from them.

In navigating between Cape Scott and Quatsino sound, do not approach the shore nearer than 2 miles.

Ragged point, 3 miles from the north entrance point of Quatsino sound, is a rocky rugged point of moderate height, with 12 fathoms at half a mile outside it. Open bay, which lies just inside it, affords landing for boats in fine weather on its east side.

The coast between Open bay and the entrance to Quatsino sound is high and cliffy ; some rocks extend nearly a mile off it.

Top-knot point, 5 miles north-west of Ragged point, is low, with a summit 300 feet high, shaped like a top-knot, just within it ; some rocks extend half a mile to the southward from it.

Raft cove, 8 miles from Ragged point, is an open bight about a mile in extent, and affords no shelter whatever.

Cape Palmerston, 14 miles north-west of Ragged point, is a bold rocky point rising to a summit 1,412 feet high ; some rocks extend half a mile from it.

SAN JOSEF BAY, the entrance to which is 14 miles north-west from Ragged point and 8 miles south-east of Cape Scott, is an extensive open bay, 3 miles deep in a north-easterly direction ; the breadth at the entrance is nearly 2 miles, narrowing gradually towards the head. Its shores are high, and off the south side are several off-lying rocks ; the soundings vary from 11 to 4 fathoms, but the bay affords no shelter, except with northerly winds, and should only be used as a stopping place in fine weather ; generally a heavy sea sets into it, and a vessel caught there with a south-westerly gale would inevitably go on shore. At the south side of the head is a fresh-water stream of considerable size, which boats can enter at high water, and find shelter within.

Intending to anchor in the bay, bring the entrance to bear N.E., and steer for it, anchoring in 7 or 9 fathoms near the middle, with the entrance points bearing South and West.

SEA OTTER COVE, just west of San Josef bay, is about a mile long in a northerly direction, and from 2 to 3 cables wide. There are 5 fathoms in the entrance, and from 1 to 3 fathoms inside it, also several rocks; the shelter within is very indifferent, and the place only fit for a coaster. Off its south-east entrance point, and separating the cove from San Josef bay, are some small islets extending nearly a mile off shore; they are bare and yellow-topped, about 40 feet high, and conspicuous from the north-west.

CAPE RUSSELL, 16 miles from Ragged point and immediately westward of Sea Otter cove, is a remarkable headland 810 feet high, and the outer part of a peninsula formed by Sea Otter cove and a small bay north-west of it; some rocks, which break very heavily, extend nearly a mile south of the cape.

From Cape Russell to Cape Scott the coast, from 500 to 600 feet high, trends in a north-westerly direction and is indented by three open bays, which are nearly a mile deep but afford no shelter whatever.

TABLE OF POSITIONS.*

Place.	Particular Spot.	Latitude, North.			Longitude, West.		
		°	'	"	°	'	"
Cape Flattery, Washington territory.	Lighthouse on Tatouch island.	48	23	10	124	45	10
Neeah bay, Washington territory.	Observation point, Wyadda island.	48	22	30	124	36	15
New Dungeness lighthouse, Washington territory.	North end of spit -	48	10	59	123	6	07
Blunt or Smith island lighthouse.	Highest part of island -	48	19	00	122	51	30
Admiralty inlet lighthouse, entrance of inlet.	Admiralty head, Whidbey island.	48	09	22	122	39	30
Port San Juan, Vancouver island.	Pinnacle rock, north side of bay.	48	33	30	124	27	37
Sooke inlet, Vancouver island	Secretary island -	48	19	35	123	42	40
Race island lighthouse -	Great Race rock -	48	17	45	123	32	15
Esquimalt harbour, Vancouver island.	Duntze head -	48	25	49	123	26	45
Victoria harbour, Vancouver island.	Laurel point -	48	25	22	123	23	02
Nanaimo harbour, Vancouver island.	Dr. Benson's house -	49	10	15	123	56	36
Semiahmoo bay, British Columbia.	Parallel station -	49	00	00	122	45	30
Point Roberts, British Columbia.	Parallel station, west side	49	00	00	123	05	26
Fraser river entrance, British Columbia.	Garry point -	49	07	04	123	12	01
Fraser river, New Westminster, British Columbia.	Military barracks -	49	13	01	122	54	26
Burrard inlet, British Columbia.	English bay, Government reserve.	49	16	18	123	12	00
Howe sound, British Columbia	Plumper cove -	49	24	39	123	29	20
Nanoose harbour, Vancouver island.	Entrance rock -	49	15	43	124	08	06
Baynes sound, Henry bay -	Beak point -	49	36	29	124	51	18
Quathiasky cove, Valdes island.	South point of island -	50	02	42	125	14	38
Knox bay, Thurlow island -	Stream at head of bay -	50	24	15	125	39	00
Port Neville, British Columbia.	Robbers nob -	50	31	09	126	04	21
Port Harvey, British Columbia	Tide pole islet -	50	33	58	126	16	40
Alert bay, Cormorant island	Yellow bluff -	50	35	02	126	57	30
Beaver harbour, Vancouver island.	Shell islet -	50	42	36	127	25	07
Port Alexander, Goletas channel.	Islet in centre of the port	50	50	49	127	39	57
Bull harbour, Hope island -	North point, Indian island	50	54	47	127	56	03
Cape Scott, Vancouver island	Summit of cape -	50	46	41	128	26	45

* These longitudes have been determined by meridian distances measured from Duntze head, Esquimalt harbour, the longitude of which has been assumed to be 123° 26' 45" west from Greenwich.

Place.	Particular Spot.	Latitude, North.			Longitude, West.		
		°	'	"	°	'	"
Triangle island, Scott islands	West point - - -	50	51	53	129	06	32
Quatsino sound, Vancouver island.	Observatory rock, North harbour.	50	29	25	128	03	39
" " "	Observatory islet, Koprino harbour.	50	30	00	127	52	16
" " "	Kitten islet, Hecate cove -	50	32	26	127	36	18
Cape Cook or Woody point, Vancouver island.	Solander island - -	50	06	31	127	57	20
Naspartii inlet, Vancouver island	Head beach - - -	50	11	21	127	37	58
Kyuquot sound - -	Shingle point, at entrance of Narrowgut creek.	49	59	55	127	09	30
Esperanza inlet - -	Observatory rock, Queens cove.	49	52	45	126	59	55
Nuchatlitz inlet - -	Port Langford, Colwood islet.	49	47	20	126	57	05
Nootka sound - -	Friendly cove - - -	49	35	31	126	37	32
Estevan point, Vancouver island.	South extreme - - -	49	22	07	126	32	32
Hesquiat harbour, Vancouver island.	Boat cove - - -	49	27	31	126	25	27
Refuge cove, Vancouver island.	Village on west side -	49	20	50	126	16	40
Clayoquot sound - -	Observatory island, Hecate bay.	49	15	22	125	56	17
Barclay sound - -	Observatory island, Alberni canal, Stamp harbour.	49	13	46	124	50	07
" " "	Observatory islet, Island harbour.	48	54	41	125	16	54
" " "	Cape Beale, south-east point of Barclay sound.	48	47	48	125	12	52

TABLE OF VARIATION.

The variation of the compass at the under-mentioned places was observed as follows :

Place.	Variation.		Year.
	'	"	
Entrance of Fuca strait - - -	21	55 E.	1861
Esquimalt harbour - - -	22	18	1862
Port Townshend - - -	21	30	1861
Semiahmoo bay - - -	22	00	1861
Nanaimo harbour - - -	22	57	1862
Fraser river, New Westminster - - -	22	40	1862
Beak point, Henry bay - - -	22	18	1860
Robbers nob, Port Neville - - -	22	14	1860
Beaver harbour, Vancouver island - - -	24	22	1862
Quatsino sound, " " - - -	23	42	1862
Naspartii inlet, " " - - -	22	44	1862
Kyuquot sound, " " - - -	23	40	1862
Nootka sound, " " - - -	23	47	1860
Barclay sound, " " - - -	23	34	1861
Clayoquot sound, " " - - -	23	00	1861

I N D E X.

	Page		Page
Acland islands - - -	58	Bajo point - - -	221
Active cove - - -	76	— reef - - -	216
— pass - - -	60	— —, inner - - -	221
— point - - -	56	Baker passage - - -	145
Admiral island - - -	57	Bamfield creek - - -	185
Admiralty head - - -	5, 14	Balaklava island - - -	177
— inlet - - -	14	Ballinac channel - - -	121
Adze head - - -	15	— islands - - -	121
Agamemnon channel - - -	139	Barclay sound - - -	184
Alarm rock - - -	55	Bare islands - - -	131, 138, 205
Alberni inlet - - -	188	— islet - - -	39, 45, 143, 245
Albert head - - -	20	— point - - -	53
Alden bank - - -	98	Barfleur passage - - -	134
— point - - -	32	Barrier islands - - -	229
Alert bay - - -	168	Barter cove - - -	234
Alexander point - - -	141	Bartlett island - - -	205
— port - - -	173	Barnes island - - -	78, 98
Allan island - - -	94	Base flat - - -	124
Alpha islet - - -	28	— point - - -	212
— passage - - -	201	Battle bay - - -	236
Amphitrite point - - -	202	Bauza cove - - -	166
Anchorage island - - -	240	Bawden bay - - -	212
Angelos point - - -	11	Baynes channel - - -	28
— port - - -	11	— mount - - -	57
Annette creek - - -	60	— sound - - -	123
Anvil island - - -	106, 133	Beacon hill - - -	25
— peak - - -	109, 133	— rock - - -	115
Arachne reef - - -	48	Beak point - - -	125
Arbutus island - - -	82	Beale cape - - -	185
— islet - - -	48	Bear river - - -	208
— point - - -	90	Beaufort range - - -	128
Arnold rock - - -	225	Beaver cove - - -	167
Arran rapids - - -	153	— harbour - - -	169, 171
Arrowsmith mount - - -	123	— point - - -	47
Ashe head - - -	22	— rock - - -	159
Atkins cove - - -	248	Becher bay - - -	17
— reef - - -	63	Bedford islands - - -	17
Atkinson point - - -	108, 132	— valley - - -	127
Augusta port - - -	127	Bedwell bay - - -	112
		— harbour - - -	37

	Page		Page
Bedwell islets	245	Boundary bay	99
— sound	208	Bowen island	109, 132
Beecher mount	127	Bowyer island	133
Beechey head	17	Boxer point	173
Bee islets	148	Boyle island	177
Belle chain	36	Breton islets	150
— rock	95	Bridge river	105
Bellingham bay	91	Bright island	61
— channel	97	— islet	178
Belmont point	223	Brockton island	247
Bentinck island	19	— point	110
Berry point	112	Broken channel	203
Bight cone	216	— group	193
— cove	248	— islands	163
Bill of Orcas	77, 87	— point	85
Birch bay	99	Brooks bay	241
Bird cove	151	Brotchy ledge	24
— islet	46	Brothers islands	24
— islets	196	Broughton strait	166, 169
— reef	53	Browning channel	173
— rock	85, 94	— creek	245
Birds eye cove	52	— harbour	34
Birthday channel	227	— passage	209
Blackberry islets	219	— rock	164
Black islets	82	Brown island	73, 85, 148
— patch	199	— point	244
— rock	66, 95, 143, 197, 225	Buddo harbour	12
Blakely island	81, 95	Bull harbour	175
Bligh island	218	— passage	138
Blind bay	89, 141	— rock	194, 248
— creek	146	Bullock bluff	146
— entrance	231	Bunsby islands	235
— reef	224	Burdwood bay	151
Blinkinsop bay	162	— point	216
Blunden island	34, 204	Burgess islet	204
— point	119	Burgoyne bay	52
Blunt or Smith island	91	Burial islet	52
Boat basin	214	Burnaby shoal	110
— channel	107	Burnt hill	245
— cove	245	Burrard inlet	108
— harbour	165	Burrows bay	93
— river	243	Burrows	94
Boatswain bank	49	Bute inlet	152
Boca del Inferno	217		
Bold bluff	52, 245	Cactus island	40
Bonilla point	1, 183	Cadboro bay	26
Boot cove	35	— point	28
Boughey bay	164	Callam bay	10
Boulder bank	149	Call creek	164
— High	128	Calm channel	152
— point	52, 146, 162	— creek	206

	Page		Page
Calver cape	20	Chatham islands	27
Campbell river	157	— point	159
Camp bay	37	Chemainos bay	54
— cove	89	Cherry point	49
— island	149	Chief rock	235
— point	161	Christie passage	173
Canceo island	80	Christ church	19
— islet	66	Church cape	17
— reef	211	Clallam point	13
— rocks	47	Clalum village	12
Capstan island	196	Clam bay	67
Captain island	141	Clan-ninick harbour	234
— passage	59	Clara islet	236
Careen creek	80	Clark island	78, 98
Carolina channel	201	Classet or Flattery cape	1, 6
Caroline reef	27	Clayoquot sound	203
Carrington bay	149	Clements reef	77
Cascade bay	90	Clerke reefs	239
Castle island	93	Cliff island	85
— islet	198	Clover point	25
Castles point	178	Coal	24, 115, 183
Catala island	225	— harbour	110, 251
Cat-face mountains	206	— island	46
Cattle islands	170	— peninsula	110
— point	71	— point	49
Caution point	74	Coaster channel	195
Cecil rock	49, 58	Cockburn cape	141
Celia reef	46	Coffin islet	53, 247
Centre island	133, 174, 226	— point	248
— islet	149	Cole bay	50
— reef	39, 68, 201	Collingwood channel	134
— rock	28, 145	Columbia river	104
Chads island	47	Colville cape	93
Chain islands	59, 193	— island	93
— islets	27	Colwood islet	223
— islet, Great	27	— farm	22
Chamis bay	233	Commerell cape	172
Chancellor channel	161	Conconi reef	36
Channel islet	201	Cone island	212
— islets	58, 140	— islands	96
— point	27	Constance bank	29
— reef	192, 227	— cove	22
— reefs	241	Constitution-mount	86
— rock	162, 196, 198	Conuma peak	216
— rocks	186, 232	Cook cape or Woody point	239
Charles island	63, 72, 140	Cooper inlet	15
— point	38	— reef	48
— rocks	60	Copper, or Tza-artoos island	187
Charlie islets	170	Cordova channel	44
Chat-channel point	230	Cormorant bay	32
Chatham channel	164	— island	168

	Page		Page
Cormorant rock	171	Deer islands	186
Cortes island	147	Denman island	123
Cottam reef	121	Dennis rock	94
Cotton point	134	Departure bay	115
Courtenay river	127	Derby, or New Langley	108
Cowitchin district	43	Deserted bay	142
— gap	103	— creek	219
— head	33	Desolation sound	146
— harbour	50	Destruction island	8
Cowlitz bay	41	Diamond point	89
Cox island	179	Diana island	186
— point	203	Dick mount	138
Cracroft island	165	Dickenson point	169
Crane island	85	Dillon point	171
— islets	177	— rock	172
Crescent bay	10	Dinner island	73
— point	55	— islet	50
Crispin rock	35	— point	36
Crown island	82	Discovery island	27
Current passage	161	— passage	155, 159
Cuttle group	236	— port	13
Cypress bay	206	Disney point	41
— cone	84	Dixie cove	231
— island	95	Dockyard island	246
— reef	96	Dodd narrows	68
Dædalus passage	171	Dodger cove	192
Dallas mount	40	Donegal head	169
Danger reef	55	Double island	200, 209, 226
— rock	42, 192, 222	— islands	85, 88
— rocks, North and South	244	— islets	144
— shoal	39	Douglas channel	75
Darcy island	31	— mount	33
Dark cove	142	Downes point	129
Dark island	209	Doyle island	176
David channel	199	Drayton harbour	100
Davidson rock	93	Drew harbour	150
Davis bay	93	— rock	37
Dayman island	57	Duncan bay	157
Decatur island	81, 83	— island	173
Deception channel	207	— rock	7
— pass	94, 209	Dungeness, False, or Port Angelos	11
De Courey islands	69	—, New	12
Deep bay	125	—, New bay	12
— cove	50	Duntze point	21
— inlet	231	— rock	7
— pass	206	Duval point	172
— water bay	158	Dyke point	21
Deer creek	210	E-cha-chets village	204
— harbour	87	Eagle point	93
— island	170	Earl ledge	161

	Page		Page
East cove - - - -	247	False Dungeness - - -	11
— entrance reef - - -	230	— narrows - - - -	69
— passage - - - -	247	— rock - - - -	55
— point - - - -	60, 76, 101	Fane island - - - -	36
— rock - - - -	237	Fanny bay - - - -	125
— sound - - - -	89	— reef - - - -	161
Eastern channel - - -	184, 191	Fauntleroy point - - -	83
Easy creek - - - -	234	Fawn islet - - - -	87
Eden point - - - -	160	Fearney point - - - -	140
Ediz hook - - - -	11	Ferrer point - - - -	221
Eel reef - - - -	167	Fidalgo island - - - -	94
Efingham inlet - - -	196	Fiddle reef - - - -	27
Egg rocks - - - -	137	Finlayson arm - - - -	50
Elbow islet - - - -	195	— — — — mount - - - -	40
— rocks - - - -	195	First narrows - - - -	110, 190
Eleanor point - - - -	58	Fisgard island - - - -	21
Eliza dome - - - -	229	— — — — lighthouse - - - -	20
— port - - - -	226	Fishing bay - - - -	90
Elk bay - - - -	158	Fitz island - - - -	222
Ellen bay - - - -	60	Five fathom shoal - - -	28
Elwha river - - - -	11	— finger island - - - -	116
Emily rock - - - -	26	Flat island - - - -	131, 137
English bay - - - -	109	— point - - - -	80
Enterprize reef - - -	36	Flattery or Classet cape - - -	6
— — — — channel - - - -	25	— — — — rocks - - - -	7
Entrance anchorage - - -	186	Flattop island - - - -	75
— bank - - - -	156	— islands - - - -	70, 112
— island - - - -	113, 192, 244	— islets - - - -	209
— mountain - - - -	244	— mountain - - - -	244
— mount point - - - -	244	— rock - - - -	75
— point - - - -	52	Flores island - - - -	210
— reef - - - -	225	Flower islet - - - -	226
— rock - - - -	119	Fog rock - - - -	187
— shoal - - - -	82	Fonté bank - - - -	30
Erie mount - - - -	71	Forbes island - - - -	200
Escalante point - - -	216	Fortune channel - - - -	208
Escape reef - - - -	54, 165	Forward bay - - - -	165
Esperanza inlet - - -	224	— inlet - - - -	244
Espinoza arm - - - -	227	Forwood channel - - - -	113
Esquimalt harbour - - -	21	Foster point - - - -	88
Estevan point - - - -	215	Foul bay - - - -	25
Evans bay - - - -	151	— islets - - - -	247
Ewing island - - - -	77	— point - - - -	25
Fair harbour - - - -	232	Francis point - - - -	138
Fairfax point - - - -	48	Fraser river - - - -	104
Fairway channel - - -	113	Frazer island - - - -	17
— island - - - -	227	Frederick point - - - -	151
False bay - - - -	82, 137, 204	Freshwater bay - - - -	11
— channel - - - -	227	Friendly cove - - - -	216
— creek - - - -	109	Friday harbour - - - -	73
		Frost island - - - -	82

	Page		Page
Fulford harbour	57	Grassy point	126
—— reef	28	Gravel spit	82
Gabriola island	70, 112, 114	Grave point	52
—— pass	70	Graves port	136
—— reefs	112	Great bank	198
—— rocks	70	—— Chain islet	27
Galiano island	63, 106, 173, 177	—— Race island	17
Galley rock	198	Green bank	90
Gallows point	114	—— cove	189
Gambier island	136	—— head	236
Ganges harbour	58	—— islet	167
Gap mountain	243	—— point	38
Garden bay	140	Grey point	103, 109, 110
Gardner mount	109	—— rock	120, 177
Garry point	107	Grief point	142
Geoffrey mount	122, 127	Griffin bay	72
Georgia, strait of	101	Grouse island	156
——, north side	143	Guaquina or Muchalat arm	219
Georgina point	62	Guemes channel	95
Gerald island	120	—— island	95
Gerrans bay	140	Guide islets	148
Gibraltar island	195	Gunner harbour	239
Gillies bay	131	Haddington island	168
Glenthorne creek	60	Haida point	88
Glimpse reefs	24	Half-tide rock	72, 82, 206
Gold river	219	Halibut channel	234
Goletas channel	172	Hall island	65
Gonzales hill	25	Halstead point	173
—— point	26	Hammond rocks	15
Gooch island	48	Hand island	198
Goose island	71	Hankin point	88, 249
—— spit	127	—— rock	209
Gordon group	173	Hanson island	165
—— head	33	Harbour entrance	196
—— point	168	—— island	188, 226
—— river	15	—— rock	72, 88
Gore island	219	Hardwicke island	161
Gorge harbour	148	Hardy bay	171
Gossip island	37, 62	—— island	141
Governor rock	64	Harney channel	88
Gower point	135	Haro archipelago	1, 33, 86
Gowlland harbour	156	—— channel	102
—— island	156	—— strait	30
—— islet	198	Harrison river	105
—— rocks	203	Harry point	48
Granite island	236	Harvey port	163
—— point	158	Harwood island	143
Grappler creek	186	Hat island	238
—— reef	56	Hatch point	49
Grass point	251	Havannah channel	163

	Page		Page
Hawkins island	60	Hutt island	136
Hay point	37	Hyacinthe bay	150
Haycock islets	180	Idol islet	56
Haystacks	237	Image island	199
Head bay	220	Indian cove	80
Hecate bay	206	—— island	67, 175, 210
—— channel	226	—— point	88
—— cove	248	Inner channel	116
—— passage	28, 192, 206	Inskip rocks or islands	21
—— rock	179	Isabella point	57
Helby island	187	Island cove	210
Helen point	37, 61	—— harbour	194
Helmcken island	161	James bay	60
Henry bay	125	—— cape	175
—— island	40	—— island	38, 44, 95
—— point	140	—— point	50, 251
Herbert arm	212	Jemmy Jones islet	29
Heriot island	150	Jenkins island	137
Hermit islet	199	Jennis point	79
Hernando island	145	Jervis inlet	139
Hesquiat bluff	215	Jesse island	162
—— harbour	215	Johns island	38
High boulder	129	Johnstone reef	33
Highest island	231	—— strait	159, 166
High-water rock	89	Jones island	45, 74
Hill island	151, 187	Jordan river	16
Hobbs islet	205	Josling point	55
Ho Hoae island	232	Juan de Fuca strait	1
Holdsworth mount	167	Julia island	63
Hole in the wall	216	Junction passage	193
Holland point	24	—— point	146
Holloway point	247	Keats island	134
Homalko river	153	Kellett bluff	40
Home island	135	—— island	93
Hood point	133	—— ledge	93
Hope island	175, 177	Kelp bar	123
—— point	133, 136	—— bay	185
—— town of	104	—— islet	200
Hornby island	123	—— point	52
Horne lake	122	—— reefs	31
Horse-shoe bay	53	Kelsemart village	204
Höskyn inlet	150	Kendrick arm	216
Hotham sound	141	Keppel cape	49
Houston island	81	King island	186
—— passage	65	—— islets	35
Howe sound	132	Kinghorn island	147
Hudson island	55	Kitten islet	248
—— point	14	Kitty islet	25
Hulah rocks	93		
Hull island	163		
Hurtado point	144		

	Page		Page
Klaholoh or Seal rock	10	Lights, Esquimalt harbour	20
Klaskino inlet	240	——, Fisgard island	20
Klaskish inlet	239	——, Flattery cape	7
Knapp island	46	——, New Dungeness	12
Knight inlet	163, 164	——, Race islands	18
Knox bay	160	——, Smith or Blunt island	92
Koikla point	9	Lilloet lakes	142
Kok-shittle arm	233	Limestone island	158, 247
Komox bluff	129	—— point	188
—— district	121	Little group	45
Koprino harbour	246	Log point	246
Koskeemo bay	247	Lone cone	207, 236
Kuhushan point	130	Long bay	203
Kultus creek	248	—— harbour	59
Kuper island	55	—— island	53, 79
Kyuquot channel	229	Look-out island	201, 235
—— hill	230	Lopez harbour	85
—— sound	229	—— island	79
Lambert channel	128	—— sound	81
Langford port	223	Lord island	222
Langley	104	Louier creek	222
Lanz island	179	Louisa rock	58
Lasqueti island	137	Low island	45, 86
Latona passage	135	—— islands	245
Laura point	61	—— peninsula	203
Lawn point	242	—— point	73
Lawrence islets	205	—— rock	225
—— point	87, 97	Lummi channel	91
Lawson bluff	77	—— island	98
—— rock	83	Lyall harbour	35
Lazo cape	130	—— point	199
Leading bluff	188	Lyre river	10
—— cone	240	Lytton, city of	104
—— island	230	Macaulay or Sailor point	22
—— mountain	228	MacLaughlin point	22
—— peak	50, 133	Malaspina strait	138
—— point	28, 201	Malcolm island	168
Ledge point	168	Malksope inlet	236
Lee rock	27	Maple bay	52
Leech island	67	—— point	124
Lemon mount	174	Maquinna point	215
—— point	176	Marble creek	249
Lennard island	204	Mark hill	223
Lewis channel	146	—— islet	185
—— reef	27	Marrowstone point	14
Liddell islet	60	Marshall point	138, 143
—— point	58, 61	Martin island	140
Lighthouse island	113	Marvinas bay	217
—— ledge	113	Mary basin	222
Lights, Admiralty head	14	——, Saint, cape	93

	Page		Page
Mary island	140, 149	Mouatt reef	25, 42
— Todd islet	26	Muchalat or Guaquina arm	219
Massacre bay	88	Mud bank	246
Masterman islands	171	Mudge cape	131
Mathilda cove	212	— island	68
Matia island	98	Mullins island	196
Maud island	157	Mussel rock	207
Maude island	119	Mutine point	168
Maury passage	83	Mystery rock	144
Mayne bay	198		
— island	35, 103	Nahmint bay	189
Mayor channel	26	Nahwitti bar	175
McKay reef	204	Nanaimo harbour	114
McKaye harbour	79	— coal mines	115
McNeil bay	25	— district	43
— farm	25	Nanoose harbour	118
McNeill port	167	— or Notch hill	112, 118
Meares island	207	Narrowgut creek	231
Menzies bay	157	Narrow island	64, 218
Mexicana point	175	Nash bank	129
Mid rock	228	Nasparti inlet	237
Middle bank	30, 81, 114	Native point	66
— channel	71, 116, 191, 224	Navy channel	36
— reef	224	Neck point	86
Mile rock	238	Neeah bay	9
— breaker	237	Needle rock	224
Miles cone	173, 177	Nelson island	141
Mill creek	50	Nettle island	195
Milly island	163	Neville port	162
Miners bay	62	New bank	246
— channel	45	Newcastle island	115
Minx reef	35, 56	New channel	40, 176
Mist islands	165	— Dungeness	12
— rock	248	— bay	12
Mistaken island	121	— fog bell	12
Mitchell bay	169	— Langley	108
Mittlenatch island	130	— rock	148
Moffat rock	170	— Westminster	107
Moke-tas island	232	Newton mount	50
Monarch head	34	Nicholas island	174
Monday shoal	246	Nile rock	140
Montagu harbour	63	Nimpkish river	167
— channel	133	Nine-pin rock	110
Moody port	111	Nitinat lake	183
Moresby island	48	Nob islet	85
— passage	46	— point	78, 188, 241
Morse island	41	Noble islets	173
Mosquito harbour	208	Nodales canal	158
— passage	40	Nootka cone	216
Mouatt channel	27	— island	221
— point	36	— sound	215

	Page		Page
Norman point	127	Ou-Ou-kinsh inlet	235
Norris rock	50, 127	Owen island	15
North arm	111, 212	—— point	15
—— bank	206	Oyster bay	130
—— bay	42, 73	—— beds	53
—— channel	114, 211, 225	—— harbour	53
—— Danger rock	243	Ozzard-mount	201
—— fork	108		
—— harbour	245	Pachena bay	183
—— Obstruction pass	84	Palmer point	197
—— passage	86	Palmerston cape	253
—— reef	54	Panama reef	97
—— rock	58, 119	Pandora peak	15
Northumberland channel	69, 116	Parke mount	64
North-west bay	121	Parker-island	63
—— cone	221	—— reef	78
Nose peak	245	Park hill	73
Notch or Nanoose hill	112, 118	Parry bay	20
Nuchatlitz inlet	222	Partridge point	14, 92
—— reef	223	Pasley-island	134
Numukamis bay	185	Passage island	- 106, 109, 133
Nye rock	177	—— rock	85, 134
		Pass islet	220
Oak bay	26	Patey rock	49
Observatory islet	190, 206, 218, 245, 246	Patos island	76
—— point	11	Peacock channel	198
—— rocks	15	Peapod islets	97
Obstruction island	83, 212	Pearl island	41
—— passage	83	Pearse islands	168
—— passes	84	Pearson island	140
Ogder point	22	Pedder bay	20
Oheslakee village	167	Peel island	179
Olympia	14	Peile point	59
Olympian mountains	2	Pelorus point	36
O'Neal island	74	Pender harbour	140
One-fathom patch	59	—— island	36
One Tree islet	141, 174	—— islands	160
Open bay	40, 150, 204, 252	Penguin island	79
Orange point	157	Penn islands	151
Oreas bill	87	Percy anchorage	68
—— island	86	—— bay	116
—— nob	72, 87	—— ledge	247
—— sound	84	Perpendicular-bluff	220
—— sounds, East and West	- 88, 89	Perry rock	34
Orford bay	153	Phillimore point	63
Osborn bay	53	Phillip point	249
Otter bay	61	Piers island	48
—— cove	158	Pillar point	10
—— point	16, 158	Pilley shoal	246
—— range	57	Pilots	24, 115
Oucklesit harbour	188	Pine island	178

	Page		Page
Finnace channel	231	Queen Charlotte channel	193
" rock	195	" sound	169
Pinnacle islet	245	Queens cove	227
" point	236	" reach	108
Pipestem inlet	199	Quiet cove	247
Pitt river	108		
Plover point	209	Race islands	17
" reefs	205	" narrows	208
Plumper bay	158	" passage	18, 161, 168
" cove	135	" point	66, 157
" harbour	218	Rafael point	211
" island	246	Raft cove	253
" passage	28	Ragged island	55, 134, 144, 193
" reef	77	" point	252
" sound	34	Rainy bay	194
Poett nook	186	Razor point	34
Popham island	134	Read island	151
Portier pass	66	Rebecca spit	150
Portland island	46	Red island	61
" point	203	" islet	60
Portlock point	61	" point	60
Possession point	17	Red Stripe mountain	241
Positions, table of	254	Redfern island	177
Pot rocks	250	Redonda island	147, 195
Powell islets	144	Reef bluff	124
Preedy harbour	57	" island	85
Prevost harbour	38	" islet	185
" island	60	" point	47, 54, 96, 115, 147, 243
" mount	106	Refuge cove	28, 211
" passage	47	Reginald hill	58
Prideaux point	247	Reid harbour	37
Princess Louisa inlet	142	" island	67
Princess Royal reach	142	" rock	74
Prosser rock	177	Rendezvous islands	152
Protection island	13, 114, 195	Resolution cove	219
Providence cove	16	Retreat cove	63
Puffin islet	79, 98	Richard rock	199
Puget sound	14	Ring island	148
Pulteney point	169	Ripple islets	208
Puntlach river	127	" point	161
Puzzle island	198	Ritchie bay	207
Pylades channel	69	Robbers island	187
Pym island	46	" nob	162
		Robert point	207
Quadra hill	64	Roberts bank	101
Qualicum bay	122	" point	100
" river	122	" spit	100
Quamitchan river	51	" town	100
Quathiasky cove	155	Robson island	245
Quatsino narrows	249	" reef	26
" sound	242	Roche harbour	41

	Page		Page
Rock islet	96	Sansum narrows	151
Rocky bay	74	Sarah point	144
—— mountains	104	Saranac island	207
—— pass	212	Sarita valley	185
—— point	113	Satellite channel	48
Rodd point	21	—— pass	192
Roller bay	178	—— reef	115
Rolling roadstead	225	Saturna island	35, 103
Root point	164	Savary island	144
Rosario strait	91	Schooner cove	120, 203
Rose islets	67	—— passage	178
Rosedale rock	18	Scotch fir point	139, 141
Ross bay	25	Scott cape	178
Rough bay	169	—— channel	179
Round head	83	—— island	57
—— island	68, 170, 197, 201, 204, 248	—— islands	179
Rowe stream	22	Scrogg rocks	21
Royal bay, or roads	20	Sea bird islet	183
Rudder reef	120	Sea Otter cove	253
Rudlin bay	27	—— rock	205
Rugged point	230	Seal rock	10
—— group	204	—— rocks	137
Rupert arm	248	Second narrows	111, 189
—— fort	170	Secretary island	17, 56
Russell cape	253	See-chelt arm	142
—— island	57	—— peninsula	142
Saanich district	43	Semiahmoo	100
—— inlet	49	—— bay	99
—— peninsula	49	Senanus island	50
Sabine channel	138	Sentinel island	39
Sail rock	197	Separation point	50, 82
Sailor point	22	Seshart channel	195
Saint John point	129	Seymour narrows	156
—— Mary cape	93	—— point	47
Salmon bank	71	Shadwell passage	174
—— bay	161	Shag rock	197
—— river	161	Shark cove	35
Salt lagoon	22	—— pass	192
Salt Spring district	57	—— reef	80
Samuel island	35	—— reefs	205
Sand heads	106, 108	—— shoal	160, 161
Sandy island	125	Sharp point	114, 211
—— point	42, 97	Shaw island	84
San Francisco	14	Sheep islet	88, 190
San Jose islets	185	Shell islet	170
San Josef bay	253	Shelter arm	212
San Juan island	40	—— island	239
—— port	15	—— islands	201
San Mateo bay	188	—— point	130
Sangster island	137	Shepherd mount	131
		Sherringham point	116

	Page		Page
Shingle point	68, 172, 231	Southey island	119
—— spit	128	Southgate river	153
Ship bay	90	South Obstruction pass	84
—— channel	201, 205	Spanish bank	109
—— islet	186	Speaker rock	161
—— passage	189	Spencer ledge	27
—— point	124	Sphinx island	63
—— rock	240	Spieden bluff	37
Shoal bay	80	—— channel	38
—— creek	162	—— island	38
—— harbour	46	Spring passage	74
—— island	53	Sproat bay	187
—— north	53	Squally reach	50
—— islands	53	Squawmisht river	132
—— passage	135	Squirrel cove	146
—— patch	245	Stag bay	145
Shushartie bay	172	Stamp harbour	189
—— saddle	172	Staples island	202
Shute passage	45	Starlight reefs	200
—— reef	48	Steamer cove	212
Sidney channel	44	—— harbour	212
—— island	44, 45	—— passage	189
—— spit	44	Steep island	156
Sinclair island	96	—— point	86
Single islet	247	Stevens passage	137
Sisters islands	199	Stewart bay	201
—— islets	47, 98, 131	St. Mary cape	93
Skardon islands	140	Stockade bay	89
Skipjack island	79	—— point	89
Skirmish islets	237	Stopper islands	199
Skull reef	37	Storm isles	178
Slimpson reef	163	Stragglings islands	250
Slip point	10	Strait of Georgia	101
Small islet	240	Strawberry bay	96
Smith or Blunt island	91	—— island	96
Snug basin	189	Striped peak	10
—— cove	133	Strong-tide islet	28
—— creek	51	Stuart channel	52
Solander island	239	—— island	37, 152
Sombrio river	16	Stubbs island	204
Sooke bay	16	Sturgeon bank	101
—— inlet	16	Sucia harbour	77
Sophia islets	165	—— island	77
South bluff	99	Sulivan reefs	236
—— channel	107, 114	Sumass river	189
—— Danger rock	246	Sunday rock	216
—— east arm	250	Surf islands	243
—— entrance	196	Surge islets	239
—— reef	223	Shushartie bay	172
—— sand head	107	—— saddle	172
Southey point	57	Sutil channel	147

	Page		Page
Sutil mount - - -	65	Trial islands - - -	25
Swale rock - - -	195	Triangle island - - -	180
Swanson channel - - -	57	Tribune bay - - -	129
Swiss boy island - - -	193	Trincomalie channel - - -	62
Sydney inlet - - -	211	Tuam mount - - -	44
—— islets - - -	142	Tucker bay - - -	138
Table island - - -	234	Tumbo island - - -	103
—— islet - - -	198	Turnbull reef - - -	47
Tah-sish arm - - -	232	Turn island - - -	73, 186
Tah-sis canal - - -	219	—— point - - -	37, 146, 174, 239
—— narrows - - -	219	—— rock - - -	73
Tat-chu point - - -	230	Turtle-back range - - -	86
Tatnall reefs - - -	176	Twenty-foot rock - - -	242
Tatouch island - - -	7	Twin island - - -	63
Tea-kerne arm - - -	147	Twins island - - -	53
Telegraph harbour - - -	56	—— islands - - -	145, 205
Templar channel - - -	203	—— islets - - -	136
—— rocks - - -	25	Tzaartoos or Copper island - - -	187
Tent island - - -	54	Uchucklesit harbour - - -	188
Texhada island - - -	137	Ucluelet arm - - -	200
Thames shoal - - -	26	Ugly channel - - -	200
Thatcher passage - - -	83	Union bay - - -	50
Thetis cottage - - -	21	—— island - - -	231
—— cove - - -	22	Unit rock - - -	31
—— island - - -	57	Upright channel - - -	80
Thomas point - - -	170	—— cliff - - -	56
Thompson point - - -	87	—— hill - - -	80
—— river - - -	104	—— point - - -	81
Thormanby islands - - -	137, 138	Upwood point - - -	138
Thornborough channel - - -	135	Useless inlet - - -	193
Three islets - - -	146	Vargas cone - - -	203
Thunder bay - - -	141	—— island - - -	204
Thurlow island - - -	160	Valdes island - - -	68, 106, 130, 149
Tide islet - - -	148	Vancouver bay - - -	142
Tlupana arm - - -	220	Vansittart island - - -	174
Tod creek - - -	50	Variation of the compass - - -	255
Todd rock - - -	27	Vendovia island - - -	97
Tofino inlet - - -	210	Vernon bay - - -	196
Tom point - - -	48	Vesuvius bay - - -	56
Tongue point - - -	66, 145	Victoria harbour - - -	22
—— spit - - -	100	—— mount - - -	142
Top knot point - - -	253	Vigilant point - - -	156
Toquart harbour - - -	199	Village bay - - -	150
Townshend port - - -	14	—— breakers - - -	193
Trail islets - - -	136	—— island - - -	194, 234
Tranquil creek - - -	210	—— islands - - -	247
Transit point - - -	165	—— islet - - -	245
Trap bluff - - -	234	—— passage - - -	199
Tsusiah waterfall - - -	184	—— point - - -	125
Tree islet - - -	55	—— reef - - -	193
Trematon mount - - -	124, 137		

	Page		Page
Viner-point	151	White pine cove	213
Virage rock	66	— rock	42, 55, 83, 95, 133, 177
Waddington harbour	153	— rocks	50
Waken-nenish island	204	— spit	67, 125
Waldron island	41	Whitestone point	248
Walker group	177	William head	20
— hook	64	Williams island	140
— rock	64	Williamson rock	94
Wall island	78	Willes island	174
Walmouth hill	93	Willis point	50
Warn bay	208	Willow point	157
— island	210	Wilson point	14
Washington or Budds harbour	13	Winchelsea islands	120
— mount	127	Winds, Juan de Fuca strait	4
Wasp islands	85	Winter cove	35
— passages	85	— harbour	247, 250
Warren islands	164	Wise island	63
Water	24, 181	Wizard islet	187
Watts point	134	Wolf island	17
Wedge island	246	Wood islands	209
Wescott creek	40	Woody point or Cape Cook	239
West arm	249	Woolridge island	135
— coast	182	Worlcombe island	134
Western channels and islands	43	Wreck bay	202
— channel	196	Wyadda island	9, 10
— reef	192	Yale	104
— rocks	230	Yellow bank	207
— sound	88	— bluff	168
Westminster, New	107	— cliff	68
Weynton passage	167	— island	85, 124
Whale rock	21	— islet	48, 157
— rocks	72	— point	54
Whaler islands	206	Yeo island	120
Whidbey island	94	Yew point	22
Whiffin island	16	Young island	94
White beach bay	88	— point	137
— bluff	126	Yule islet	237
— cliff	80	Yuquot point	216
— head	230	Zeballos arm	227
— point	133	Zero rock	31
— horn point	99	Zuciarate channel	218
— island	134		
— islet	136, 144, 206		