

Depths in the extensive bight between Capes Ford and Londonderry, on a line joining those capes, vary from 16 to 44 fathoms, deepening westward. Between Capes Ford and Dussejour, by night or in thick weather, 16 fathoms will be a safe depth. Westward

of Cambridge Gulf the deep water approaches closer to the shore which should therefore be given a berth of at least 10 miles, there being depths of 45 and 35 fathoms 5 miles northward of Lesueur and Stewart Isles, respectively.

CHAPTER 4

CAPE LONDONDERRY TO THE APPROACHES TO KING SOUND—ALSO OFF-LYING ISLETS AND REEFS IN THE MAIN TRACK OF VESSELS BETWEEN THE AUSTRALIAN COAST AND TIMOR

4-1 **Caution.**—The coast between Cape Londonderry and King Sound and its approaches is more broken and indented than any other part of Australia of similar extent, and, although possessing many good harbors, requires considerable caution when approaching, by reason of the numerous islets, rocks, and reefs fronting it, and from the considerable strength of the tidal currents caused by so many extensive inlets. Also charts and directions, being chiefly derived from sketch surveys, are, in many places, necessarily incomplete.

4-2 **COAST** (*H. O. Chart 3419*).—From Cape Londonderry the coast which is low trends west-southwestward for a distance of about 11 miles to Cape Talbot. There are some bays between these two capes separated by low sandy points; and several bare sandy islets off the coast.

Reef.—A reef extends from positions about 4.2 miles, 034° (about 3 miles offshore), and 3.1 miles, 017° from Cape Talbot, thence it trends south-southwestward towards that cape. There are several patches of black rocks on the outer edge of the reef which dry about 10 feet.

The western end of the reef which encloses Cape Londonderry and the Stewart Isles is charted 2 to 3 miles outside the north-western end of the above-mentioned reef.

4-3 **Cape Talbot.**—Eleven miles west-southwestward of Cape Londonderry is Cape Talbot, a low sandy point covered with trees.

Owing to the low-lying sandy formation of the coast to the eastward, the cape is very difficult to distinguish until it bears about 060° , when the land to the eastward is shut in.

The land behind Cape Talbot rises slightly and is thickly wooded, the tops of the trees being about 60 feet high.

The cape is very foul for an estimated distance of about 500 yards from the shore, to the northward and westward, but boats can find a good anchorage between these ledges and the main reef to the northward.

Southward of Cape Talbot the bottom is reported to be comparatively level, and it is said that good anchorage can be found at about 1 mile from the shore, but this area has not been closely examined and has only been sounded over to a distance of about 3 miles southward of the cape.

A great deal of discolored water was seen seaward of this stretch of coast, where no bottom was obtained at 15 fathoms, but the whole area round the point was not obstructed by a reef.

A spit on which the least water found was $4\frac{1}{4}$ fathoms extends to a position 2.5 miles 316° from Cape Talbot; during the strength of the tide it is marked by muddy patches in the water. As this locality was not closely examined, it is quite possible that other shoal patches exist.

4-4 **Sir Graham Moore Islands** are two in number fronting Napier Broome Bay west-southwestward of Cape Talbot. The larger

of the two is about 7 miles long in an eastward and westward line and in breadth varies from about 600 yards to 1.5 miles. It is of conspicuous formation, its eastern end being a prominent flat-topped hill about 180 feet high and its western and central part a large level plain thickly wooded. The flat-topped hill is thickly wooded also, except on its northeastern side, in which direction a long, low, sandy point extends. A small islet lies about 200 yards offshore at about 1.5 miles west-northwestward of the low sandy point, and a reef extends to the west-northwestward from about 800 yards outside the islet. It is reported that on the southern side of the larger island is a large mud creek with anchorage in from 10 to 20 fathoms affording good shelter.

The northwestern and western sides of Southwest Sir Graham Moore Island have not been surveyed.

The southern shore of this island is described in Geranium Harbor, northern side (sec. 4-26).

The northeastern island ($13^{\circ}52' S.$, $126^{\circ}37' E.$), about 1.5 miles long in a north and south direction and 1 mile broad, rises on its northwestern side to a conspicuous flat-topped summit, 200 feet high, the shape of a cone with the apex cut off.

Scorpion Point, the southeastern extremity of the island, is at the end of a low neck of land, and is about 40 feet high. Extending off the western side of the island is a reef.

Ships visiting these island (1922) report that the natives met with were friendly.

Mast.—A mast is located near the northwestern end of Southwest Sir Graham Moore Island. Koojarra Islet lies about $6\frac{1}{2}$ miles northeastward of the position of the above mast.

4-5 Reef.—A reef extending about 1,000 yards to the northward of Northeast Sir Graham Moore Island, dries at its termination as a small sandy islet.

A patch, on which the sea breaks, apparently connected by reefs with Sir Graham Moore Islands, lies $331^{\circ} 5$ miles from the summit of the northeastern island.

According to the chart (but this locality has not been examined) the western limit of these reefs extends in a southwesterly direction from this shoal, passing to the westward of Southwest Sir Graham Moore Island, and nearly connecting with the reef westward of Mary Island (sec. 4-29).

4-6 NAPIER BROOME BAY ($14^{\circ}00' S.$, $126^{\circ}35' E.$) between Cape Talbot and the northeast extremity of the peninsula which separates it from Vansittart Bay, is about 14 miles wide at its entrance and just within these points opens out to its extreme width of about 25 miles. The average length is about 10 miles.

Between Cape Talbot and Anjo Point the bay spreads out fanlike, forming four smaller bays, separated from one another by deeply salient points projecting from the main.

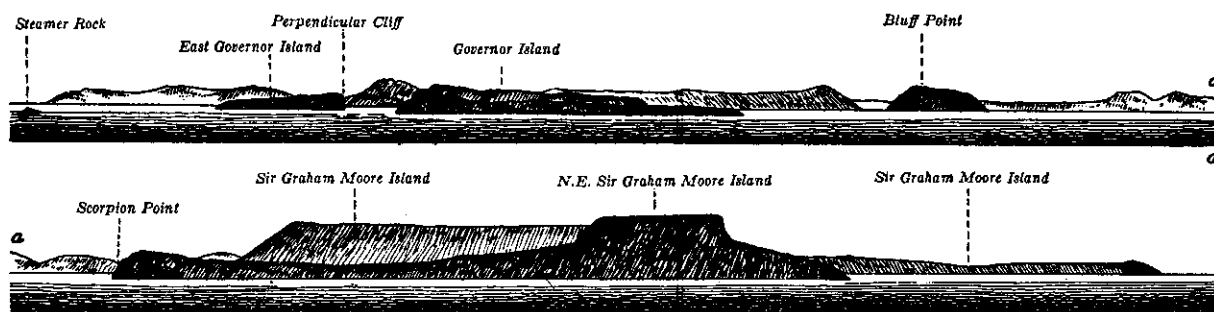
4-7 Aspect.—The first land to be seen in approaching the coast is Northeast Sir Graham Moore Island and in fairly clear weather it can be seen at a distance of 15 or 16 miles. At first, due to similarity of color, Sir Graham Moore Islands appear as one.

As the entrance is approached the Governor Islands are very conspicuous. They present a lighter appearance than Bluff Point, and the perpendicular western edge of the eastern island is noticeable.

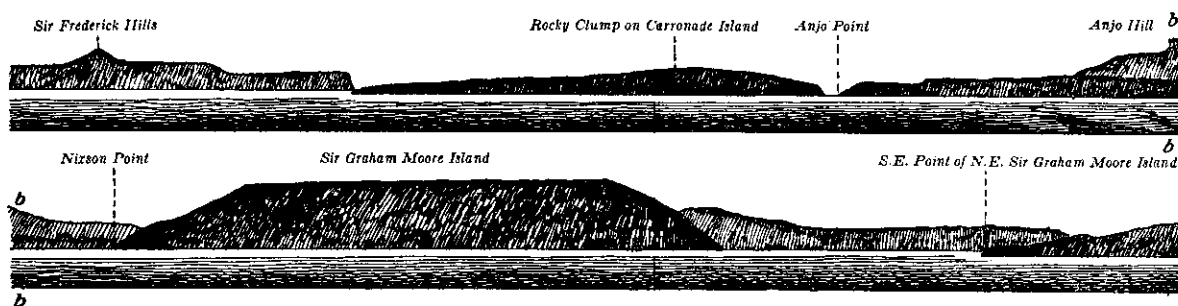
Within the head of the bay rise Sir Frederick Hills, conspicuous flat-topped hills about 600 feet high, with a conical peak near the western edge of the ridge.

NAPIER BROOME BAY

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Western edge of East Governor Island bearing 167°



Rocky Clump on Carranade Island bearing 228°

4-8 The main entrance to Napier Broome Bay is between Cape Talbot and Sir Graham Moore Islands, a distance of about 8 miles. It has not been determined what the extent of foul ground is off Sir Graham Moore Islands, but a channel has been sounded out whose center line is 347°, distant 4.5 miles and 12.8 miles from the western extremity of East Governor Island. The channel varies in width from 1.6 miles at the inner end to 2.4 miles at the outer end. A least depth of 8 fathoms will be found on the recommended line of bearing for entering.

4-9 Governor Islands are situated off Galley Point, the easternmost salient point inside the bay and about 9 miles south-southwestward of Cape Talbot. The larger or western island (13°56' S., 126°41' E.) lies 4.5 miles east-southeastward from Southwest Sir Graham Moore Island; it is about

2 miles long in a south-southwesterly and opposite direction, 1 mile wide, and about 154 feet high. The island is covered with trees, hilly and has at its northern end a narrow peninsula, Ila Point, composed of large boulders.

The northeastern and northwestern sides of this island are very foul, ledges and rocks extending about 200 yards from shore. Connected to the island by a drying reef is an islet situated off the western side.

East Governor Island, small and lower than the western island, appears from the northward as a wedged shaped mass of rock the western edge of which is perpendicular, and is the leading mark for Napier Broome Bay. The island is about 1 mile long in a north and south direction and 700 yards wide at its northern end tapering to a point to the southward.

Running out from the northeastern corner of this island is a long ledge of rocks, and a drying reef is situated between this island and Steamer Rock.

There is only 100 yards between the two Governor Islands and both are joined at low water by a rocky ledge.

In approaching these islands considerable caution should be used as dangers probably extend for some distance to the northeastward and eastward of them.

Between the Governor Islands and the reef which projects from Galley Point the channel is rocky and uneven.

Steamer Rock, about 20 feet high, is situated about 2,400 yards to the northeastward of the Governor Islands, and is so called from its resemblance at a distance to a steamer. No soundings were taken in its vicinity, but it is probably foul.

4-10 Louis Islands, three in number, lie off the northwestern shore and about 8 miles west-southwestward of the Governor Islands.

The northwesternmost island ($14^{\circ}00' S.$, $126^{\circ}32' E.$) about 1 mile from shore, is about 1,200 yards long in a east-northeast-erly and opposite direction, about 400 yards broad, and is considerably larger than the other two. The two western islands are covered entirely with trees about 40 feet high, and are fringed with mangroves.

Bird Island, the easternmost island, is sandy and covered with scrub. A large number of sea birds were found nesting there.

It appears that there is deep water to the northward of Bird Island, and between it and the center island. The area in the sector comprised between lines extending for about 1 mile eastward and one mile southward of Bird Island, has not been examined.

Reef.—The area between Carronade Island, about 5 miles to the northeastward, and Louis Islands is also unexamined, but a

large reef, which dries, is situated between Bird Island and Anjo Point to the northward.

4-11 **Coast.**—From Cape Talbot, the coast which is rocky, takes a south-south-westerly direction for a distance of 9 miles to Curran Point, a sandy point at the northern entrance to the Drysdale River, with a conspicuous patch of white sand just northward of it.

Beauty Point which is sandy is situated at the southern entrance to the Drysdale River about 2 miles southward of Curran Point.

Between Beauty Point and Galley Point, about 5 miles westward, the coast is low and wooded.

Depths.—An anchorage was found by the British naval vessel *Encounter* in 8 fathoms about 4 miles north-northwestward of the northern point of West Governor Island. Soundings obtained by this ship (1916) show a depth of 5 to 8 fathoms between the anchorage and the entrance channel, but there is less than 3 fathoms to the southward of a line joining the northern end of West Governor Island and the northern entrance point of the Drysdale River.

4-12 **Drysdale River.**—The estuary of the Drysdale River inside of Curran and Beauty Points is nearly blocked by sandbanks and small islands covered with mangroves. The river deepens to 3 fathoms increasing to 15 fathoms inside the bar formed by these banks and islands, but at about 15 miles up a natural obstruction of rocks blocks it.

Inside the southern entrance point are three rather large entrances to creeks; the westernmost creek was examined for about 2 miles but the size was found not to change and 1 fathom of water was found at the highest point reached as was found at the entrance.

Galley Point ($13^{\circ}58' S.$, $126^{\circ}43' E.$) is low and fringed with mangroves. The Governor Islands lie off this point.

A reef extends to the northward of Galley Point for a distance of about 1,500 yards, in the direction of the Governor Islands.

Coast.—There is a conspicuous red rocky bluff about 1.5 miles south-southwestward of Galley Point, from which the coast curves southward, southeastward, and then eastward. The northern entrance to Ian Bay is about 3.5 miles south-southeastward from Galley Point.

4-13 Mission Bay, so called from the Spanish Mission situated in the cove at the head of the bay, is situated between Bluff Point and the coast about 3 miles southward of Galley Point. The bay is about 4 miles long and 4.5 miles wide at its entrance in a southwesterly and northeasterly direction. Ian Bay is in its northeast corner and Mission Cove, lies at its head or southern end.

Ian Bay, the shore of which is lined with mangroves, is 2 miles in length and 2 miles wide at its entrance in a north and south direction. This bay, probably shoal, has not been examined.

The southern entrance point of Ian Bay projects for some distance beyond the general coastline, which from abreast of that point trends in a south-southwesterly direction for about 2.5 miles to Mission Point, the eastern entrance point of Mission Cove.

From Mission Cove the coast trends in a north-northwesterly direction to Tate Point, which projects for nearly 1 mile, and at about 2.5 miles west-northwestward of Tate Point is Bluff Point.

A danger area (sec. 1-19), having a radius of 1 mile, lies in Mission Bay with its center about 1 mile east-northeastward of Bluff Point.

4-14 Mission Cove ($14^{\circ}07' S.$, $126^{\circ}42' E.$) is approximately 1 mile wide at its entrance, and about 1.5 miles in length in a north and south direction. Along its eastern and western shores and for some distance from its head it is shallow. The shores are thickly covered with mangroves with the exception of the eastern and southeastern

shores which are only fairly covered with them. On the southeastern side, the Mission Station can be seen through the trees. A small fresh water creek runs past it.

Good anchorage can be obtained just inside the entrance points and about equidistant from them in 5 fathoms of water. The channel in the entrance is about 1,000 yards wide between the 3-fathom lines on either side.

4-15 Bluff Point ($14^{\circ}04' S.$, $126^{\circ}39' E.$), situated about 7 miles south-southwestward of Galley Point, is high and rocky and is backed by a hill about 217 feet high, which slopes down towards the southward, until abreast of Mission Cove when it is low and covered with scrub.

4-16 Deep Bay is 7 miles wide at its entrance between Bluff and Guy Points, opening out to a distance of 9 miles in an easterly and westerly direction within those points, and has an average length of about 5 miles.

This bay has not been examined, but it appears to shoal rapidly from the entrance, the deeper water being on the eastern side.

From Bluff Point the eastern shore, composed of low hills, covered with coarse grass and small scrub, trends in a southerly direction for about 8 miles to the eastern entrance point of the King Edward River, from which point King Harman Point, at the western entrance, is about 3 miles distant in a northwesterly direction.

In 1950 a vessel entering King Edward River carried a depth of 8 fathoms for a distance of 6 miles south-southwestward of Bluff Point; proceeding one mile inshore anchorage was found in 7 fathoms, hard mud. Further inshore, sand banks extend across the estuary.

There is a bay between King Harman Point and Guy Point, the width of which is about 3.5 miles and the length 3 miles. The shore along the bay is composed of low sand hills, scrub-covered, and terminating in Guy Point, which is low and wooded.

4-17 Pim Hill, at the head of Deep Bay and about 9 miles southwestward of Bluff Point, is 660 feet high and is a conspicuous

bare hill composed of red rocks, the eastern face being steep and sloping away gently on its western side. A conspicuous wooded hill with a conical peak is situated about 5 miles westward of Pim Hill.

Guy Point ($14^{\circ}05' S.$, $126^{\circ}31' E.$), 8 miles westward of Bluff Point, is the termination of a peninsula about 3 miles long, which separates Deep Bay from West Bay. It is low and wooded.

4-18 West Bay is situated between Guy Point and a part of Anjo Peninsula north-westward from Guy Point. The bay is 2.5 miles wide and 3.5 miles in length in a north-easterly and southwesterly direction.

The eastern shore of the bay is stony, the remainder of the coast being lined with mangroves, except where interrupted by several sandy beaches and rocky ledges.

The bay appears to have about 5 fathoms of water in its center and 7 fathoms midway between the entrance points.

Coast.—The coast from West Bay trends north-northeastward to Anjo Point a distance of about 8 miles.

Anjo Point is the extremity of the great peninsula extending in a northeasterly direction for about 12 miles, and forming the western side of Napier Broome Bay.

4-19 Anjo Cove, of which Anjo Point is the eastern entrance point, and a rocky promontory forms the east side, is about 1,200 yards wide in the entrance, narrowing very considerably toward its head; it is about 1 mile in length in a northerly and southerly direction. Anjo Hill, 165 feet high, is situated on the southwestern side of the cove.

Anchorage can be obtained in the cove for a small vessel just inside the entrance, but there are two or more 3-fathom patches farther in, and the water shoals rapidly.

Tidal currents.—At the mouth of Anjo Cove both flood and ebb streams appear to run to the northward, causing a ship to be

tide bound across a fresh northeasterly wind on both tides.

4-20 Carronade Island ($13^{\circ}56' S.$, $126^{\circ}36' E.$) is a small island situated about 1.5 miles east-northeastward of Anjo Point. It is sandy and covered with small trees the height of which are about 40 feet. On the eastern side there is situated a conspicuous clump of rocks.

Shoal.—There is a small drying reef lying eastward of Carronade Island and a 2-fathom shoal about 800 yards eastward. A berth of nearly 1 mile should be given the eastern side of the island as it has not been examined.

Anchorage.—Anchorage was found nearly equidistant from the Governor Islands, Louis Islands, Bluff Point, and Carronade Island in from 8 to 9 fathoms, mud bottom; also 4 miles north-northwestward of the northern point of West Governor Island, with the northern entrance point of the Drysdale River bearing 117° , distant 8 miles. See also Mission Cove in section 4-14.

4-21 Mackenzie Anchorage, southward of the Louis Islands, affords a well-sheltered anchorage in from 5 to 10 fathoms, mud bottom. The tidal currents in this anchorage are reported to be weaker than in any other part of Napier Broome Bay examined.

Pearl Shoal, with $11\frac{1}{4}$ fathoms least water, lies in the southern part of Mackenzie Anchorage and 065° , distant 2.7 miles, from Guy Point.

Water.—Fresh water can be found in a small creek 3 miles northward of the northern entrance to the Drysdale River; also from the creek near the Mission Station in Mission Cove.

Tidal currents.—The tidal currents are said to set strongly in an east-northeasterly and west-southwesterly direction in the entrance to Napier Broome Bay, until nearly

abreast of Northeast Sir Graham Moore Island. In the bay the tidal currents are weak.

Directions.—Approaching Napier Broome Bay from the eastward give Cape Talbot a good berth until the summit of Northeast Sir Graham Moore Island bears 190° , then bring it ahead on that bearing. Make good this course of 190° until the extreme western edge (which is perpendicular) of East Governor Island bears 167° , then steer for it until Anjo Point and the northern extremity of Carronade Island are in range bearing 230° , when:

4-22 If proceeding to Mission Cove, steer with Anjo Point and the northern extremity of Carronade Island in line until the summit of Northeast Sir Graham Moore Island is abeam, then pass about midway between Carronade and Governor Islands on a 180° course until the right edge of the long sandy beach at the head of Mission Bay, just eastward of Mission Point, comes into range with the easternmost small hill to the southward bearing 147° , then steer on that line. When Mission Cove can be seen, steer for it giving Tate Point (in the western approach) a rather wide berth, as there is a ledge off it.

An approach has been sounded out to Mission Cove from which it would appear that if the above directions are followed, a least depth of $4\frac{1}{4}$ fathoms will be found. On this tract the soundings vary from a general depth of 10 to 13 fathoms when between Carronade and Governor Islands, and $4\frac{1}{4}$ to 6 fathoms in Mission Bay.

4-23 If proceeding to Mackenzie Anchorage, make good a course with Anjo Point and the northern extremity of Carronade Island in line, until the summit of Northeast Sir Graham Moore Island bears abeam, then pass about 1 mile eastward of Carronade Island making good a course of 203° , and when Bird Island (the easternmost Louis

Island) bears more than 314° , change course to the westward and anchor as convenient, being careful to avoid Pearl Shoal in the southern part of the anchorage.

By following the above directions a least depth of 9 fathoms will be found in the channel.

No warning of the vicinity of a shoal can be expected, due to the turbid nature of the water.

4-24 If proceeding into Geranium Harbor make good a course with Anjo Point and the northern extremity of Carronade Island in range, until Fly Point (the southeastern extremity of Southwest Sir Graham Moore Island) bears nearly abeam, when the course may be changed to pass between Fly Point and the northern point of Carronade Island, into the harbor.

Buoy.—A barrel buoy is moored about $3\frac{3}{4}$ miles 302° from Sharp Point. The buoy marks the northern extent of the shoals off Anjo Peninsula.

4-25 Geranium Harbor (*H. O. Chart 3419*), between Southwest Sir Graham Moore Island to the northward and Carronade Island and the northeast end of Anjo Peninsula to the southward, affords well-sheltered anchorage for a number of vessels of any size, in depths varying from 4 to 14 fathoms, mud bottom. There is a minimum width of 1 mile between the 5-fathom curves on either side, for a length of about 4 miles in an easterly and westerly direction.

4-26 Northern side of Geranium Harbor. —Nixson and Fly Points, about 1,200 yards apart, lie at the southeastern extremity of Southwest Sir Graham Moore Island, the coast between these points being cliffy and rocky. The remainder of the southern shore of the island is low lying for the most part.

From Fly Point the coast trends north-westward for about 1 mile to abreast of a low neck of land, which is only about 400 to

600 yards in width and 10 feet high. From the southern side of this neck three small islets, the Geranium Islands, extend for about 1 mile in a southwesterly direction. The two inner islets are covered with mangroves.

The outer islet is about 40 feet high, and is situated about 1.3 miles west-northwestward from Fly Point. A small rock, Canoe Rock, lies about 100 yards southward of the outer Geranium Island and dries 2 feet.

From abreast of the neck of land the coast trends westward for about 2.3 miles to a rocky headland about 30 feet high.

This headland is on the southern side of Circular Cove. The cove is open to the west-southwestward and is about 500 yards wide in the entrance; at about 600 yards from the entrance it opens out and becomes nearly circular, and about 1,000 yards in diameter. The cove was not closely examined, but it appears to carry about 2 fathoms of water, if a midchannel course is followed into it.

Between Circular Cove and Nigger Point the coast is much indented, and takes a general westerly and then nearly southerly direction, forming Womerah Bay (which has not been examined).

Nigger Point, the northern entrance point of the western entrance to Geranium Harbor, is about 1.5 miles northward of Sharp Point on Anjo Peninsula and 4.3 miles westward of Fly Point. Binghi Rocks, about 400 yards off Nigger Point, are two bare rocks 10 feet and 20 feet high.

From Nigger Point the coast takes a westerly direction for about 1.5 miles to Low Point, the southwestern extremity of the island.

4-27 Southern side of Geranium Harbor.—Elbow Point is about 1 mile north-northwestward of Anjo Point and is at the north-eastern extremity of Anjo Peninsula.

Sharp Point ($13^{\circ}56' S.$, $126^{\circ}32' E.$) is the most northerly point of the peninsula, and lies about 2 miles west-northwestward of Elbow Point, with a shallow bay between them.

Tidal currents.—In Geranium Harbor the tidal currents run at the rate of about 2 knots at springs, eastward when the tide is falling and westward when it is rising. The current runs strongest in the western entrance.

The eastern entrance to Geranium Harbor is about 1.5 miles wide between Fly Point and Carronade Islands, with depths of 16 to 20 fathoms in the center, which depths extend for about 1,000 yards on either side of midchannel.

4-28 The entrance from southward, between Carronade Island and Anjo Point is obstructed by two shoals, on which the least water obtained is $3\frac{1}{2}$ fathoms, but they have not been examined.

A ship may, however, pass through from Anjo Cove in not less than 8 fathoms by keeping the outer Geranium Island on a bearing of 358° .

In this channel the ebb current runs to the northward, but the flood is not felt.

The approach to this entrance from the southward has not been examined.

The western approaches to Geranium Harbor have not been surveyed.

Coast.—From Sharp Point, the southern point at the western entrance to Geranium Harbor, the coast takes a general west-southwesterly direction for about 8 miles to a point abreast of Mary Island, at the eastern entrance to Vansittart Bay.

4-29 Mary Island ($13^{\circ}59' S.$, $126^{\circ}23' E.$), low and about 2.5 miles long in an easterly and westerly direction is situated about 8 miles southwestward of the Sir Graham Moore Islands, and about 1.5 miles from

the shore, to which it is nearly connected by reefs.

Reef.—A reef extends for more than a mile westward from Mary Island and continues to the northeastward nearly connecting with the reef which extends from the Sir Graham Moore Islands. Inside the edge of the reef and about midway between the western extremes of Mary and Sir Graham Moore Islands, there is a bare rock, 20 feet high, and a small islet about 1 mile south-eastward of the rock.

4-30 VANSITTART BAY (*H. O. Charts 3419 and 3432*) is about 8 miles wide at the entrance between Mary Island and the point of Bougainville Peninsula (the northern point of Fresh-water Bay) immediately westward of that island. It is about 15 miles in length in a northerly and southerly direction.

The *Geranium*, in 1921, stood down the center of the bay, with Myola Bluff (at the head of the bay) bearing 172° . Even soundings of from 10 to 6 fathoms were obtained until abreast of Encounter Cove.

The western side of the bay is much indented, and the anchorages along that shore would appear to provide good shelter for vessels of suitable draft.

The eastern shore is low and rocky, with two prominent points at 5 miles and 11 miles south-southwestward from Mary Island. The bay inclosed by these points is fronted by a reef, apparently a continuation of that to the westward of Sir Graham Moore and Mary Islands, and extending to Low Island, a low islet close southward of the inner point.

4-31 Head of the bay—Anchorage.—Low Island forms the northern side of the entrance to Pauline Bay, which bay extends nearly 5 miles into the low rocky land to the eastward.

The sides of the bay are foul, but good anchorage exists for a ship of moderate draft, southward of Low Island in 4 to 5 fathoms, mud bottom.

Myola Bluff.—The southern entrance point of Pauline Bay projects to within about 2.3 miles of Low Island, and terminates in Myola Bluff, 176 feet high. The bluff is flat-topped and covered with trees, and forms a good mark for avoiding Waratah Shoal.

4-32 Jar Islet ($14^{\circ}09' S.$, $126^{\circ}14' E.$), about 180 feet high, is composed of enormous sandstone boulders of a reddish-yellow color, and so is easily distinguished when standing down Vansittart Bay. It is at the western entrance to the head of the bay, and situated about 3 miles westward of the eastern entrance point, and about 5 miles northward of Rocky Cove, which latter is in the southwestern corner of the bay.

Reef.—Foul ground extends for some distance off the western shore at the head of the bay. A reef extends from Jar Islet to Rocky Cove, which it incloses.

The channel between Low Island and the reef which extends from the western shore of the head of the bay carries a depth of 5 to 14 fathoms, except for Waratah Shoal.

The passage inside of Low Island is very foul, with a maximum depth of 6 feet.

4-33 Waratah Shoal, with a least depth of $2\frac{1}{4}$ fathoms, is 1,000 yards long in a north-northwesterly direction, and about 400 yards broad, within the 5-fathom curve. The north-northwestern end of the shoal lies about 1.3 miles eastward of the northeastern extremity of Jar Islet.

The western shore, northward of Jar Islet, is more broken and indented than the eastern side, and appears to be generally steep-to.

Encounter Cove, the southernmost indentation, is approximately 1 mile wide at the entrance and 2 miles in length (as charted). The entrance is about 1 mile west-northwest-

ward of Jar Islet. It appears that the cove can afford anchorage for vessels of moderate size, in from 5 to 7 fathoms, mud bottom, just within its entrance, the northern shore being favored; it is, however, shallow for some distance from its head, the foul ground continuing along the southern shore.

4-34 **Seafflower Bay** is about 4 miles northward of Encounter Cove. It is about 1 mile wide at its entrance and 2 miles in length.

On the southern entrance point of Seafflower Bay is a conspicuous flat-topped hill. The salient point in the middle of the harbor which divides it has thickly wooded hills upon it.

The northern entrance point is rocky. The bay has not been examined and vessels should therefore proceed with caution, but it would appear from the few soundings available that there is anchorage, in $4\frac{1}{2}$ to 8 fathoms, in the outer part of the bay, in 4 to 6 fathoms to the northward of the dividing point, and in 3 to 4 fathoms to the southward of that point.

Water.—Fresh water can be obtained on the northern side of the bay, about midway between the head of the northwestern bight and the rocky entrance point on the northern side of the bay; also on the northwestern shore of the southeastern bight, near its head. It is reported that fresh water can be obtained on Mary Island.

4-35 **Fresh-water Bay.**—Four miles northward of Seafflower Bay, and separated from it by a large peninsula covered by wooded hills, and some 3 miles in width at the extremity, is Fresh-water Bay, lying in an eastward and westward direction, which appears to be quite clear of dangers in the open, having depths of from 5 to 9 fathoms in it.

Overlooking the head of Fresh-water Bay is a conspicuous round-topped hill.

Fresh water can be obtained on the southern side of the head of the bay.

Anchorage.—There is good anchorage in 7 to 9 fathoms, mud bottom, in the center of Vansittart Bay, to which the sea breeze extends. Apparently there is sheltered anchorage in Freshwater Bay, Seafflower Bay, and Encounter Cove as suitable to the draft of vessel.

4-36 **Eclipse Islands** lie in the approach to Vansittart Bay, about 11.5 miles eastward of Cape Bougainville. The easternmost two of this group together extend northward and southward 7 miles, their greatest breadth being about 1 mile; they are separated by a small opening with a rock in it, at 3 miles from the northern extremity of the islands. Long Island, the southern island, is of a rugged aspect, and formed principally of large water-worn masses of sandstone.

Reefs, which dry in patches at low water, connect Eclipse Islands with Jones Island to the northward.

Water may be obtained near the northern end of Long Island, from a well about 1,000 yards from the beach.

4-37 **Eclipse Hill Island**, 1,000 yards westward of Long Island, is about 6 miles in circumference, and rises to a flat-topped hill, 281 feet high, which, being more elevated than the land near it, is a good mark. Eclipse Hill Island, with the reef extending northward, forms the eastern side of the western entrance into Vansittart Bay.

4-38 **Directions.**—Vessels approaching Vansittart Bay from the northward or eastward should take Troughton Passage, between Troughton and Jones Island, which has been surveyed as far in as a line joining Cape Bougainville and Jones Island. Navigation of the waters south of that line should be taken with great caution. The passage between Jones and Troughton Islands is

about 10 miles wide, but it is obstructed by Tait Bank, with 4 fathoms on it. Thence a southerly course leads westward of the reef, which extends from the Eclipse Islands, and so into any of the anchorages in the bay. Bearings of Troughton and Jones Islands will check the position of a vessel approaching and the southern extremity of Troughton Island bearing southward of 255° will lead northward of Tait Bank, which has a least depth of 4 fathoms.

The eastern channel has not been surveyed. It is apparently about 3 miles wide between the reefs which extend 8 miles eastward of Jones Island, and about the same distance northward of Sir Graham Moore Islands, and is reduced to about 1 mile between the reefs fronting Long and Mary Islands. Near the center of this narrow portion is Middle Rock, 2 feet above water. The best channel is eastward of it, in a depth of about 7 to 12 fathoms, thence proceed up the bay and anchor where most convenient, in from 6 to 9 fathoms, mud bottom.

The tidal current sets through the channel with considerable strength.

The recommended course from Geranium Harbor to Vansittart Bay is as follows: From a position 1.9 miles 295° from Sharp Point, steer 313° for a distance of about 3.3 miles, passing about 500 yards northward of the barrel buoy moored about $3\frac{3}{4}$ miles northwestward of the point. When the bare rock, 20 feet high bears 206° , change course and steer 234° for a distance of about 10 miles, then keep in the center of the passage between Long Island and Mary Island.

Least depths in this passage are believed to be about 4 fathoms, but extreme caution should be used, as the area has not been adequately surveyed.

4-39 ISLETS AND DANGERS NORTHWARD OF CAPE BOUGAINVILLE.—Jones Island ($13^{\circ}45' S.$, $126^{\circ}21' E.$, *H. O. Chart 3432*), about 600 yards in extent, lies 17.5 miles northeastward of Cape Bougainville; it is 10 feet high, sandy, and encircled by a

reef which dries to about 1.5 miles, with shallow water extending about 1 mile beyond the northwestern extremity of the dry reef.

Tait Bank, with 4 fathoms least water, lies eastward of the fairway of Troughton Passage, nearly midway between Jones and Troughton Islands, with the former bearing 087° , 5.8 miles.

4-40 Troughton Passage, the deep channel between Troughton Island and the reefs off Cape Bougainville, is 6 miles wide, and has depths of 24 to 34 fathoms in the center. Vessels taking the inshore route around Cape Bougainville should pass northward of Tait Bank, avoiding the tide-rip off the southern extremity of Troughton Island Reef.

Troughton Island, situated 9.5 miles north-northeastward from Cape Bougainville, is 1,500 yards in length, 13 feet high, and of a reddish color, without any distinguishing feature. It is composed of ironstone, covered with wiry grass, and surrounded by a coral reef which extends 1,000 yards north and northwestward, 1 mile westward and 1,500 yards to the southward.

Troughton Island Light is shown on request, from a radio mast on the southern extremity of the island. A fixed red light is shown from the top of the same mast.

Landing is fairly good on the southwestern coast in a bight of the reef.

Northeastward of the island, on the edge of the reef are two conspicuous coral boulders, one is awash and the other 4 feet high.

A **radiobeacon** is located $\frac{1}{4}$ mile southward of the summit of Troughton Island. A **radio-direction-finder** station is located about $\frac{1}{2}$ mile northward of the radiobeacon.

Tides.—High-water interval at Troughton Island is 11h. 15m.; mean range 13 feet 6 inches spring range 21 feet.

4-41 Guichen Reef, 1.5 miles north-northwestward of Troughton Island, dries from 6 to 12 feet at low-water spring tides. It is 1 mile in length, 800 yards in breadth, and separated from the reef northward of

Troughton Island by a passage 1,400 yards broad, with foul ground. No vessel should attempt to pass through.

Northward of Guichen Reef a bank of coral extends 3.3 miles. The least water over it is 3 fathoms; this spot is 351° distant 2.8 miles from the northern extremity of Troughton Island.

Bishop Rocks consist of a small group of coral heads, drying 2 feet at low water, south-southwestward of Guichen Reef, and 290°, distant 2.1 miles from the northern extremity of Troughton Island.

4-42 Otway Bank, between Troughton Island and East Holothuria Reef, is nearly round, formed of coral, and about 1 mile in diameter. The least water over it, which is near the middle of the bank, is 2 fathoms, and its position is 315°, distant 6.8 miles from the northern extremity of Troughton Island.

Branch Banks, distant 8 miles north-northeastward from Troughton Island, are two coral banks, with depths of 6 and 7 fathoms; they are about 2 miles in extent, and lie directly in the fairway of the passage northward of Troughton Island.

Van Cloon Shoal (12°37' N., 126°27' E.), with a least depth of 7 fathoms over it, lies about 67 miles north-northeastward of Troughton Island and about 19 miles north-northeastward of the shoalest part of Baldwin Bank.

4-43 HOLOTHURIA BANKS (*H. O. Chart 3432*), northward of Troughton Island, extend from 13°05' N. to 13°40' N., and 125°45' E. to 126°20' E. They are divided by Penguin Deep, with depths of 40 to 70 fathoms. The eastern end of the deeps is fronted by a bank about 9 miles in length eastward and westward with a least depth of 10 fathoms. The banks appear to be composed chiefly of dead coral covered with sponges. Sea snakes from 4 to 6 feet in length are common on Holothuria Banks.

4-44 Directions—Caution is requisite when navigating between the dangers northward of Cape Bougainville, for the waters are so turbid, and the isolated rocks found so numerous and steep-to, that it is highly probable that dangers exist yet uncharted. Vessels above 12 feet draft should proceed slowly and with caution.

No vessel should attempt to pass between East and West Holothuria Reefs. The channel northward of Troughton Island, between Otway Bank and the shoal water extending northward from Guichen Reef, is 2 miles wide, ill-defined, and therefore not recommended for vessels other than of light draft.

Vessels proceeding inshore of the Holothuria Reefs, should take Troughton Passage; patches of mud and lime stirred up from the bottom and other floating matter have sometimes the appearance of coral reefs.

4-45 Penguin Shoal (13°06' S., 125°58' E.) is a coral bank about 3 miles in length northward and southward, with a least depth of 5¼ fathoms. It is the northernmost of the detached patches in the neighborhood of Holothuria Banks. The depths are from 24 to 30 fathoms northward of it.

Baldwin Bank (12°52' S., 126°10' E.), about 13 miles northeastward of Penguin Shoal, is 6 miles in length northeast and southwest with depths or from 8½ to 20 fathoms. The least depth is located on its northwestern extremity.

Eavell Bank and Gale Bank, both with a least depth of 12 fathoms, lie about 8 and 15 miles, respectively, northward of the shoalest part of Baldwin Bank and about 60 to 70 miles northward of Troughton Island.

Warn Rock, on the northern Holothuria Bank, has a least depth of 6 fathoms, and lies 117°, 8.5 miles from the 6-fathom patch on Penguin Shoal.

4-46 Bassett-Smith Shoal (13°18' S., 125°45' E.), 18 miles southwestward of Penguin Shoal, is a round coral shoal about 1.5 miles in diameter, with a least depth of 3

fathoms, 50 fathoms close around, and about 25 fathoms at the distance of 1 mile. The sea was not seen to break on this shoal, and there was nothing in the appearance of the water to indicate danger.

Combe Rock ($13^{\circ}25' S.$, $125^{\circ}55' E.$), 12.5 miles southeastward of Bassett-Smith Shoal, is of small extent and awash at low-water springs. Except in strong winds the sea does not break on this rock when there is as much as 6 feet of water over it.

A rock, with 5 feet of water, lies 1,000 yards southwestward of Combe Rock, and the bottom is foul for a distance of 2 miles in that direction.

4-47 West Holothuria Reef.—In addition to the numerous sunken rocks on the southern Holothuria Bank, the southern edge of the bank has several dangers which uncover at low water. West Holothuria Reef, the southwesternmost of these, dries 2 feet at low-water springs and is about 2 miles in length; its center is in $13^{\circ}33' S.$, $125^{\circ}45' E.$

This reef is seldom visible, and sunken rocks extend about 1,000 yards off. As the water is turbid and the tidal currents irregular near this reef, caution is necessary when navigating near it.

A small islet about 30 feet in height was reported on West Holothuria Reef (1926).

4-48 East Holothuria Reef consists of two patches, together about 11 miles in length eastward and westward, which uncover 10 feet at low water with some rocks awash at high water on the northern and eastern edges. Its eastern extremity lies 095° , 20 miles from West Holothuria Reef.

Tidal currents.—On Holothuria Banks the currents run with a velocity of 2 to 3 knots at springs. The flood sets southwestward commencing about three-fourths of an hour before low water by the shore; the ebb sets northeastward, commencing about 1 hour before high water.

4-49 Dangers in the main track, between Holothuria Reefs and Timor, and in the approach to King Sound.—Sahul Bank (*H. O.*

Chart 3416), said to extend from the meridian of 126° to $124^{\circ} E.$, and from the parallel of $10^{\circ}43'$ to $12^{\circ} S.$, consists of banks of sand and coral rocks with depths ranging from 5 to 16 fathoms; these rise abruptly from just within the 100-fathom edge of the bank of soundings, which extends from the northern coast of Australia to within 50 or 60 miles of the coast of Timor. There are several heads of 12 fathoms, as charted, and there may be less water on some of them. The bottom near these banks is generally coarse sand and broken shells; farther off, white sand; and when clear of them, a green muddy sand. No breakers have been seen on Sahul Bank, although it was stated to be dangerous in some places. As the bank has not been surveyed, it and the neighborhood should be passed with caution.

A depth of 11 fathoms, not marked by discolored water, was reported lying northeastward of Sahul Bank, and about 120 miles south-southwestward of the eastern extremity of Timor.

Shoal.—A coral shoal, 3 miles in length and with depths of probably less than 5 fathoms, was reported (1929) to lie in $11^{\circ}38' S.$, $125^{\circ}03' E.$ In 1945 a depth of 5 fathoms was reported to lie in $11^{\circ}45' S.$, $124^{\circ}50' E.$ A 4-fathom shoal was reported (1956) to lie about 134 miles eastward of the southwestern extremity of Timor in $10^{\circ}45' S.$, $125^{\circ}42' E.$ approximately. In the same year a 14-fathom patch was reported about 30 miles eastward of the 4-fathom shoal.

4-50 Fantome Bank ($11^{\circ}38' S.$, $123^{\circ}57' E.$), westward of Sahul Bank and at the northern edge of the 100-fathom curve, has a least known depth of 4 fathoms, and within the 10-fathom curve is about 1,000 yards in length in a northwesterly and opposite direction. The chart shows a patch of 10 fathoms at 25 miles southeastward of Fantome Bank, and another at 6 miles northeastward.

Hibernia Reef, discovered in 1810, composed of coral, is 6 miles in length eastward

and westward, 1 mile in breadth, and dry at low water; near its eastern end is a sandbank which uncovers at half ebb in $12^{\circ}00' S.$, $123^{\circ}24' E.$ In 1945 a depth of 8 fathoms was reported about 24 miles northeastward of the eastern extremity of Hibernia Reef. A depth of 9 fathoms is located about 13 miles northward of the same extremity.

Ashmore Reef, about 16 miles in length eastward and westward, lies from 15 to 30 miles southwestward of Hibernia Reef; it is composed of coral and sand, with five low islets and also several sandbanks, which uncover at half ebb.

Note.—The position of the southeasternmost islet of Ashmore Reef is charted in $12^{\circ}13' S.$, $123^{\circ}08' E.$ The reef was reported in 1953 to lie about 5 miles southward.

4-51 Ashmore Islets.—These islets were taken formal possession of by Great Britain in 1878. In 1931 the islets were placed under the authority of the Commonwealth of Australia.

West Islet is about 1,200 yards long in a northward and southward direction and 700 yards broad, being from 8 to 10 feet high.

Water.—Fresh water can be obtained from a roughly constructed well near the center of the islet.

Middle Islet, 3.5 miles east-southeastward of West Islet, is composed of sand covered with coarse grass, the top of the islet being depressed. It is 400 yards in length eastward and westward, 230 yards in breadth, and 9 feet high.

East Islet, 3.5 miles eastward from Middle Islet, is also sandy and grass covered. It is 9 feet high and is nearly square, with sides 400 yards in length. A shoal was reported (1953) about 5 miles south-southeastward of East Islet.

The reef extends about 2.5 miles westward of West Islet, and 5 miles eastward of East Islet; its southern side is an unbroken ridge of coral marked by heavy breakers, but the northern edge is broken, forming four passages to the lagoons, but only the western-

most was examined. Between the second and third openings, the shallow water extends across to the southern edge of the reef, thus dividing the interior into two lagoons, both containing many detached patches of coral; they were not closely examined.

The western opening, encumbered with rocks, lies 2 miles northeastward of West Islet, and leads into a lagoon. There are several detached reefs in this lagoon, having depths of 4 to 12 feet of water over them, with from 6 to 10 fathoms between, but it would be a safe anchorage for small vessels; a good lookout from aloft, with the sun in a favorable position for seeing the discolored water, being all that is necessary to insure safety in entering.

Anchorage may be had anywhere along the northern side of the reef in 17 to 25 fathoms, about 1 mile distant.

Tides.—It is high water, full and change, at West Islet between 10h. and 11h.; rise of tide 15 feet. The flood current sets eastward and the ebb westward.

Supplies.—Turtle are plentiful in the season, and bêche de mer exists in quantities.

4-52 Cartier Islet ($12^{\circ}32' S.$, $123^{\circ}34' E.$, *H. O. Chart 3419*), formed of sand and loose coral, is 4 feet high.

The island was annexed by Great Britain in 1909 and was placed under the authority of the Commonwealth of Australia in 1931.

It is 350 yards long and 25 yards broad, the reef being 2.5 miles long in an easterly and westerly direction and 1.3 miles broad, and nearly entirely dry.

Its western extremity is in $12^{\circ}32' S.$, $123^{\circ}33' E.$, 1.2 miles within the western edge of the surrounding coral reef. This reef is said to be about 4 miles in length, eastward and westward, by 2 miles in breadth, dry in places at low water, and steep-to.

Wreck.—A conspicuous wreck lies on the reef about 1 mile southward of Cartier Islet.

(4549) AUSTRALIA—Timor Sea—Cartier Island—Wreck information.—
The legend “(conspic)” charted against the wreck in (approx.) 12°32.8 S.,
123°33.2' E. will be expunged.

(N.M. 28/66.)

(N.M. 23(219), Sydney, 1966.)

H.O. Chart 3419.

H.O. Pub. 74, 1952, page 140.

CARTIER ISLET

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(Chg 7)

No bottom at 110 fathoms of line has been obtained 1.5 miles eastward of Cartier Islet. The bottom at 10 to 15 miles northeastward of the islet is uneven and rocky, the soundings varying from 12 to 50 fathoms, but no dangers were seen from the masthead.

Wave Governor Bank, with a depth of 18 fathoms, lies about $3\frac{1}{2}$ miles southeastward of Cartier Islet, and Johnson Bank, with a depth of $7\frac{1}{2}$ fathoms, lies about 18 miles northwestward of the islet.

The rise and fall of the tide is estimated at 15 feet at springs.

Caution.—In moderate weather the sea does not break on Cartier Islet reef from 2 hours before to 2 hours after high water. As the current runs at the rate of 1 knot and is uncertain in direction, it presents a great danger to vessels, as the lead gives no warning.

Anchorage.—In southeasterly weather good anchorage may be obtained in 21 fathoms about 450 yards from the western end of the reef. Landing is possible from 2 hours before until 2 hours after high water if the wind is light.

Barracouta Shoal, with a depth of $6\frac{1}{2}$ fathoms, lies about 27 miles eastward of Cartier Islet in $12^{\circ}34'$ S., $124^{\circ}01'$ E. (approx.). A 14-fathom patch lies about $8\frac{1}{2}$ miles east-northeastward of Barracouta Shoal.

4-53 Woodbine Bank ($12^{\circ}25'$ S., $123^{\circ}27'$ E., *H. O. Chart 3416*) was reported in 1873 and in 1887. From an examination it is found to be an extensive bank of sand and coral, situated northward of Cartier Islet, with a deep channel between.

A narrow ridge, with depths of from 8 to 10 fathoms, and 3 miles long in an easterly and westerly direction, is situated on its southwestern edge; the center of this ridge

bears 336° , 8 miles from Cartier Islet.

This bank has only been partially examined, and shoaler water may exist. The 100-fathom curve surrounding Woodbine Shoal is marked by tide rips.

A bank with a depth of 12 to 19 fathoms is charted 20 miles eastward of Woodbine Bank.

4-54 Vulcan Shoal is of live coral, 3 miles long, eastward and westward, by 1 mile wide, with general depths of from 8 to 12 fathoms. The least depth, 5 fathoms, near the western end, is approximately in $12^{\circ}49'$ S., $124^{\circ}16'$ E. The shoal is steep-to, with from 50 to 90 fathoms around.

Heywood Shoal, also of live coral, is 3.8 miles long, northwestward and southeastward, by 2 miles broad, and has general depths of 9 to 15 fathoms, with the least depth, 6 fathoms, near the southeastern end ($13^{\circ}29'$ S., $124^{\circ}03'$ E.). Deep water, of from 30 to 50 fathoms, closely surrounds the bank.

4-55 Browse Islet ($14^{\circ}07'$ S., $123^{\circ}33'$ E., *H. O. Chart 3419*) of coral formation, and covered with white sand, is about 800 yards in extent; its northern end, which is 20 feet high, was, in May, 1900, observed to have some slight vegetation, but no huts were seen.

A coral reef surrounds Browse Islet, extending for distances of from 1,400 to 1,600 yards, except to the northeastward and eastward, where it is 800 yards from the islet, and is dry at low-water spring tides. To the northwestward and westward the outer edge dries from 2 to 4 feet.

(6932) **AUSTRALIA—Northwest coast—Browse Island—Light changed.**—
Browse Island Light ($14^{\circ}06.5'$ S., $123^{\circ}32.8'$ E. approx.) now shows *Gp. Fl. (2)*
6 sec. 115 ft. 13 M. The light is shown from a white steel lattice tower **105 feet**
in height.

Note.—A white hut is adjacent to the tower.

(N.M. 44/86.)

(N.M. 36 (352), Sydney, 1966.)

H.O. Chart **3419.**

H.O. Pub. 111B, No. **16600.**

H.O. Pub. 74, 1952, page **142.**

A light is shown from a white steel skeleton tower, 24 feet high, on the southern end of Browse Islet. The light is reported to be unreliable.

Echuca Shoal, with a least depth of $7\frac{1}{2}$ fathoms, is located about 24 miles east-northeastward of Browse Islet.

Landing.—The eastern side of the island appears to be easiest of access for boats, but only at high water and when easterly winds are light.

4-56 Anchorage.—An anchorage, off the reef, can not be recommended anywhere, as, to obtain depths of from 15 to 20 fathoms, a vessel would have to be within 300 yards of the reef, and the coral bottom is most uneven.

Tides and tidal currents.—It is high water, approximately, at Browse Islet at 10h. 30m.; springs rise from 13 to 19 feet. The tidal currents cause rips near the reef. The current of rising tide commences setting to the southward and finishes to the eastward; that of the falling tide sets first north-northeastward, and ends to the westward at rates of from 1 to $1\frac{1}{2}$ knots.

4-57 Seringapatam Reef ($19^{\circ}38' S.$, $122^{\circ}04' E.$, *H. O. Chart 3419*), about 7 miles in extent, is triangular in shape, inclosing a lagoon, and having on its western side a few sandbanks which appear at half ebb. The reef dries at low water, and round the edges are large boulders; it is steep to on the southern side, but no soundings were obtained either to the eastward or westward. On a calm night breakers on the reef were heard at a distance of 6 miles.

Scott Reef, discovered in 1801, comprises three separate coral shoals; the northern and southern, of considerable extent, are almost dry at low water, and have on their outer edges several dry rocks.

4-58 Sandy Islet ($14^{\circ}03' S.$, $121^{\circ}49' E.$).—On the central Scott Reef is a sandy islet, 8 feet high, 600 yards in length, and very narrow; the reef dry at low water extends 1 mile to the northwestward and southeastward, and about 1,000 yards in other directions from the islet. There is a conspicuous tower on the islet.

A reef, which dries 2 feet and from which shoals extend up to a distance of 500 yards, is located about $11\frac{1}{2}$ miles northeastward of Sandy Islet. It is about 400 yards long in a northwesterly and southeasterly direction.

A boulder, which dries 8 feet, is located about three-fourths of a mile northward of Sandy Islet and within the surrounding reef. A stranded wreck is located about one-half of a mile west-northwestward of the boulder.

4-59 Southern reef.—The northwestern extremity of the southern reef known as West Hook, lies 2 miles southwestward from Sandy Islet, whence it trends (a narrow strip of coral marked by heavy breakers) to the southward, eastward, and northeastward, in the form of a crescent. A short distance within the northeastern extremity, known as East Hook, a patch of sand dries at low water, and immediately southward of the sand there is an area of foul ground which gives the false appearance of being a narrow passage. Between a 29-foot shoal extending about 400 yards from West Hook and the reef which surrounds Sandy Islet, the water is free from danger except for shoal patches with a least depth of 25 feet, located about 2 miles south-southwestward of Sandy Islet.

4-60 Northern reef.—The southwestern elbow of the northern Scott Reef is about 4 miles northeastward of Sandy Islet. It is

(1534) **AUSTRALIA—Northwest coast—Scott Reef—Shoal nonexistent.—**
The 5 fathoms depth and the Legend "D'Artagnan Shoal (1865)" in (approx.)
13°15' S., 120°36' E. will be expunged.

(N.M. 10/66.)

(N.M. 5 (56), Sydney, 1966.)
H.O. Charts **3416, 5590, 826.**
H.O. Pub. 74, 1952, page **143.**

CAPE BOUGAINVILLE

approximately circular in shape, having a radius of 4 to 4½ miles and enclosing an extensive lagoon of apparently deep water.

The passage between the 2-foot drying reef located about 1½ miles northeastward of Sandy Islet and the northern reef is free from dangers. However, there are tide rips and eddies for a distance of about 1 mile off the southwestern side of the northern reef, where there is a narrow opening in the reef.

The passage between East Hook and the northern reef is also free from dangers.

Depths.—The soundings around Scott Reef are deep, there being no bottom with 84 fathoms of line close to the southwestern corner of the northern reef, no bottom with 124 fathoms 1,500 yards northwestward of Sandy Islet Reef, no bottom with 134 fathoms 1 mile from the southern edge of the southern reef, and no bottom with 60 fathoms 1,000 yards from the eastern edge of the southern reef.

Caution.—The sea breaks heavily on the weather side of Scott Reef, and at night the breakers may be heard at some distance; but the lee side being quite smooth, and the tidal currents strong, caution is necessary in approaching Scott Reef, for the lead gives no warning.

Tides.—It is high water, full and change, at Sandy Islet, Scott Reef, at about 9h.; rise of tide 13 feet.

4-61 D'Artagnan Shoal ($13^{\circ}16' S.$, $120^{\circ}37' E.$, *H. O. Chart 3416*), northwestward of Scott Reef was passed over in 1865 with depths of 11 fathoms, apparently shoaler places of about 5 fathoms were seen.

Corona Shoal ($12^{\circ}26' S.$, $118^{\circ}40' E.$) was reported in 1869 by the ship *Corona*; the bottom is said to have been distinctly seen, and the depth estimated at 10 fathoms but no soundings were obtained. As the assigned position was in 1875 passed over by the German naval vessel *Gazelle*, and a

sounding of 2,855 fathoms obtained about 13 miles eastward, its existence is doubtful.

4-62 Lynher Reef ($15^{\circ}26' S.$, $121^{\circ}55' E.$, *H. O. Chart 3419*) seen from the schooner *Lynher* in 1838, consists of patches of coral with not more than 2 or 3 feet of water on them. The locality having been sounded over, and a depth of 21 fathoms obtained near the assigned place of the reef, this position, pending further examination, must be considered doubtful.

It is charted about 68 miles westward of Adele Island and about 73 miles southward of the southern end of Scott Reef.

Discolored water, with 17 fathoms, sand bottom, and from 25 to 40 fathoms close around, is charted in $15^{\circ}45' S.$, $122^{\circ}05' E.$ Depths of 17 to 18 fathoms and 14 to 15 fathoms are charted, respectively, about 14 and 21 miles eastward; a depth of 17 fathoms about 18 miles east-southeastward; depths of 17 to 18 fathoms about 21 miles southeastward; a depth of 20 fathoms, which rises abruptly, with overfalls and discolored water extending about 2 miles southeastward from it, about 22 miles south-southeastward; and a depth of 18 fathoms about 20½ miles southward of the 17-fathom discolored patch just mentioned.

Discolored water having the appearance of a shallow patch is reported, in $15^{\circ}28' S.$, $121^{\circ}44' E.$, about 10 miles westward of Lynher Reef.

Tide rips.—Along the 100-fathom edge of the bank, 5 to 10 miles westward of Browse Islet and Lynher Reef, heavy tide rips are met with, which, seen in a calm, have the appearance of a continuous line of breakers.

4-63 CAPE BOUGAINVILLE ($13^{\circ}54' S.$, $126^{\circ}06' E.$, *H. O. Chart 3419*) is the northern extremity of the peninsula which separates Vansittart Bay from Admiralty Gulf. The peninsula is wooded with stunted gum trees,

stony and arid, and formed in numbers of ridges, each surmounted by a flat ironstone cap from 10 to 30 feet thick, giving the appearance of a general table top, 200 to 300 feet high.

The land is visible from a distance of about 20 miles in clear weather, but owing to bush fires, is often not seen beyond 5 or 6 miles.

The cape is foul to the distance of 2.3 miles.

4-64 Red Island, 116 feet high, lies 1 mile eastward from Cape Bougainville, and connected by a reef that dries at low water. Its red cliffs show out distinctly against the land when the sun is in a favorable position.

Eyre Reef, a coral patch 1,400 yards in length, dry at low water, lies 1.8 miles from Cape Bougainville, on the northeastern edge of the 3-fathom bank extending from the cape.

Bougainville Rock, with 4 feet of water, lies 323° from the cape, on the northwestern extremity of the reef which extends 2 miles from it. This danger was not seen to break.

A patch of 4 fathoms lies 1.8 miles, 270° , from it.

Hat Point lies west-southwestward, 5 miles from Cape Bougainville, with a shallow bay between; the bottom in the offing between these points is very uneven, and tide rips are numerous.

Hat Point, named from an isolated hill, 189 feet high, shaped like a Tyrolese hat, upon the extremity of the promontory, is conspicuous from northeastward and south-eastward. It is covered with scrub, and is the only noticeable mark in the vicinity. Landing may be effected westward of the point.

Parry Harbor, between Hat and Gibson Points, 4 miles apart, affords shelter to vessels of 12 feet draft, or less, in all weathers. There is good anchorage in 5 to 7 fathoms, protected from every direction except west. A peninsula divides Parry Harbor into two arms.

Natives.—There is a native encampment at the head of the northeastern arm of the harbor.

4-65 Hecla Island, 75 feet high, 1 mile northeastward from Gibson Point, is small, rocky, and covered with grass.

Fury Rock, which dries about 20 feet, lies 1,600 yards northward of Gibson Point, with Hecla Island bearing 093° , 1.2 miles. A reef, dry at low water, extends 800 yards northwestward of this rock, with foul ground beyond, a patch of 5 fathoms being situated 1.2 miles northward of the rock.

Tidal currents.—Off the entrance to Parry Harbor the currents run with a velocity of 3 knots at springs. The flood or southwestern current makes 1 hour before low water, and the ebb or northeastern current at 1 hour before high water by the shore. Tide rips are strong over the uneven bottom.

Directions.—Entering Parry Harbor, having passed 2 miles northward of Fury Rock, keep in midchannel between Hat Point and Hecla Island, and anchor as convenient.

4-66 Off-lying dangers westward of Cape Bougainville.—Long Reef, with its outlying dangers, is about 22 miles in length northward and southward, with its center about 18 miles due west of Cape Bougainville. The coral reef, 15 miles in length, dries about 10 feet, with sand in the middle of it.

At the distance of 3.3 miles within the northern extremity, in $13^{\circ}51' S.$, $125^{\circ}48' E.$, is Sand Islet, 4 feet high, covered with grass.

At 1 mile northward of the northern point of Long Reef is a detached circular coral reef, 1,500 yards in diameter, with a sand cay which dries about 20 feet.

From this cay, sunken dangers extend in a northerly direction for a distance of 6 miles within the 10-fathom curve, with a steep-to 5-fathom patch on its extremity; a patch with less than 6 feet lies about midway between, with Cape Bougainville bearing 123° , 19 miles.

Cassini Island bearing southward of 205° leads westward of Long Reef and off-lying dangers.

Directions.—Vessels passing the northern end of Long Reef should not be within 11 miles of Sand Islet, on Long Reef, and it should therefore not be in sight from the deck, even at low water. The sunken dangers just mentioned do not break. Halfway between these dangers and the East Holothuria Reef there is a detached bank, upon which the least water found was 4 fathoms, coral bottom.

4-67 Cassini Island ($13^{\circ}57' S.$, $125^{\circ}38' E.$, *H. O. Chart 3419*), about 26 miles westward from Cape Bougainville, and 4 miles westward of Long Reef, is about 2 miles in length, northward and southward, from 800 yards to 1 mile in breadth, flat, and 72 feet high. The island, composed of ironstone, is of a light reddish color, and surrounded by cliffs from 30 to 60 feet high, except at the northern end, where the land slopes gradually, terminating in a rocky ledge, which is awash at high water. The top of the island is sparsely covered with bushes. A fringing reef extends to the distance of 1,000 yards in places.

On the eastern side are four sandy beaches much frequented by turtle; natives visit the island occasionally to capture them. There is fair landing on the southeastern side.

4-68 Dangers between Cassini Island and Cape Voltaire.—Oliver Rock, a small coral head, with $11\frac{1}{2}$ fathoms of water, and 22 fathoms at a short distance, lies with the southern extremity of Cassini Island bearing 081° , 4.3 miles. The sea was not seen to break on this rock and there is nothing in the appearance of the water to indicate danger.

Pascal Island, 124 feet high, 6 miles southward of Cassini Island, is small with a sharp conical peak. It is about 400 yards in extent, and a coral reef surrounds it which extends 800 yards southward.

4-69 Condillac Island, 6 miles southwestward of Pascal Island, is nearly circular, 1,200 yards in diameter, and covered with bushes, with a table-topped summit 235 feet high. The coast line is rocky, except the eastern point, which is a high sand beach. Natives visit it for turtle.

About 200 yards from the northern end of the island there is a rock 2 feet high; and at 1,200 yards northward of the island a coral patch with a depth of 3 fathoms.

Baudin Island ($14^{\circ}08' S.$, $125^{\circ}36' E.$), 10 miles southward of Cassini Island, is the center of the pearl fishery and the most convenient spot within 400 miles for a stranger to rate his chronometers, as the position is accurately fixed.

The island is of dark color, 1,200 yards in length northward and southward, by 600 yards in breadth, covered with grass and bushes, and has a well-defined summit 220 feet high.

Landing is good upon the sand beach. Except at this part of the island, the coast is fringed with coral reef, which dries several feet at low-water spring tides.

4-70 Anchorage is in 10 to 14 fathoms, sand bottom, at 500 yards from the sand beach, with the southern extremities of Con-

dillac and Baudin Islands in line bearing 295°.

Tides.—It is high water, full and change, at Baudin Island at 11h. 31m.; springs rise 19 to 22 feet, neaps rise 12 to 15 feet; extraordinary springs rise 24 feet 6 inches. The highest tides occur two days after full and change. Though the tide is affected by a large diurnal inequality of height, the time and height of the higher of the two high waters are so regular that the table of approximate times and heights is inserted, as in this complicated navigation such approximate knowledge may be useful. No difference is made in the table between the two halves of the 24 hours, either with regard to moon's transit or time of tide; but it is to be understood that only one of the tides in 24 hours will occur as herein stated, the other having much less range.

Tidal currents.—The current of rising tide sets southward and westward and begins about 20 minutes before low water. The current of falling tide runs northward and eastward, and begins 2 hours before high water. Diagrams showing the approximate direction of the tidal currents at several spots on Holothuria Banks are given on the chart.

4-71 Randall Island, 1.5 miles southwestward of Baudin Island, is 600 yards in length, formed of rock, and has a conspicuous hump near the southern end, 50 feet in height. The coast is fringed with a coral reef which extends 1,000 yards eastward and 800 yards northward. A flat extends northward of the reef, with 6 to 8 fathoms of water, which should be avoided.

4-72 Institut Islands are a group of over one dozen islands, with a number of islets and rocks, in the mouth of Admiralty Gulf, northeastward of Cape Voltaire.

The principal islands are Fenelon, Descartes, and Corneille, which are inhabited (Corneille, the highest, being 425 feet), and Kingsmill Islands. The larger islands are

covered with bushes and stunted gum trees, and from all points of view have flat-topped summits.

A sand spit with a depth of 1 fathom was reported in 1944, to extend about 1 mile west-southwestward from a position just westward of the southwestern end of the eastern Kingsmill Island. Depths of 7 to 8 fathoms were reported inside this spit.

A depth of 7 fathoms was reported (1963) about 1 mile westward of the southern end of Fenelon Island.

Channels.—Between Institut Islands there are three channels; Oyster Rock Passage, between Long Reef and Oyster Rock; Fenelon Passage, between Fenelon and Descartes Islands; and Voltaire Passage, between Cape Voltaire and the southwestern islands of the group. The latter is least recommended.

Caution must be exercised in navigating this part at low-water spring tides in vessels of over 12 feet draft, as the bottom is very uneven, the sea smooth and thickly impregnated with lime, and nothing as a rule can be seen 2 feet below the surface. It is possible that shallow spots may exist other than those marked on the chart.

4-73 Oyster Rock Passage (14°03' S., 125°45' E., *H. O. Chart 3419*) is about 2½ miles wide in its narrowest portion, between Oyster Rock and Long Reef. The following dangers border or lie near the fairway:

Oyster Rock, on the southern side of the channel, is a small rock 8 feet high, its top whitened by the birds. A coral reef, awash at low water, extend 200 yards northward of Oyster Rock.

Lee Rock is a dangerous coral pinnacle with 3 feet of water, and 10 to 17 fathoms close around, lying in the fairway, with Oyster Rock bearing 195°, 1,600 yards. From the rock, Baudin Island summit is just open northward of Bird Islet. Near low-water springs it is sometimes discernible by a slight tide rip.

Ivy Rock is a small coral head with 4 feet of water, and from 4 to 13 fathoms close around. It lies 160° , distant 850 yards, from Oyster Rock.

4-74 Low Rocks, 19 feet high, are situated at the extremity of the shallow flat which extends nearly 2 miles southeastward of the southern end of Long Reef; several patches of 3 fathoms extend $2\frac{1}{2}$ miles westward of it, nearly halfway to Ivy Rock.

Tancred Bank, in the eastern approach to Oyster Rock Passage, is of coral, 1,400 yards in diameter, with a general depth of 3 to 7 fathoms and 16 to 22 fathoms around. The westernmost 3-fathom patch bears 129° , 2 miles from Low Rocks summit.

Forrest Rock is a coral patch with $2\frac{1}{2}$ fathoms of water and 13 to 18 fathoms close around, with Low Rocks bearing 002° , 3.2 miles.

Directions—Oyster Rock Passage.—Proceeding westward through Oyster Rock Passage, Oyster Rock should not be brought in line with the western extremity of Corneille Island until Baudin Island is open its own length northward of Bird Island, which leads northward of Lee Rock. Thence a midchannel course between Cassini and Pascal Islands.

Fenelon Passage.—Proceeding westward through Fenelon Passage, and being westward of Flat Island, off the southern extremity of Fenelon Island, the northern extremity of Corneille Island must not be brought open of the southwestern extremity of Flat Island until the whole of Condillac Island is open northward of Baudin Island. This will clear Bullara Rock, marked P. D., with less than 6 feet of water, situated approximately 1 mile northward of the islet, 57 feet high, which is situated westward of Descartes Island.

4-75 Cape Voltaire ($14^{\circ}15' S.$, $125^{\circ}36' E.$, *H. O. Chart 3419*) is the northern extremity of a peninsula separating Admiralty Gulf from Montague Sound; there is a flat-topped hill, 402 feet high, within it, and a peaked hill, Sharp Peak, 476 feet high, 3 miles farther to the southward. Both are covered with stunted gum trees, as is also the intervening country.

On the western part of the cape there is a narrow peninsula terminating in a rocky hill 146 feet high.

Bigge Point, 8 miles eastward of Cape Voltaire, forms the southeastern point of Voltaire Passage; it is fringed by rocks to a short distance, but it and Admiralty Gulf, eastward of it, have not been surveyed.

Voltaire Passage, which should not be used by large vessels, is only 800 yards wide abreast Passage Island, 35 feet high, and situated 1 mile northeastward of Cape Voltaire; shallow water extends from 800 to 1,000 yards westward from it. About 1.8 miles, 036° from Passage Island is an islet having upon it a remarkable rock named Dice Rock, 20 feet high.

4-76 Jamieson Reef ($14^{\circ}03' S.$, $125^{\circ}21' E.$) lies 17 miles 247° from Cassini Island in the western approaches to Voltaire and other passages to the inner route and in the track of vessels bound from Roebuck Bay or Derby to Wyndham or Port Darwin by the outer route. It is 2.3 miles in length, northward and southward, 1 mile in breadth, and dries 5 feet in one spot near the center, at low-water springs.

Discolored water and tide rips were reported (1923) 3 miles northwestward of Jamieson Reef.

4-77 Ingram Reef (*H. O. Chart 3419*) lies 6.5 miles southwestward of Jamieson

Reef, also in the track of vessels adopting the outer route. It is 1 mile in length north-westward and southeastward, with depths of 26 fathoms close around. A coral patch at the northwestern end of the reef, 600 yards in length, is awash at low-water springs, and lies 267° distant 16.5 miles from the flat-topped summit of Condillac Island.

The sea does not break on Ingram Reef at neap tides, nor at spring tides until nearly low water. There is nothing in the appearance of the water to indicate danger, and the lead gives no warning.

4-78 ADMIRALTY GULF ($14^{\circ}15'S.$, $125^{\circ}50'E.$, *H.O. Chart 3419*) is about 24.5 miles in breadth between Gibson Point and Cape Voltaire, 35 miles in length, and is approached from the northward by Troughton Passage. The approach from the westward is by the channels between the Institut Islands, just described.

The gulf has not been surveyed and the information here given is mostly very old and must be received with caution.

The east shore of Admiralty Gulf from Gibson Point trends southeastward for about 15 miles to the isthmus between Vansittart Bay and Admiralty Gulf, from whence it takes a more southerly direction for 25 miles, to an opening trending to the southward; this shore, being fronted by Osborne Isles, was indistinctly seen.

From the above-mentioned opening a hilly promontory extends 4 miles to the westward, from whence the eastern shore continues about 7 miles in a general southerly direction to Port Warrender, the head of Admiralty Gulf. Here are two creeks, one winding southward and the other southwest-

ward along the base of a dividing range of high, steep, and wooded hills.

4-79 Osborne Isles, high and rocky, extend northward and southward for about 16 miles, and are from 1.5 to 7 miles from shore; a conspicuous bluff forms the western extremity of the southwestern island, and Steep Head, the southernmost island, is remarkable for its precipitous form.

Moon Rock (*H. O. Chart 3419*), dry 8 feet at low water, is reported to lie about 306° 1.5 miles from Steep Head.

Harbor.—A very commodious landlocked harbor, to which there are two entrances, is reported to have been found in the vicinity of Osborne Isles and the mainland. A good depth of water, varying from 5 to 15 fathoms, was found throughout the eastern half, but it shoals considerably over the western half. The least depth in either entrance is 7 fathoms.

Coast.—The coast line along the eastern side is reported to differ materially from that shown on the chart, especially in the vicinity of Osborne Isles.

4-80 Head of the gulf.—Crystal Head ($14^{\circ}28'S.$, $125^{\circ}51'E.$, *H. O. Chart 3419*), on the western side of approach to Port Warrender, is a steep, rugged projection, flat-topped, covered with stunted trees and long grass. An islet surrounded by a reef lies near the shore, 1.5 miles northward of the head.

4-81 Port Warrender, the head of Admiralty Gulf, is a secure harbor, affording good anchorage in from 6 to 15 fathoms within and southward of Crystal Head. A reef with small islets forming the eastern side of the entrance, extends from 3 miles eastward of Crystal Head in a southerly direction for 6 miles. Between this reef and the western shore, which consists of a succession of points and bays, the port appeared free from dangers, with secure anchorage in

from 15 to 4 fathoms, for a distance of about 5 miles above Crystal Head.

A sand bar, dry at low water, extends across the creeks at the head of Port Warrender, about 9 miles southward of Crystal Head.

The land about Port Warrender is rugged, the rocks consisting of sandstone; and although the soil is shallow, the hills on the western side are thickly covered with trees and grass.

4-82 Western shore.—At about 2.5 miles westward of Crystal Head, a narrow point, surrounded by rocks, projects 2 miles beyond the adjacent coast. Pickering Point lies 3.5 miles northwestward of that point, with shoals between. Walmesly Bay lies between Pickering Point and Bigge Point, the southeastern extremity of Voltaire Passage, and is about 7 miles wide. It has not been surveyed, and the chart states there are several sunken rocks in it.

Parry Island ($14^{\circ}19' S.$, $125^{\circ}46' E.$), about 60 feet high, lies 3.5 miles southeastward of Bigge Point.

River.—Southward of Pickering Point, where the coast line is not defined, an opening about 1 mile wide, supposed to be the entrance of a river, is reported to exist; it was explored for a distance of about 5 miles, and a minimum depth of $5\frac{1}{2}$ fathoms sand bottom, was found; beyond, this opening continued as far as could be seen.

For 7 miles the banks are low mangroves, broken by occasional sandstone hills, and for 3 miles it runs through sandstone cliffs, 150 feet high.

The water for the last 4 miles was brackish, indicating a large volume of fresh water above. The river swarms with alligators, over 100 being seen in one day.

Tides.—It is estimated that the rise and fall of tide in the river is about 20 feet.

Supplies.—The whole of Admiralty Gulf is well adapted to fishing for trepang, which are very abundant among the reefs, and fish and turtle were plentiful. Pearl shell fisheries in Admiralty Gulf have been successful. Several streams of fresh water were found on the western shore of Port Warrender in August, 1884, but no water could be found in the month of October.

4-83 BONAPARTE ARCHIPELAGO.—Bonaparte Archipelago comprises all of the islands, islets and rocks lying off Montague Sound, York Sound, and Brunswick Bay. Montague Sound lies between Cape Voltaire and Bigge Island, within the Montalivet Groups. It is about 25 miles wide and is encumbered with islands and rocks.

The eastern shore of Montague Sound from Cape Voltaire extends in a southerly direction 19 miles to Swift Bay, a double bight forming the southeastern corner of the sound. The shore consists of rocky points and bays, with a wide channel between it and Water Island, with depths of from 7 to 15 fathoms leading from Cape Voltaire into Swift Bay.

4-84 Katers Island, 345 feet high, forms the western side of approach to Swift Bay. Between this island and three projecting points of the mainland to the southward is a channel 1 mile wide, communicating with Swift Bay from the westward, with reported depths of 3 to 8 fathoms.

There are several islets and reefs between Katers Island and Water Island, 5 miles northward of it.

Anchorage, in 8 fathoms, mud bottom, can be obtained between Katers Island and the isthmus separating Montague Sound from Walmesly Bay, and still more secure in Swift Bay, in from 4 to 7 fathoms, mud bottom.

Tides.—It is high water, full and change, in Swift Bay, at 0h. 0m.; the tide rose 18 feet, and at Capstan Isle 21 feet.

4-85 **Wollaston Island** ($14^{\circ}30' S.$, $125^{\circ}27' E.$, *H. O. Chart 3419*), 620 feet high and 3 miles westward of Katers Island, is nearly 12 miles in circumference, with a reef extending from its northwestern point. The island is separated from the mainland to the southeastward by a narrow opening, apparently blocked by islets and rocks which front the eastern side of the island. These, together with a rocky reef extending from the northwestern extremity of Katers Island, contract the approach to the western channel into Swift Bay, to 1,500 yards, the depth being from 10 to 11 fathoms.

4-86 **Mudge Bay** is a deep indentation of the land between Wollaston Island and a projecting head to the westward. The entrance is 3 miles wide, but within it the bay becomes much broader, and forms two bights in the rugged coast to the southward, which is thickly clothed with stunted trees.

The outline of this bay is actually indented with some very commodious arms, a number of which were examined and found suitable for anchorage. There are five islands in the bay, and several rocks which dry at half tide. The western side of the entrance is composed of small high islands, separated by narrow passages.

The depths in Mudge Bay range from 4 to 10 fathoms.

Coast.—Between the western entrance point of Mudge Bay, 510 feet high, and a point 9 miles southwestward, forming the turning point into Scott Strait, are two bays, which have not been sounded. They are fronted by a chain of small islands, extending from the entrance of Mudge Bay to the entrance of Scott Strait; Capstan Isle, the southwesternmost of the chain, is small, but high and rocky.

4-87 **Scott Strait**, the channel separating Bigge Island from the mainland, is 13 miles in length and from 3 to 1.3 miles in width,

but has not been surveyed. Its eastern shore, which is broken and rocky, extends from the point near Capstan Isle, 11 miles south-southwestward to Cape Pond, which is distinguished by the small rocky island lying close off it.

A rock, which covers at high water springs, was reported (1960) to lie about $3\frac{1}{4}$ miles northward of the northern extremity of Capstan Isle.

Scott Strait is bounded on the western side by Bigge Island and numerous islands and reefs extending nearly 6 miles southwestward from the southern point of the island; there may be channels through these, but if so they must be very narrow. Some dry rocks lie in the fairway of Scott Strait, and the depth of water is irregular, the deepest being near the eastern shore, where there are from 10 to 14 fathoms. Great caution should be observed in going through Scott Strait, as the tidal currents are strong and the water muddy.

Anchorage.—There is anchorage on the southwestern side of Bigge Island, in $6\frac{1}{2}$ fathoms, at high-water neap tides; also at the northeastern corner. There are no signs of life, and all appears extremely barren.

4-88 **Lamarck Island**, of moderate elevation, and about 5 miles in circumference, lies in the southern approach to Scott Strait, at 7 miles westward of Cape Pond. It has some islets and rocks close southward of it.

There are several reefs charted between Lamarck Island and Cape Pond, and the entrance to Scott Strait.

Jussieu Island, about 1,000 yards in length, lies about 5 miles northward of Lamarck Island, and about the same distance southwestward of Queen Islet. The vicinity has not been surveyed.

4-89 **OFF-LYING ISLANDS.**—**Montalivet Group** (*H. O. Chart 3419*), the most seaward of the islands fronting Montague

Sound, consists of five principal islands of moderate elevation, of dark color, being wooded with stunted gum trees, and visible in clear weather from a distance of 20 miles. They are named East Montalivet Isles, three in number, Walker Island and West Montalivet Island.

Most of these off-lying islands are composed chiefly of quartzite tinged with oxide of iron.

Supplies.—Wood and water can be procured at these islands.

4-90 East Montalivet Isles ($14^{\circ}17' S.$, $125^{\circ}18' E.$) are connected by a reef awash at low water. The largest and southwesternmost is 1.3 miles in diameter, flat-topped in appearance, and 230 feet high. The southwestern point of it is formed by a conspicuous dark cliff, 60 feet high. The other two islets, which lie close northeastward and northward of the largest islet, are 250 and 120 feet high, respectively.

Anchorage was taken off the southeast end, near Walker Island.

Wolf Rock (*H. O. Chart 3419*) is a remarkable wall-sided rock 30 feet in diameter, drying 10 feet, and bearing 070° , 3.2 miles from East Montalivet Group, and 12 miles westward of Cape Voltaire. There is a depth of 20 fathoms mud bottom, close around within 200 yards of the rock.

A sand cay (*H. O. Chart 3419*), awash at high water, lies 268° , 2.8 miles from Wolf Rock, and about 1 mile northeastward of the northern islet of East Montalivet Group.

4-91 West Montalivet Island, about 4 miles westward of the eastern isles, is flat-topped, of a dark color, and 250 feet high.

A fringing coral reef extends for a distance of 1,400 yards from the southern end of the island.

This island abounds in snakes. There is an ample supply of water.

Anchorage was taken off the southwest end of the island, in $6\frac{1}{2}$ fathoms low-water springs, off a sandy beach. No natives were visible, but there were signs of them being about.

There was good landing on the sandy beach.

Albert Reef, the northwestern part of which dries at low water, is situated with the highest bushes on West Montalivet Island, bearing 130° , 4.5 miles.

4-92 Walker Island, 180 feet high, the southeasternmost of the Montalivet Group, is small in extent, of a light color, being covered with grass, and has an ill-defined summit. There are three small islets between this island and the largest East Montalivet.

In the area between Cape Voltaire, the Montalivet Islands, and Bigge Island there are a number of islands, islets, and rocks, a few of which are deserving of notice.

4-93 Water Island ($14^{\circ}21' S.$, $125^{\circ}30' E.$), 146 feet high, the easternmost of these, and situated 7 miles southwestward from Cape Voltaire is a small rugged uninhabited island of a light color and covered with coarse grass and bushes. On the southeastern side there is a small sandy beach with good landing. From the northeastern coast a reef awash at low water extends a distance of 300 yards.

Tancred Island, 240 feet high, and 5 miles westward of Water Island, is a conspicuous rugged island, 1,000 yards in diameter, of a light color, with a well-defined summit. It is steep-to all round. There are two remarkable rents in it in a northwestward and southeastward direction.

Southward of Tancred Island is Cleghorn Island, 200 feet in height, with islets and rocks awash at high water still farther southward, for which see the chart.

Biddles Rock (*H. O. Chart 3419*), 4 feet high, lies 2 miles northward of Tancred Island. There is a depth of 17 fathoms, mud bottom, close around the rock.

4-94 Hawick Island (*H. O. Chart 3419*), 80 feet high, 1.3 miles westward of Tancred Island, is small and rugged. It is of a light color and 400 yards in diameter. There are two small islets off the northern end of Hawick Island, 20 and 15 feet high, respectively, which are connected with it by a reef.

Warn Island, 94 feet high, and 3.5 miles westward of Hawick Island, is a small round rocky island 250 yards in diameter.

At 200 yards from the eastern coast there is a rock, 2 feet high; it is connected with the island by a sunken reef.

The channel between Walker Island and Warn Island is 1.5 miles wide, and apparently free from dangers.

4-95 Prudhoe Island, 5 miles southwestward from Warn Island, is irregular in outline, 1.5 miles in length eastward and westward, by 1 mile in breadth, with a black well-defined summit 280 feet high.

Between Prudhoe and Bigge Islands there is a chain of islets and rocks, which do not call for special mention.

Cotthurst Rock, 12 feet high, lies 3.5 miles westward of Prudhoe Island and 1.3 miles

off the northern point of Bigge Island. There is a depth of 15 fathoms at the distance of 300 yards all round.

4-96 BIGGE ISLAND, which forms the western side of Montague Sound, is 14 miles in length northward and southward, by 7 miles in breadth, rugged and barren, composed entirely of quartzite tinged with oxide of iron, and has several irregularly-shaped hills. The general height is from 200 to 250 feet, but the highest point is a table-topped hill 470 feet high, named Savage Hill, near the southern extremity of the island. There is also a dark rounded hill in the center 320 feet high, and another 410 feet high near the western coast, abreast Queen Islet, named Camp Hill, from an encampment of natives seen round about it.

The rocks on the islands are heaped up in the utmost confusion, with deep rents in every direction; the coast also is rugged and rocky, with occasional short sandy beaches. On the northwestern side of the island is Boomerang Bay, an indentation in the coast 2 miles in length.

Water was obtained in July, 1884, from a stream at the head of the bay on the south-eastern side of the island.

A rock with less than 6 feet of water over it is located about 2 miles 327° from the northern extremity of Bigge Island.

4-97 Queen Islet ($14^{\circ}35' S., 125^{\circ}05' E.$, *H. O. Chart 3419*), 1 mile off the western coast of Bigge Island, is 132 feet in height, and 1,500 yards in length, with a sandy beach on its eastern side. At 1,500 yards northward is an islet, 45 feet in height, surrounded by a reef. There is a reef between that islet and Queen Islet.

Tooth Rocks, a group situated about 4 miles south-southwestward of Queen Islet, are from 10 to 15 feet.

Anchorage.—Fair anchorage has been found in from 10 to 15 fathoms sand and coral, between Queen Islet and Bigge Island. The ground to the southwestward of the southern point of the islet appeared foul and shallow.

Championet Islet, 600 yards in length, rocky, 35 feet high, with a flat grassy summit, lies 1,500 yards from the northwestern coast of Bigge Island, near the northern point of Boomerang Bay. A reef extends 200 yards southwestward of it, and a rock awash at low water, lies close eastward of it. A drying reef, about 1 mile south-southwestward of Championet Islet lies at the northern end of the foul ground extending northward from the southern entrance point of Boomerang Bay.

Eyre Rock ($14^{\circ}30' S.$, $125^{\circ}06' E.$), awash at high water, and steep-to, lies 1,500 yards westward of Championet Islet.

4-98 MARET GROUP, from 5 to 9 miles northwestward of Bigge Island, consists of a chain of islands and islets extending for a distance of 9 miles in a northward and southward direction. The general formation and appearance of the larger islands is the same as that of Cape Bougainville, the ridges being flat-topped, surmounted by an ironstone cap, and covered with stunted gum trees.

Caution.—In the vicinity of Maret Group and Montalivet Islands, the tidal currents are strong, banks and reefs steep-to, and the water unusually turbid, great care is necessary when navigating in these localities. The flood sets south-southwestward and the ebb north-northeastward.

4-99 Berthier Island ($14^{\circ}31' S.$, $125^{\circ}00' E.$), the largest of Maret Group, is 2.5 miles

long, northward and southward about 1,000 yards wide, with a flat summit, 340 feet high.

Trig Rock.—Detached from the northern point of Berthier Island by a boat channel there is a smaller island, 220 feet high; and eastward of this, connected with it at half tide, there is Trig Rock, flat-topped, and 83 feet high.

Corvisart Islet, 45 feet high, lies about $1\frac{1}{2}$ miles southeastward of the southern extremity of Berthier Island; a smaller islet lies $\frac{1}{2}$ mile farther southeastward. There is foul ground for about $\frac{1}{2}$ mile southward of these islets.

Combe Islet, about 3 miles southeastward of the southern end of the northern Maret Islands, is black, rocky, and 41 feet high. A reef extends northwestward for a distance of 500 yards. **Ripple Rock**, which dries 12 feet, lies about $1\frac{1}{2}$ miles south-southwestward of Combe Islet.

Albert Isles, a group of five small islands connected by a sunken reef, lie 3 miles westward of Berthier Island. The largest and highest, the second from northward, is 130 feet high.

Rob Roy Reefs, consisting of three partially drying reefs, lie about 18 miles westward of Cape Chateau Renaud, the northern point of Bigge Island. A sand cay on the northern reef dries 14 feet, the western reef dries one foot, and the southern one dries 6 feet.

There is apparently a clear channel of 3 miles width between Bigge and Maret Islands, between Ripple Rock and Eyre Rock, and southeastward of the islets southeastward of Berthier Island. The chart shows soundings to be scanty, so care should be exercised in the channel.

4-100 YORK SOUND is 14 miles wide between Cape Pond and the Coronation Islands, and is the approach to Prince Frederick Harbor. On the eastern shore of the

sound, immediately southward of Cape Pond, are two points; the first is fronted by a cluster of rocks, and the other, 3 miles from the cape, has an islet close off it, with a reef extending southwestward. Between this point and the eastern entrance point of Prince Frederick Harbor, 13 miles southward from Cape Pond, the coast forms two bays; that to the southward being fronted by Anderdon Isles, which extend northward about 5 miles from the eastern point of entrance to Prince Frederick Harbor. Reefs extend from the western side of some of them.

The large bay between Cape Pond and the entrance to Prince Frederick Harbor has depths in the outer part of 5 or 6 fathoms with mud bottom. The several arms of the inner part dry at low water, but there is plenty of room, and it is well protected from north to south, through east. The prominent feature in the bay is an island resembling Lion Island in Broken Bay, N. S. W. The passage between Anderdon Isles and the mainland is very foul.

4-101 Cape Torrens ($14^{\circ}57' S.$, $125^{\circ}07' E.$), the western point of entrance to Prince Frederick Harbor, has a rock close to the eastward of it.

Hardy Point, the western extremity of the same peninsula, has an islet close off, and is separated from the principal Coronation Island by a channel nearly 4 miles wide, leading to Port Nelson.

A reef, which dries 21 feet, lies $019^{\circ} 3\frac{1}{2}$ miles from Hardy Point.

Anchorage.—At about the middle of York Sound the bottom is rocky, but there is good anchorage near Coronation Islands, and there may be equally good on the eastern side, between Cape Pond and Anderdon Isles.

4-102 PRINCE FREDERICK HARBOR, a continuation of York Sound, is 3 miles wide at the entrance, extending from Cape Torrens in an east-southeastward direction for 15 miles, to two islets; here the harbor divides into two branches, the northern one terminating in Hunter River, to the northeastward, and the other in Roe River, to the southeastward.

4-103 The northern shore of Prince Frederick Harbor consists of rocky points and small bays, to the entrance of Hunter River. For the first 5 miles the shore is fronted by islets and rocks extending from 1 to 2.5 miles from land; between these and an islet on the northern side of Hunter River entrance, the water is deep close to the shore. The land is backed by irregular ranges of steep rocky hills, rising to several peaks, the most remarkable being Manning Peak and Mount Anderdon.

The land between the entrances of Hunter and Roe Rivers terminates to the westward in two points, with a shallow bay between them, the southern point being connected by a shoal with the two islets which lie between the entrances of the river.

4-104 The southern shore of Prince Frederick Harbor from Cape Torrens to the entrance of Roe River, being fronted by islands and rocks, was indistinctly seen. An islet, with a reef extending to the southeastward, lies on the northern side of midchannel, 9 miles above Cape Torrens, with another islet 1.5 miles to the eastward and a sunken rock 2 miles west-southwestward on the southern side of the fairway. There are three other islets between these and the two between the entrances of Hunter and Roe Rivers, with deep water between them.

Aspect.—Although the country about Prince Frederick Harbor appeared to be very stony and almost destitute of soil, it was thickly wooded. The rock chiefly consists of

sandstone, with the usual traces of iron. Few birds and fish were noticed, but alligators were numerous.

Anchorage is not very good in the entrance of Prince Frederick Harbor, but good bottom may be found within the small islet, with reef, northward of the fairway, above mentioned, when Hunter River begins to open, bearing 088°; and there is probably anchorage on the northern shore, or anywhere out of the tidal current.

4-105 Hunter River ($15^{\circ}01' S.$, $125^{\circ}23' E.$) trends northeastward about 14 miles along the base of Mount Anderdon. It is about 1 mile wide at the entrance, and preserves nearly that width for 4 miles, with depths of 5 to 7 fathoms. The banks are formed of masses of rounded rocks. About halfway up this reach there is an opening on the northern side, probably the mouth of a mountain stream, as it appeared to wind under Manning Peak. At the end of this reach the river suddenly contracts and becomes shallow, winding through a narrow valley between the rocky heights, which rise abruptly from the mangrove banks to an elevation of at least 300 to 400 feet.

Shoal.—A patch of 3 fathoms extends nearly into midchannel from the southern side of the mouth of Hunter River.

Anchorage.—A vessel may anchor in 7 fathoms in the upper part of the wide reach, within the entrance, but during the rainy season this cannot be recommended.

Water.—About 9 miles above the entrance of Hunter River a considerable spring of fresh water was seen in the month of September, bubbling up among the mangroves, but it is overflowed at high water.

4-106 Roe River ($15^{\circ}07' S.$, $125^{\circ}22' E.$) has a small island on the northern side of the approach, between which and the southern shore is the fair channel, 2 miles wide, with from 5 to 7 fathoms of water. From

the entrance islet, the river trends eastward 6 miles, gradually decreasing from 3 miles to 1 mile in breadth. The deepest channel through this reach appeared to pass between two small islands and the southern shore, varying in depth from 2 to 5 fathoms. There is good anchorage in this part of the river, but it must be remembered that the tidal range is about 28 feet. The southern shore is broken and irregular, rising to rocky, but thickly wooded hills.

At the head of the first reach the river is contracted to a narrow 2-fathom channel, between two small islands, connected with either shore by shoals. At 3 miles above these islets the river is reduced to about 1,000 yards in width.

The shores are low and lined with mangroves, intersected by salt water creeks, extending through lowland to the rocky hills behind. At low water the banks of the river are fronted in many parts of mud flats, so soft as to prevent landing.

Roe River, after continuing in an easterly direction for about 6 miles farther, takes a sudden turn southward for 15 miles. This part is about 70 yards wide; the banks are lined with mangroves, but the rocks rise perpendicularly behind them to a height of 300 feet. The width of the stream at low water, which was quite salty, was not more than 25 feet, but there was a depth of 4 fathoms 27 miles above the entrance, with every appearance of being navigable for a boat for at least half that distance farther up.

Tides.—It is high water, full and change, in Prince Frederick Harbor at noon; springs rise 28 feet. When the flood commenced it came in so rapidly that the water rose 5 feet in 10 minutes, the rise on that day being 24 feet; but driftwood was noticed among the rocks at least 14 feet above ordinary high-water mark, and from the appearance of

the country and the steep hills (generally about 300 feet high) through which the river flows, there was little doubt of its being, during the rainy season, a considerable fresh water stream.

4-107 **PORT NELSON** ($15^{\circ}04' S.$, $125^{\circ}00' E.$, *H. O. Chart 3419*) is a secure harbor on the western side of the promontory which separates it from Prince Frederick Harbor, and is partly protected to the westward by Coronation Group. The entrance between Hardy Point and the principal Coronation Island, is 4 miles wide, with depths of 10 to 12 fathoms, whence Port Nelson extends southward 8 miles, terminating in two bights. Careening Bay, the western bight, is separated from that to the eastward by a narrow point, with a rocky spit extending northward. The eastern shore trends nearly in a direct line to the southward from Hardy Point, and is partly bordered by narrow reefs.

The southernmost island of Coronation Group, which forms the western side of the upper part of Port Nelson, may be approached to the distance of about 650 yards in depths of 8 to 10 fathoms. This island appears to be connected by shoals with islets close to the northwestward, both being separated from the principal island of the group by an opening 1 mile wide, which has not been examined.

4-108 The western entrance into Port Nelson is 1 mile wide between the southernmost Coronation Island and the irregular broken shore extending from Careening Bay to Cape Brewster, 5 miles westward.

The only known danger in this entrance is a patch of dry rocks, lying nearly mid-channel off the southern point of the southernmost Coronation Island. The better channel is on the northern side of these rocks, where the depth is from 7 to 14

fathoms and the tidal currents set directly through.

Tides.—High-water interval at Port Nelson is 11h. 30m.; mean range 19 feet spring range 30 feet.

Anchorage.—The narrowest part of Port Nelson is 2 miles wide, and it appeared free from dangers, with good anchorage throughout, in from 12 to 7 fathoms.

4-109 **Careening Bay** has a sandy beach, and the level land behind it is backed by thickly wooded hills. The country in the vicinity of the bay is only covered with a poor sandy soil, notwithstanding which vegetation is abundant.

Water.—In the month of September, there was found abundance of pure fresh water in a gully behind the beach in Careening Bay, and a considerable stream was at the same time seen in the next bay to the eastward, but in the following July no fresh water could be found in either of these places. Plenty of firewood may be procured here at any time.

4-110 **OFF-LYING ISLANDS**—**Coronation Islands** (*H. O. Chart 3419*).—The eastern portion of this group, which has been mentioned as bounding York Sound and Port Nelson to the westward, extends 14 miles northward and southward, and about the same distance eastward and westward. The group consists of 17 or 18 islands, besides rocky islets too numerous and scattered to be separately described.

The largest island is 8.5 miles in length, northward and southward, and from 2.5 to 4.5 miles in breadth, with two remarkable peaked hills, one on the eastern and the other on the western side. A low rock lies 3.5 miles westward from the southern point of the island. Two small islands of this group, each about 1 mile in extent, lie westward of the large island, distant 4 and 8

miles from the western peaked hill. Westward and northwestward of the latter are the two westernmost of the Coronation Islands, each distant 2 miles. These islands are covered with vegetation, and the largest are well wooded.

Anchorage has been taken on the eastern side of the island in 3 fathoms, mud bottom.

The channel between the southernmost island and the island northwestward of it is reported (1928) to be about 1 mile long and 50 yards broad, with depths of 5 to 6 fathoms.

4-111 **Colbert Isle** ($14^{\circ}50' S.$, $124^{\circ}42' E.$), 13 miles westward from the northernmost Coronation Island, has a reef extending 1.5 miles northward, on which is a rock. An islet lies 2 miles eastward of Colbert Isle, and two to the southward, between it and Buffon Isle.

Foul ground, with a least depth of 2 fathoms, extends about one-half of a mile from the eastern extremity of the island.

Buffon Isle, 3 miles southward of Colbert Isle, is about 2 miles in length, and has a peaked hummock on its southern end; two small islets lie to the eastward of the hummock, distant 1 and 2 miles, respectively.

A reef extends nearly 2 miles southwestward from the western islet.

Keraudren Islet, 160 feet high, lies about $2\frac{1}{2}$ miles west-southwestward of Buffon Isle, with a number of islets around its northern end. A narrow reef which dries 8 feet, lies about $1\frac{1}{4}$ miles northward of Keraudren Islet.

4-112 **De Freycinet Islet** is small, but may be easily recognized from its resembling in shape an inverted basin; it lies about 9 miles west-southwestward from Keraudren Islet. A reef which covers at high water, lies about $1\frac{1}{2}$ miles east-northeastward of De Freycinet Islet. A dangerous submerged rock lies about 6 miles east-southeastward of De Freycinet Islet.

A cluster of small rock islets lies about 5 miles southeastward of De Freycinet Islet; Forbin Islet, with a small above-water rock close southward, lies about 5 miles farther southeastward. The latter groups have not been closely examined.

White Islet ($15^{\circ}04' S.$, $124^{\circ}19' E.$), about 13 miles west-southwestward of De Freycinet Islet, is 31 feet high and being covered with guano appears white. It lies on a reef about 2 miles long, which dries 16 feet on its northern end and has a depth of 2 fathoms on its southern end.

A shoal with $2\frac{1}{2}$ fathoms depth lies about $6\frac{1}{2}$ miles east-northeastward of White Islet; another shoal with $3\frac{1}{4}$ fathoms lies about the same distance northeastward of the islet.

Dugesclin Islet, 133 feet high, with three islets within $1\frac{1}{4}$ miles northeastward of it, lies about $7\frac{1}{4}$ miles southward of De Freycinet Islet. See section 4-116 for other islands in the vicinity of Dugesclin Islet.

4-113 **COAST—Cape Brewster and Bat Islet.**—The cape, which lies 5 miles westward from Careening Bay, Port Nelson, is steep, rocky, and thickly covered with brushwood. Bat Islet is a mass of sandstone connected with the cape by a narrow ridge of rocks, probably covered at springs. The cape and islet correspond in aspect, both being rocky and barren; heaps of water-worn fragments of quartzose rocks, containing copper pyrites, were found in a cavern on Bat Islet.

4-114 **Brunswick Bay** ($15^{\circ}05' S.$, $124^{\circ}40' E.$) lies between the Coronation Islands and Augustus Island, and within De Freycinet Isle and other outlying islands, before described. It communicates with Hanover Bay, Prince Regent River, and Port George the Fourth, and is stated to have good anchorage all over. The bay has not been surveyed.

From Cape Brewster the coast trends southwestward for 6 miles to Cape Wellington, which terminates in two points, forming the eastern side of the approach to Prince Regent River. Two small islands, surrounded by a reef lying from 1 to 4 miles southwestward of the cape, separate the eastern approach from the western approach, and from Hanover Bay.

4-115 High Bluff, 10 miles west-southwestward from Cape Wellington, is the northwestern extremity of a peninsula, separating Hanover Bay from Port George the Fourth. It is formed of perpendicular cliffs, 250 feet high, connected with the mainland by a low sandy neck. About 1.5 miles eastward of the bluff is a low rocky point, forming the western extremity of Hanover Bay.

Islets.—Two clusters of rocky islets lie off the latter point, one bearing 350° , 3 miles, and the other 040° , 2.5 miles.

A sunken patch lies 3 miles beyond the eastern cluster of rocks, with the point in range with them, and with Cape Wellington bearing 090° , 4 miles.

A reef, which dries at low water, lies 1.5 miles 317° of the northern extremity of High Bluff.

4-116 Adieu Point, the northern extremity of Augustus Island, is a table-topped rocky bluff, 200 feet high, appearing from seaward as two lumps; it forms the western point of Brunswick Bay, and also of the entrance of Port George the Fourth. A chain of small islands and reefs extend 5 miles northwestward from Adieu Point.

Jackson, Browne, and Rocky Islets are clusters of islets, rocks, and reefs, nearly 10 miles in length eastward and westward, extending from a position 048° , 8 miles to 331° , 7 miles from Adieu Point. The southwesternmost Jackson Islet forms a remarkably rocky peak, and is a good mark for making Port George the Fourth; a reef

extends from 4 to 5 miles westward of it; a rock, above water, surrounded by reef, lies midway between Jackson Islet Reef and Browne Islet. A rock, awash at half tide, but steep-to, lies 1,000 yards northwestward from Browne Islet, the westernmost of the group. The channel northward of Adieu Point is clear and deep.

4-117 PRINCE REGENT RIVER has been considered the most remarkable feature of the northwestern coast; it trends in a southeasterly direction a distance of 54 miles into the interior, with scarcely a point to interrupt the view after being 13 miles within the entrance; whereas the principal inlets on this coast generally form extensive ports in the entrances, and when they begin to assume the character of a river, become winding and irregular.

The eastern entrance, between Cape Wellington and the reef surrounding the two islands fronting it, is recommended for a sailing vessel; the western one, communicating with the head of Hanover Bay, is very narrow, though deep.

This entrance is apparently less than 1,000 yards in width, but within, the channel widens, and is again contracted to about 1 mile, with depths of from 24 to 37 fathoms of water, abreast the islands off the southern point of the bay within the cape.

Immediately southeastward of Cape Wellington is an apparently rocky and shallow opening, 1 mile wide at the entrance, and increasing in width as it extends in between the rocky ranges of hills on either side.

Rothsay Water, 5 miles southeastward from Cape Wellington, is 1.5 miles wide at the entrance, thence trending northeastward toward Prince Frederick Harbor, with which it possibly communicates. A shallow bank

fronts the shore on the southern side of the entrance.

4-118 **Munster Water** ($15^{\circ}10' S.$, $124^{\circ}52' E.$) is an opening immediately facing Rothsay Water, and bounded seaward by the large island between the entrances of Prince Regent River; within it is Greville Isle.

There are several islets and rocks in Munster Water, and from the easternmost and largest a reef, dry at low water, projects so far to the eastward as to reduce the main channel of the river to 1,000 yards in width. These islets, although rocky, are mostly covered with vegetation, but the summits only of the small rocks are visible at high water.

There is good anchorage in 4 and 5 fathoms, mud bottom, amongst some of these islets, but Munster Water is an inconvenient place for a vessel to stop at, if bound up the river.

Tides.—The river between Rothsay and Munster Waters is much disturbed by violent eddies and whirlpools, caused by the rapid tidal currents rushing through the confined channels, rendering the passage sometimes dangerous.

From the entrance to Rothsay Water the coast trends southward for 6 miles to the entrance of St. George Basin, forming two bights, which are so shallow and overrun with mangroves as to afford no landing place. There is anchorage off both bights, but their inner parts are shallow. A rocky spit projects from the southern entrance point of the southeastern bight.

4-119 **Greville Isle** is nearly 3 miles in length, and has a flat-topped hill on its southern end. The island is of a rocky aspect, consisting of a coarse-grained sandstone, covered with a reddish-colored soil, just sufficient to produce vegetation. Greville Isle is separated from a projecting point on the western shore by a winding passage, forming a communication between Munster

Water and Halfway Bay, not exceeding 150 yards in width, and in one part contracted by a bed of rocks to a much narrower channel, through which the tidal currents run at the rate of 6 to 7 knots.

4-120 **Halfway Bay** is southward of Greville Isle. At 1.5 miles northeastward of its southern point is Gap Islet, divided by a remarkable gap, through which the water flows at high-water spring tides. A dry rock lies off the point, between which and Gap Islet is a depth of 17 fathoms. There is another dry rock in Halfway Bay, with good anchorage close outside, in from 4 to 8 fathoms out of the strength of the tidal currents, with plenty of room for getting under way.

In midchannel this part of Prince Regent River is deep, the bottom consisting entirely of shells, and the currents run with great strength, and, from irregularity of the bottom, cause numerous eddies and whirlpools.

4-121 **St. George Basin** ($15^{\circ}25' S.$, $125^{\circ}03' E.$, *H. O. Chart 3419*).—At 4 miles above Greville Isle the shores of Prince Regent River approach to about 1,500 yards of each other; and the southwestern side is fronted by a rocky shoal, which reduces the entrance into the basin to barely 1,000 yards in width, and the currents rush through with great strength, causing whirlpools, as in the other narrows.

St. George Basin is about 12 miles in length, and about 6 miles wide from the southwestern shore to the foot of Mount Waterloo. St. Patrick and St. Andrew Islands lie in the northern part of the basin, the former 2 miles and the latter 5 miles within the entrance. St. Patrick Island is nearly 2 miles in length, and has an islet close off its southwestern end, connected by a shoal. St. Andrew Island is 3.5 miles in length, and from 1 to 1.5 miles in breadth. A small islet lies between the northern extremities of the two islands, and other islets

and rocks lie off the northern end of St. Andrew Island, nearly blocking the channel between that island and Mount Waterloo.

Anchorage.—There appeared to be deep water throughout the basin, except near the northwestern shore, but it affords no extensive anchorage until a vessel is above St. Andrew Island. There is anchorage in from 3 to 14 fathoms between the northwestern shore of the basin and the islands, out of the strength of the tidal currents.

Mounts Trafalgar and Waterloo are two remarkable hills with a fort-like appearance, rising abruptly from the low land which projects into the northern part of St. George Basin.

4-122 Upper river.—From St. George Basin, Prince Regent River runs up so perfectly straight for 14 miles in a southeasterly direction that the rocky hills which rise from either bank are lost to sight in the distance. Some of these hills rise to the height of 300 and 400 feet and occasionally nearly overhang the river. The banks on either side are intersected by salt water inlets, bordered with mangroves.

The average breadth of this part of the river is about 1,350 yards, but the channel is contracted by several islets and shoals, with a general depth of water from 4 to 8 fathoms over a yellow sandy bottom.

The river thence becomes gradually narrower, with lower banks and greater growth of mangroves, and, although slightly curved, it still preserves its southeasterly direction between the precipitous rocky hills, for about 20 miles farther.

Sandbanks.—Above Alligator Islet, which lies 12 miles above St. George Basin, there are numerous sandbanks dry at low water, the narrow winding channel between them not being more than 2 fathoms deep.

4-123 Rapids ($15^{\circ}42' S.$, $125^{\circ}28' E.$, *H. O. Chart 3419*).—At about 17 miles above

St. George Basin a considerable cascade of fresh water falls into the river on the southwestern side, and at 12 or 13 miles above the cascade a bar of rocks crosses the river, which, when the tide is only just high enough to fall over it, is dangerous to pass. Here a considerable stream of fresh water joins the main river. At about 3 or 4 miles higher up the river is stopped by a fresh rapid, at which the tide ceases. Beyond this the stream, which is from 200 to 300 yards wide, was still seen flowing from the south-eastward.

Aspect.—The course of Prince Regent River being generally bounded by steep rocky hills, very little of the interior of the country is seen. The rugged lofty hills rising from the shores and banks of the river consist of masses of reddish sandstone, with just sufficient soil to produce stunted trees and thick scrub. Alligators, a few kangaroos, and various kinds of birds were seen.

Water.—At the close of the dry season very little fresh water was found in Prince Regent River below the cascade, but in the rainy season it may probably be procured in many of the gullies near the mouth of the river.

Tides.—It is high water, full and change, in St. George Basin, at 0h. 20m.; rise 24 feet; but at Alligator Islet, 12 miles above the basin, the rise was 30 feet, and in some parts of the river it rises 37 feet. The velocity of the current naturally varies with the width of the channels, in some places running about 5 knots, and in others as much as 7 knots.

4-124 Hanover Bay is 4.5 miles wide, between High Bluff and the reef extending from the islands off Cape Wellington, and about the same in length. A point, connected by a ridge with an islet off it, divides the bight of the bay into two openings, that

to the eastward communicating with Munster Water and Prince Regent River.

The western shore of Hanover Bay, to the low rocky point eastward of High Bluff, is intersected by inlets forming deep ravines in the rugged sandstone hills behind, which are thickly covered with stunted trees and scrub. These inlets can only be entered by a boat at high water. In the rainy season they all doubtless afford fresh water in abundance, and are perhaps seldom without it.

The western opening at the head of Hanover Bay is about 1,000 yards wide at the entrance, from whence it trends southward 2 miles, with depths of from 8 to 3 fathoms, and then southwestward about 2 miles, where it terminates in a shallow basin.

Supplies.—Turtle may be caught at the islands in the vicinity, and fish with the seine in the sandy bays; some kangaroo and birds may also be shot in the bush.

At about 1.5 miles within the opening, on the southern side, a rivulet flows into the inlet, through a deep wooded ravine between precipitous rock cliffs rising to an elevation of at least 250 feet. Although water was abundant in this ravine in the month of August, an unusually dry season, there may be some difficulty in procuring a supply for a vessel, as even, at high tide, after pulling about a mile up the rivulet, a boat can not approach within 300 yards of the fresh water, owing to the rocky and shallow nature of the channel. Abundance of wood may be cut near the waterside.

4-125 Anchorage.—There is safe anchorage in from 9 to 15 fathoms, in all parts of Hanover Bay, it being somewhat protected from the sea by the islands and reefs which front the bay, and although exposed in some degree to the north-northwestward,

the holding ground is so good that no danger need be apprehended.

Tides.—It is high water, full and change, in Hanover Bay, at about 11h. 30m., with a spring rise of about 30 feet.

4-126 Port George the Fourth is 6 miles wide at the entrance between High Bluff and Adieu Point, and extends 9 miles southward to the entrance of Rogers Strait, which communicates with Brecknock and Camden Harbors.

The eastern shore of Port George the Fourth extends in a southerly direction 8 miles from High Bluff to Rogers Strait; it consists of a succession of projecting rocky points and small bays. One of the latter, at about 4 miles within the bluff, approaches within 1 mile of the head of the inlet in the bight of Hanover Bay; the neck of land between is described as highly fertile, and from its convenient position between two good harbors, far superior for a settlement to any locality on the northwestern coast. A mission station is situated about 5.5 miles southward of the above-mentioned neck of land.

The western shore of Port George the Fourth is formed by the eastern side of Augustus Island, extending 10 miles from Adieu Point to Rogers Strait. It is a high rocky coast with two projecting points; the southern point is fronted by a reef, between which and Rogers Strait is an islet with some rocks. The two bights separated from each other by the northern point have not been closely examined.

At about the center of Port George the Fourth, and 2 miles to the southward of Entrance Island, is an islet, which, from its shape was named the Hummock.

4-127 Channels.—**Entrance Island** ($15^{\circ} 16' S.$, $124^{\circ} 38' E.$, *H. O. Chart 3419*), 2 miles in length, lies in the center of the entrance. The northeastern extremity of the island

consists of light red cliffs about 200 feet high, which, from the other cliffs being of a dark color, form a good mark for making the eastern and better channel. This channel is nearly 2 miles wide, with depths of 18 to 19 fathoms, mud bottom, and is apparently free from danger other than a rocky shelf projecting about 1,500 yards from the eastern shore. This patch which dries at 1.5 miles 317° of High Bluff must be given a berth.

The western channel is a deep but narrow and intricate passage through the islets and reefs between Entrance Island and Adieu Point and may be known by one of the islets appearing like a haystack when bearing southward. This channel, unless buoyed, should not be attempted.

4-128 Anchorage.—There is good anchorage in 9 fathoms, mud bottom, between Entrance and Hummock Islands, and also in 10 fathoms, mud bottom, with the Hummock bearing about 272° , 1 mile.

Captain Stokes, in his remarks on Port George the Fourth, states: "A finer port than this, in some respects, can hardly be imagined; like Hanover Bay, over which, however, it possesses the advantage of an easier access from sea, it affords safe anchorage, abundance of fresh water, plenty of fuel, and a fine beach for the seine, but the numerous islands and reefs which skirt the coast, greatly reduce the value of both these harbors."

4-129 Directions.—Approaching Hanover Bay or Port George the Fourth from westward, a good course is to run nearly midway between Red and White Islets, 11 miles apart, thence to pass about 2 miles southwestward of Browne Islet, to avoid the reefs which lie northward of Vulcan Isles. Jackson Island Peak, bearing 097° , leads northward of them. When Browne Islet bears 050° , 2 miles, steer for High Bluff, bearing about 116° , giving a berth to the reef which dries at $1\frac{1}{2}$ miles northwestward of it; thence as requisite.

See section 4-134 regarding tidal currents in this vicinity.

4-130 Rogers Strait connects Port George IV with Brecknock Harbor southwestward. The passage lies between the southern coast of Augustus Island and the mainland. Neither the strait nor the harbors have been thoroughly surveyed. The tidal streams run with strength. It is considered an unsafe channel except for those with local knowledge.

An island, about $1\frac{1}{2}$ miles in extent, covered with grass and boulders of granite, lies in the southwest entrance of Rogers Strait. A spit extends from the southern point of the island and a sunken patch lies about 1,000 yards to the westward. A number of scattered islets lie in the northeastern entrance of the strait.

4-131 REEFS AND ISLANDS NORTHWESTWARD.—From the mainland in the vicinity of Port George IV and Rogers Strait, a succession of groups of islands, reefs and shoals extends about 35 miles west-northwestward. The chart shows a fairly wide and deep passage northeastward of these groups; the soundings are as yet scanty, however, and it has not been completely examined.

Augustus Island, westward of Port George the Fourth, is 13 miles in length, northward and southward, and 9 miles in breadth at its southern end. It is high, rocky, and mostly covered with stunted trees and scrub. Between the western and southwestern points is a double bay nearly 3 miles wide at the entrance, its southern one, penetrating to within 3 miles of the eastern side of the island. This bay has not been examined, but some reefs were seen fronting the northwestward side of the entrance.

4-132 Heywood Islands, together with numerous rocks and reefs, lie immediately westward of Augustus Island, separated by a passage about 2 miles wide. There are apparently two main islands, almost connected, lying with long axis northeast and southwest, about 11 miles long.

Byam Martin Island, 220 feet high and almost 3 miles in extent, lies southward of

the Heywood Islands, separated by a strait $1\frac{1}{2}$ miles wide. Three small islets lie off its northern shore, thus reducing the clear width of the strait just mentioned. A rocky patch is charted about 2 miles eastward of Byam Martin Island.

A reef, of doubtful position, with 3 fathoms depth, and possibly less, lies about $2\frac{1}{4}$ miles westward of the western extremity of Byam Martin Island; the ground is reported foul for about two miles southward of this position.

Another shoal of doubtful position, having 5 fathoms depth, is charted in $15^{\circ}23'S.$, $124^{\circ}15'E.$

4-133 **Vulcan Islands** ($15^{\circ}14'S.$, $124^{\circ}23'E.$, *H.O. Chart 3419*), are rocky; the main island is about $1\frac{1}{2}$ miles in extent and 289 feet high. Small islets are charted in the strait between Vulcan Islands and the northeastern Heywood Island. Unsurveyed reefs lie up to $3\frac{1}{2}$ miles northeastward from the main Vulcan Island, and a series of islets extend southeastward to Adieu Point, the northern extremity of Augustus Island.

4-134 **Champagny Islands**, westward of Heywood Islands, consist of one principal island and a number of islets and reefs extending 10 miles in a northeasterly and southwesterly direction. They are of light-colored rocky formation, thinly covered with scrub. **Degerando Islet**, with an elevation of 105 feet at its western end, lies close southward of the southern islets fringing the main Champagny Island; it is practically surrounded by foul ground. A light is shown on the western extremity of Degerando Islet. The strait between Champagny and Heywood Islands appears deep, and has a width of almost two miles between the shoals.

Tidal currents.—The flood current sets strongly in a southerly direction in the areas northward of Heywood and Augustus Islands. The current of a falling tide was found to run northeastward through the channel eastward of the Champagny Isles at the rate of nearly 6 knots, and in the southwestern entrance the meeting of the tidal currents causes such strong rippings and whirlpools as would appear to a stranger dangerous for a small vessel to enter.

4-135 **Red Island** ($15^{\circ}13'S.$, $124^{\circ}16'E.$) is a rounded lump of dark red sandstone, with perpendicular cliffs of no great elevation; on its summit is a little stunted vegetation. It has shoal depths of 19 feet about $\frac{1}{2}$ mile off its southern side. From a position about $\frac{3}{4}$ mile westward of Red Island, a series of five reefs, named **Rainbow Shoals**, extends south-southwestward for about 3 miles; one of these dries 23 feet. A $5\frac{1}{2}$ fathom patch lies between the southernmost reef and the northwest shore of Champagny Island.

Violet Shoal and **Orange Shoal**, each consisting of a sunken rock, lie, respectively, about $1\frac{3}{4}$ miles north-northwestward and 2 miles north-northeastward of Red Island.

Osborn Reefs, which dry, consist of two reefs about 1 mile apart and lie about 5 miles northwestward of Red Island.

Wildcat Reefs are two drying reefs about $1\frac{1}{2}$ miles apart; the western dries 25 feet and the eastern 23 feet. Each reef is about 2 miles in extent. The western reef lies 11 miles westward of the northern extremity of Champagny Island. A 4-fathom shoal lies about 2 miles north-northwestward of the drying part of the western Wildcat Reef.

4-136 **Coast—Camden Sound** is the open space of water bounded on the northward by Augustus Island and the islands westward above described, and on the southward by the coast as far as the Slate Islands. Within it are Brecknock and Camden Harbors.

Anchorage.—Good, well-protected anchorage may be had in Camden Harbor, although numerous reefs and patches have been seen in it, especially in the eastern part.

4-137 **Brecknock Harbor** ($15^{\circ}29'S.$, $124^{\circ}33'E.$) is one of the best ports on the northwestern coast.

The entrance is about 1.8 miles wide, with depths from 9 to 15 fathoms, but is somewhat obstructed by New Isle and two other small islets close northward; there is, however, a clear deep channel, nearly 1,000 yards wide, on either side of New Isle. A pinnacle rock, 20 feet in height, lies about 500 yards

off the mainland fronting the southern side of New Isle.

Brecknock Harbor is 5 miles in length, extending gradually from a width of 1.8 miles at the entrance to 4 miles at the eastern part, with an area of nearly 20 square miles, and is thoroughly landlocked. The coast line within the harbor is everywhere indented with bights. Rogers Strait, at its northeastern extremity leads to Port George the Fourth, but is not recommended.

Anchorage.—Vessels of 10 feet draft and over may select any spot within these limits and find a secure anchorage. Vessels of less than 10 feet draft, after crossing the rocky bar, 036° from Careening Island (not charted), may find safe anchorage anywhere in midchannel, as far as the entrance to Camden harbor, with not less than 3 and 4 fathoms at low water.

4-138 Directions.—The best approach to this harbor is from the westward through Camden Sound, passing southward of Champagne Isles and the charted dangers, but great caution is necessary as the bottom is very uneven and the locality has not been surveyed.

Vessels entering Brecknock Harbor from Camden Sound have two known dangers to avoid; one is the bank extending northward from Pinnacle Rock, the other is the rocky bar between Careening Island and the circular reef, not charted. The rock southwestward of New Isle, visible at all times, may be passed in midchannel, but on sighting Pinnacle Rock, which is close to the southern shore, shape a course to pass about 250 yards from New Isle, which will command the deepest water, carrying from 13 to 14 fathoms at the narrowest part of the entrance. When Pinnacle Rock bears 182°, an 081° course may be steered for 2.5 miles, until the northern entrance into Camden Sound opens out, bearing 317°; thence a

070° course of 3 miles may be steered in 6 to 7 fathoms of water, either toward Green Island or Camden Harbor.

4-139 Camden Harbor (15°30' S., 124°35' E.), the eastern continuation of Brecknock Harbor, is at the head of the bay between that harbor and Rogers Strait; water communication probably exists between it and Doubtful Bay, some 30 miles to the southward.

The harbor, though deep in places, is encumbered with many shallow ridges, rendering it an undesirable anchorage.

From a high hill on the southern shore of Camden Harbor, a most luxuriant and well-watered country was seen over the low southeastern shore, extending in an east-southeasterly direction toward Glenelg River, on the eastern side of a remarkable peak, Mount King, visible from Port George the Fourth; part of this rich land approaches within 5 miles of Camden Harbor.

Tides.—It is high water, full and change, in Camden Sound, at 11h. 30m., springs rise 30 feet; at Brecknock Harbor, at noon, springs rise 30 feet. The tidal currents are strong.

Supplies.—Good water is abundant in the valleys and on nearly all the islands, and runs down to the beaches. There were beds of edible oysters in the harbor.

4-140 The coast from abreast New Island, Camden Sound, trends in a west-southwesterly direction for 3.5 miles to Battery Point, a flat rocky point about 20 feet high. Between this point and Wilson Point to the southward the coast curves in to the eastward, forming a bight. About 1 mile from Battery Point is Sampson Inlet, a narrow deep-water inlet, 700 yards wide at its

entrance; it runs in an easterly direction for almost 1.5 miles, and then opens out into a basin about half a square mile in area; it then trends to the southward for about 1.5 miles, where it ends. This inlet has not been closely surveyed.

Rice Rocks are two small isolated pinnacle rocks which dry 6 feet at low-water ordinary springs, and lie 800 yards apart in a northerly and southerly direction. They are both steep-to, being surrounded by depths of from 10 to 12 fathoms. The southern rock is situated 1.4 miles, 300° from the extremity of Battery Point.

4-141 Slate Islands.—A group of four rocky islands, 15, 89, 115, and 140 feet high, respectively, lie close off Wilson Point. Two of these islands, which lie closest inshore, are connected to Wilson Point and to each other by a drying coral reef; the other two islands, which are connected to each other by a drying reef, which extends in a southerly direction for 600 yards from their southern extremity and for 400 yards in a northerly direction from their northern extremity; in other directions the reef extends offshore from 200 to 300 yards. There is a deep-water channel 600 yards broad between the southern of these two islands and the outer of the two off Wilson Point.

Wilson Point, is a rocky point rising abruptly to the 215-foot summit above it; just to the northward the coast is cliffy.

4-142 Bumpus Island is a barren rocky island, 78 feet high, situated 1.1 miles 011° from the northern extremity of the northern Slate Island. A drying reef extends for 300 yards from its southern extremity in a southerly direction, and between this reef and that off the northern Slate Island there is a channel from 200 to 1,000 yards in width and with not less than 10 fathoms of water in it.

Hull Bank is an extensive mud bank with a least depth of 9 fathoms of water over it as far as yet been surveyed; it extends for 2 miles in a northward and southward direction and 1.8 miles in an eastward and westward direction. It is situated about 5 miles 270° from the Slate Islands.

4-143 Coast.—From Wilson Point the coast trends to the southward for 4.3 miles to Hope Point, a low, rocky point forming the northern entrance point to Deception Bay; the coast between these points is rocky and broken up by reddish cliffs from 100 to 200 feet high. Bluff Hill, a rounded summit, 287 feet high, situated about 1.5 miles northward of Hope Point, is wooded and has reddish, cliffy slopes extending to the coast. It is conspicuous from the southward.

4-144 Deception Bay.—A shallow bay between Hope and Buckland Points is 4.5 miles in extent in a northward and southward direction and 1.5 miles broad, the entrance to this bay between these points being 1,400 yards wide. The bay is clear of dangers; its coast line is rocky except at the northern and southern ends, where there are extensive mud flats which dry at low water; these mud flats reduce the area of the bay with more than 18 feet of water in it at low-water ordinary springs to about 1 square mile, making it thereby only useful as a secure anchorage for small vessels, except from westerly winds, to which the bay is open.

Buckland Point, the southern entrance point to this bay, is low and rocky, with a reddish cliff rising close to the southward of it. Drying reefs fringe this point, extending for a distance of 400 yards offshore.

4-145 Coast.—From Buckland Point the coast trends to the southward for 2.8 miles, then turns to the westward to Hall Point, forming two small bays on the southern coast of this bight, which are separated from

each other by a red, clifly promontory, 60 feet high. In the eastern of these two bays is Kid Islet, a small rocky islet, 34 feet high, which divides this bay into two, in either of which there is shelter for small vessels, except from northerly and westerly winds.

Tides.—It is high water, full and change, at Kid Islet at 12h. 6m.; springs rise 31 feet 6 inches, neaps rise 18 feet 6 inches, neap range 5 feet. Equinoctial tides rise 3 feet above ordinary spring tides. The tidal currents off this part of the coast run northwestward and southeastward, the flood currents running to the southward, their maximum velocity at springs being about 2 knots.

4-146 Hall Point.—An isolated rocky summit, 265 feet high, covered with trees, lies 8.6 miles 188° from the southwest Slate Island. It appears wedge shaped when seen from the northward or southward, its steep side being the eastern. It is separated from the mainland by a narrow sandy spit which covers at high water.

A small rocky islet, 66 feet high, lies close to the northern extremity of Hall Point, to which it is connected by a drying reef.

Coast.—From the southern point of Hall Point, the coast runs to the eastward for 1 mile and then to the southward for about 3 miles to Prior Point; in the bight thus formed lie the Claret Islets, a group of small rocky islets, the highest of which is 78 feet, is situated 1,600 yards 333° from the southern extremity of Hall Point. The depths in this bight are irregular, making it only useful as a shelter to small vessels from northerly winds.

4-147 Prior Point.—A long narrow rocky point, situated 2.3 miles 165° from the southern extremity of Hall Point; on its eastern side there is a narrow shallow bight between this point and the mainland. A shoal coral spit, with a least depth of 12 feet over it, is

situated 1,350 yards 309° from the extremity of Prior Point; the outer edge of the 10-fathom line, projecting from this shoal, is situated 1.3 miles in a north-northwesterly direction from this point. The general trend of the coast from here is to the southward for about 9 miles, where it turns sharply to the northeastward, forming a bay.

4-148 Barron Banks.—Two isolated coral banks surrounded by deep water, are situated about 6.5 miles 240° from Prior Point. The northern bank is 1,200 yards in length in a northwesterly and southeasterly direction, and 200 yards broad, and has a least depth of $8\frac{1}{2}$ fathoms of water over it; the southern bank is 1.6 miles in length in an easterly and westerly direction and 400 yards broad, and has a least depth over it of 7 fathoms.

From the coast between Battery Point and Prior Point the land rises in a long flat undulating ridge, covered with trees, and from 300 to 700 feet in height, running in a northward and southward direction; the only prominent summit is Wedge Hill, a wooded wedge-shaped summit, 980 feet high, with a sharp fall on its northeastern side. It is situated 9.5 miles 121° from Hall Point summit.

4-149 Montgomery Islands consist of one low sandy island densely wooded, nearly 12 miles in circumference, and several barren rocky islets to the northeastward on an extensive drying coral reef, which has only been traced on its northern and eastern sides. This reef extends to the west-southwestward from the largest island, and from it the breakwater, a long coral spit, which dries from 10 to 16 feet at low-water ordinary springs, runs in a northerly direction for 7 miles, and is about 1 mile broad; its northern extremity is situated 193° , 3.5 miles from the highest part of Cockell Bank.

4-150 **High Cliffy Islet**, 70 feet high, is situated on the easternmost point of the reef, between which and the reefs fronting the mainland to the eastward there appears to be a channel 3 miles wide.

Several rocky patches lie from 1 to 4 miles off the eastern and southeastern edges of Montgomery Reef.

A shoal, with depths of 4 to 5 fathoms, lies about 5 miles northward from High Cliffy Islet, and there are probably others uncharted.

4-151 **Cockell Reefs**.—A number of drying coral reefs, situated about 3 miles to the northward of the northern extremity of the breakwater. The largest of these reefs is 4 miles in extent in a northwestward and southeastward direction, from 400 yards to 1 mile in breadth, and is irregular in shape. On the highest part of this reef is Cockell Bank, a small sandbank, which dries 24 feet at low-water ordinary springs, and is situated 19 miles 250° from Hall Point summit.

The channel between the breakwater and the Cockell Reefs is not recommended, as the bottom is very irregular, and there are several dangers in it, including a group of rocks in midchannel with depths of less than 6 feet over them.

There are numerous detached reefs and shoals off the Cockell Reefs; owing to the strong currents and the discoloration of the water these dangers should be given a wide berth.

Reyne Shoal.—A dangerous rocky shoal of small extent, with a least depth of 18 feet over it at low-water ordinary springs, and surrounded by deep water, is situated 050° , 7.5 miles from Cockell Bank.

Thorne Reef.—A small isolated coral reef, which dries 3 feet at low-water ordinary springs, and has depths of from 10 to 13 fathoms close to it, is situated 055° , 5.5 miles from Cockell Bank.

4-152 **Nicolle Reef** (*H. O. Chart 3595*).—An isolated coral reef, 800 yards in length,

in a northwestward and southeastward direction and 400 yards in breadth, dries 2 feet at low-water ordinary springs, and has depths of 5 to 10 fathoms surrounding it. A large boulder near its center dries 11 feet, and is situated 275° 4.4 miles from Cockell Bank.

Niblock Rocks is a small rocky patch, with less than 6 feet of water over it at low-water ordinary springs. It is steep-to, and has depths of $5\frac{1}{2}$ to 10 fathoms close to it, and is situated 247° 5.1 miles from Cockell Bank.

Lorikeet Shoal, with a depth of $5\frac{3}{4}$ fathoms, lies about 7 miles northward of the large boulder on Nicolle Reef.

4-153 **Rosella Shoal**, with a depth of $4\frac{3}{4}$ fathoms, lies about $9\frac{1}{2}$ miles northwestward of Lorikeet Shoal and about $14\frac{1}{2}$ miles north-northwestward of the large boulder on Nicolle Reef. Several other shoal patches lie in the vicinity of Rosella Shoal.

Tides.—It is high water, full and change, at Montgomery Isles, at 12h. 00m.; springs rise 36 feet. The flood current sets to the southward, at the rate of 2 to $3\frac{1}{2}$ knots near the shore, and in the approach to Doubtful Bay.

4-154 **The coast** (*H. O. Chart 3419*).—From Hall Point a low, straight, rocky coast, with no shelter, trends southward for about 13 miles, where it turns sharply to the northeastward, forming a bay. Thence it resumes its southerly direction to Doubtful Bay, but is partly hid from seaward by a chain of high, rocky islands, extending southward for 10 miles from the eastern side of the point, and terminating in the northern entrance point of Doubtful Bay.

Reef.—A narrow reef fronts the shore from about 6 miles northward of Lizard Islet and extends south-southeastward to encompass that islet. There is a passage 1,000 yards wide between this reef and the shore, with depths of from 7 to 12 fathoms of water.

4-155 **Doubtful Bay** ($16^{\circ}04' S.$, $124^{\circ}27' E.$, *H. O. Chart 3419*) is about 9 miles in length, 6 miles in breadth, and 2 miles wide in its entrance (named Foam Pass) with depths of not less than 10 fathoms. Being protected from seaward by Montgomery Island reefs, and affording good holding ground, it forms a secure harbor, but has not been surveyed. Pearling vessels are sheltered here.

A range of rocky hills rises from Raft Point, its southern extremity, to a tableland of sandstone formation, 900 feet above the level of the sea; these hills back the southern and eastern shores of the bay, ranging from 600 to 700 feet in height.

Red Hill, on the southeastern shore, is conical and conspicuous; Steep Island, 490 feet high, lies eastward of Raft Point.

There does not seem to be any agricultural or even pastoral land in the immediate vicinity of the bay, and the hills, both of the island and the mainland, are most precipitous. The southeastern shore is fringed with an immense mangrove swamp, intersected by numerous deep creeks.

Anchorage.—There appears to be a regular depth of water of about 16 fathoms, across the bay, about 1 mile within the entrance; and there is good anchorage in the southern part of the bay out of the strength of the current eastward of Steep Island; the northern portion is rocky, with two or more dangers, and affords no convenient anchorage.

4-156 **Directions.**—Vessels having carefully approached Doubtful Bay, should steer in with Red Hill seen through the center of Foam Pass (at a distance of about 2 miles westward of the pass the summit of the conical hill will appear above the horizon). This course should be kept for 2.5 miles within the bay, until Success Strait, the western entrance into George Water, bears

000°, then anchor, as the tide here is felt less than elsewhere. Through Foam Passage and to the anchorage recommended the depths are apparently not less than 10 fathoms over sand and mud bottom. The tidal current has a velocity of 3 knots or more at springs.

Supplies.—Wood and water are to be had with little trouble.

There is a sandy cove close within Raft Point, and about 1,000 yards eastward a stream of fresh water was seen in the month of April, falling into the sea. A small steep island and some rocks lie off the cove and watering place, the depth being 9 fathoms close within the islet.

4-157 **George Water** ($15^{\circ}52' S.$, $124^{\circ}34' E.$), northward of Doubtful Bay, may be entered by two channels, one on each side of an island 4.5 miles in length, which separates George Water from Doubtful Bay. George Water is about 9 miles in extent northward and southward and 6 miles from eastward to westward, with a depth of 15 fathoms through a considerable portion of its length, affording good anchorage. The eastern channel from Doubtful Bay into George Water has depths of from 8 to 17 fathoms; it is, however, narrow, and the tidal current rushes through with great velocity.

4-158 **Success Strait**, the western channel, is by far the better of the two, having equally good water and an average of twice the width, while the navigation is more free from danger; the tidal current, however, runs with considerable strength. A mud bar stretches across the northern end of George Water, with a depth of 6 fathoms on the southern side and 12 fathoms on the northern, between the bar and Barlee Impediment. This impediment is formed of mangroves, and is in the northwestern part of George

Water; it has shallow channels or creeks through it.

4-159 Maitland Bay.—In the northeastern corner of George Water is Maitland Bay, with Rocky Island at the mouth. The shores are of red sandstone, covered with long grass; the soundings in the bay average 15 fathoms, and the anchorage is good. In the channel between the islands off the southern extremity of the bay and the mainland not less depths than 10 fathoms were carried.

4-160 Glenelg River discharges into George Water through Maitland Bay. A reef bars the entrance of the river, but there is a deep channel near the southern end of the reef. The mouth of the river is about 500 yards wide for the first mile, taking a south-eastward course. There are several rocky islets in this first mile, from 25 to 50 feet high. The banks also partake of the same precipitous character. A bend of the river opens into a reach having a northerly course for 4 miles; this reach, like the first mile, is studded with islands and reefs running parallel to the general course. At about 2 miles up the reach on the right bank there are mangrove and mud islands, with probably a connection with Barlee Impediment. Above the northern termination of this reach the rocky banks of the river give place to mangrove and muddy shores.

The Glenelg may be described as safe and easy to navigate in a small steamer for 40 miles, from Foam Passage to the lower falls or rapids. Above the rapids cargo boats might ply for fully half the year to a farther distance of 25 miles, but this navigation would be uncertain between the months of May and November. The Gairdner and Fish Rivers (names not charted) have a rise of tide of not less than 10 feet; water communication to a limited extent, therefore, could

be depended upon in these rivers for the same period as in the upper Glenelg.

Mount Lyell, 1,600 feet high, with Mount Stewart, southwestward of it, are charted on the northern bank a few miles above the lower falls.

Supplies.—Kangaroos, particularly the larger species, were very numerous in the Glenelg District. Birds also were abundant, including amongst many others, the emu, geese, ducks, turkeys, pheasants, jungle fowl, and the lyre bird. The waters of the district are also rich with both salt and fresh water fish, the dugong, turtles, crawfish, and pearl oysters in the former, whilst the latter streams teem with fish of large size and excellent flavor. Dolphins and seals frequent George Water; aquatic snakes and alligators are numerous.

Tides.—The tidal current in Doubtful Bay runs with a velocity of 1 to 3 knots, with a rise of 36 feet. It is high water, full and change, at Barlee Impediment about 9h.; springs rise 36 feet. The highest tide occurs three days after full and change. In Long Reach, Glenelg River, the tide rises 28 feet, the flood running 5 hours and the ebb 7 hours.

4-161 Coast—Eagle Point ($16^{\circ}10' S.$, $124^{\circ}24' E.$) lies 7 miles southward from Raft Point and has a small reef about 1,000 yards to the westward. It is a rocky spur of sandstone, projecting northward from a high range, and is the eastern point of approach to Collier Bay.

The coast between Eagle and Raft Points forms a bay bordered by a flat, which dries at low water, off which a vessel may find temporary anchorage, comparatively out of the stream.

4-162 COLLIER BAY (*H. O. Chart 3419*) is about 21 miles across from Eagle Point to its western extremity, off which are

the Wood Islands, two wooded islands, which lie 2 to 7 miles in a north-northeastward direction, with a chain of islets and reefs extending in a northwesterly direction to Viney and Cæsar Islands. The bay is 15 miles in length, and terminates to the southward in Secure and Shoal Bays.

The eastern shore of Collier Bay from Eagle Point consists of high rocky points and shallow bights, mostly lined with mangroves and fronted by numerous islets and rocks. High Bluff, 6.5 miles southward of Eagle Point, and two small islands about midway between the point and the lagoon, are of gray slate formation. A coast range of moderate height extends from Eagle Point to the head of the bay, which is remarkably rugged, with here and there a cone.

The few soundings obtained in Collier Bay were from 12 fathoms and upwards, but along the eastern shore there appears to be anchorage in from 5 to 11 fathoms, sand and mud bottom, between High Bluff and the bight of the bay.

4-163 Secure Bay ($16^{\circ}25' S.$, $124^{\circ}21' E.$), the easternmost of the two bays at the head of Collier Bay, is a considerable sheet of water, with a narrow entrance named the Funnel, studded with rocks, through which the tidal current rushes with a velocity of 4 to 6 knots. In the southeastern corner of the bay is a channel leading into a sheet of water equal in extent to George Water, and bounded on all sides by mangrove banks and creeks. A very strong current runs through this narrow channel, which, near its entrance, has an island in the middle and perpendicular cliffs on both sides. Beyond the first wide reach, which trends to the southeastward, is a second narrow passage with whirlpools formed by the tidal currents which rush through with greater

strength than in the entrance narrows, making the passage both difficult and dangerous.

4-164 Shoal Bay, the western head of Collier Bay, has islets of red sandstone, and rocks stretching across the entrance; its shores are lined with mangroves. The grass on the islands is thin but of good quality, beans grow in great abundance, and the eucalyptus trees attain a height of 50 feet, and give evidence of occasional strong winds prevailing.

Anchorage, in 4 fathoms, may be had at the mouth of Shoal Bay.

Supplies.—The islands are frequented by turtle, but in the dry season there is no water.

Tides.—High-water interval at Collier Bay is 11h. 35m.; mean range 23 feet, spring range 36 feet.

The tidal current was found to gradually decrease in strength toward the head of the bay, where it scarcely exceeds one-half of a knot.

4-165 The coast (*H. O. Chart 3595*) from the western entrance point of Collier Bay trends westward about 12 miles, and thence trends northwestward to Koolan Island, forming a bay which has not yet been surveyed.

Between the breakwater and Sanders Point, Koolan Island, are several islands and reefs, which almost entirely block the entrance to Collier Bay, except apparently for two channels, the eastern of which passes on either side of Viney Island, and to the eastward of the eastern Wood Island, between it and the drying coral reefs extending to the westward from the Montgomery Islands; the western channel passes close to the east shores of Koolan Island. Neither of these channels has as yet been examined.

The southwestern shore of Collier Bay is backed by a range of barren rocky hills, from 600 to 800 feet high, rising abruptly from it, and is fronted by several islands

(3538) A U S T R A L I A—North coast—Buccaneer Archipelago—Denman Shoal—Depth reported.—A depth of 5 fathoms 5 feet has been reported (1966) in (approx.) $15^{\circ}42.2'$ S., $123^{\circ}56.3'$ E.

(N.M. 22/66.)

(N.M. 15(145), Sydney, 1966.)

H.O. Charts 3419, 3416.

H.O. Pub. 74, 1952, page 171.

and rocks, the southeastern group extending 3.5 miles from the shore. Another island lies near the shore, 6 miles southeastward of the western entrance point, and is 480 feet high.

The most important of the islands at the entrance to Collier Bay are as follows:

4-166 **Viney Island**, the northeastern island of this group, is rocky and covered with grass, and is situated 063°, 14.1 miles from Sanders Point. Its highest part, 140 feet, is at its northern end; its eastern shore is cliffy.

A spit, on which are several rocks above high water, extends for 1,200 yards from the western extremity of this island, and a small coral patch, which dries 3 feet, is situated 1,700 yards 299° from the western extremity of this island.

The Pyramid.—A small barren rock island, cone shaped, and 190 feet high, is situated 144°, 3 miles from Viney Island summit.

There are several small islets between this and the Wood and Caesar Islands, which are apparently all connected by drying coral reefs.

4-167 **Caesar Island** is rocky and covered with grass; it is 1,000 yards long in a north and south direction and 400 yards in breadth, and 93 feet high. It is situated 071°, 8.8 miles from Sanders Point. A drying coral reef extends for 1,000 yards in a northerly direction from the northern extremity of this island.

Scaddan Island.—A narrow rocky grass-covered island, 210 feet high, is 1.3 miles in a north-northwestward and south-southeastward direction and 400 yards broad. It is located 3 miles eastward of Sanders Point. A rock, which dries 4 feet, lies about 400 yards northwestward of the northwestern extremity of the island.

4-168 **The Sisters** are two rocky, grass-covered islands, 172 and 165 feet high, respectively; the northern one lies 128°, 2.5 miles from Sanders Point, and from it the southern one is 1,000 yards in a southerly direction.

Denman Shoal, an extensive shoal, with a sandy bottom and less than 20 fathoms of water over it; the least water obtained on this shoal was 10 fathoms, which is situated 294°, 9 miles from Cockell Bank.

Tidal currents.—The tidal currents between the Cockell Reefs and Koolan Island run in a northwesterly and southeasterly direction, the ebb current running to the northwestward, and turns one hour after low water by the shore; the flood current turns one hour after high water by the shore. These currents attain a maximum velocity at springs of from 2 to 3 knots.

General.—Certain places in the latter part of this chapter are not charted, and according to recent surveys (1945) the charted positions of some places are incorrect by 1 or 2 miles.