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**SECTOR 8** — CHART INFORMATION

## SECTOR 8

### LOUISIADE ARCHIPELAGO

**Plan**—This sector describes the 10 volcanic islands and numerous coral reefs lying within the parallels of 10°10'S and 11°45'S, and the meridians 150°55'E and 154°25'E, with the exception of Basilaki and several small islands lying close E of it. The arrangement is from W to E.

#### General Remarks

**8.1** Louisiade Archipelago is part of the Territory of Papua. The islands of **Tagula** (10°30'S., 153°30'E.), Pana Tinani, Rossel, and Misima are high and mountainous. The remaining islands in the archipelago are small. The main portion of the group is encircled by a barrier reef, through which there are numerous passages. Rossel Island is surrounded by a separate reef of considerable extent. A large portion of the archipelago has been surveyed. Little is yet known in the area at the W end of the archipelago, and between that archipelago and **Woodlark Island** (9°00'S., 152°50'E.) with its adjacent islands, and the **D'Entrecasteaux Islands** (9°00'S., 151°00'E.). Vessels must exercise caution while navigating in this area.

These islands possess considerable natural wealth. Alluvial and reef gold have been found, and for many years gold mining yielded the largest returns. Production has now dwindled due to the exhaustion of the alluvial deposits. Numerous beds of pearl shell exist, but the great depth in which they are found prevents the fishery being extensively prosecuted.

#### Barrier Reef—East of Stuers Islets

**8.2** The barrier reef extends in an E direction for nearly 60 miles between **Stuers Islets** (11°06'S., 151°08'E.) and Jomard Entrance. The reef is awash and steep-to on the seaward side with openings in places. The waters to the N of this part of the reef have not been sufficiently explored to render them safe for navigation.

**Quessant Island** (Tariwerwi Island) (11°09'S., 151°15'E.), a low wooded island, lies on the NE end of a reef forming a portion of the barrier reef, in a position about 7.5 miles ESE of Stuers Islets. Three reefs occupy nearly the whole space between Stuers and Quessant Islets. A large reef lies close SE of the island and a patch of discolored water lies 0.75 mile further SE.

Vessels can take anchorage, sheltered from SE winds, under the lee of the reefs lying between Quessant Island and Stuers Islets. The anchorage is not good. The bottom consists of coral, with irregular depths of from 11 to 40m. There are depths of from 12.8 to 16.5m N of Quessant Island, but there is no shelter, as the swell sets through the openings between the reefs on either side.

Imbert Islet, located about 8.5 miles N of Quessant Island, is low and wooded with a reef extending about 0.5 mile S of it. Two reefs, awash, lie, respectively, about 1.5 miles S and 2 miles SW of the islet. There is a reef awash 1.25 miles S of

Imbert Islet and a crescent shaped reef 2.5 miles SW of this islet.

Rapid Patches are two shoals, with depths of 10.9m and 7.3m, lying, respectively, about 5.5 and 8 miles E of Imbert Islets.

**Sable Islands** (11°11'S., 151°21'E.) are three sand cays on the NW edge of a reef lying about 5.5 miles ESE of Quessant Island. The SW cay has a few trees on it. The sand cay at the NE end of the reef was covered with vegetation, the middle one being bare, but possibly is now overgrown like the others. There is an opening about 3.5 miles wide between Sable Islets reef and the reef lying close SE of Quessant Island. Discolored water and heavy rollers, appearing like a shoal, were observed in this opening.

Vessels can take anchorage during the SE Monsoon in a position about 0.5 mile NW of the NE Sable Islet.

**Anchorage Reefs** (11°11'S., 151°27'E.) are two reefs extending about 7.5 miles E of the NE most Sable Islet. The W reef is separated from Sable Islet reef by a channel, about 1 mile wide, with a least depth of 12.8m.

**Kosmann Island** (Maragili Island) (11°04'S., 151°32'E.), low and wooded, lies about 11 miles NE of the NE most Sable Islet. The island is surrounded by a number of small reefs.

Several dangerous shoals lie SW of Kosmann Island.

The best anchorage off Kosmann Island lies about 1 mile NW of the island in a depth of 10.9m, coral.

**Long Reef** (11°10'S., 151°39'E.), an extensive atoll, lies with its SW end close E of Anchorage Reef. The lagoon, which appears navigable, but has not been surveyed, is enclosed on its N and S sides, and at its E end, by an almost continuous barrier reef. On the N side the reef is always above water and has several sand cays and much driftwood on it. Several cays with mangrove bushes lie near the W extremity of the reef about 3 to 4 miles SE of Kosmann Island. There are some rocks above water near the center of the reef on the S side. No openings could be found into the lagoon from the S or E, but it is probable there are passages between the patches which stretch across its W end.

There is a narrow opening between the SW extremity of Long Reef and Anchorage Reefs, but it has not been surveyed.

There is an opening in the barrier reef from 2 to 3 miles wide between the E end of Long Reef and the atoll forming Bramble Haven. Tidal currents run at a considerable rate through this passage. No bottom could be found with a 183m sounding in the passage or in the waters S of Bramble Haven. This opening is reported to be a good passage. Vessels must exercise caution because the reefs are difficult to see and there are no islets in the S entrance.

**Lejeune Island** (11°10'S., 151°49'E.), low and wooded, lies on the N side of Long Reef, about 3 miles W of its E extremity.

Vessels can take anchorage during the SE Monsoon in the bay formed between the patches which lie at the W end of

Long Reef, Anchorage Reef, and Kosmann Islet, the water being smooth and depths regular.

**8.3 Bramble Haven** (11°14'S., 152°00'E.) is the lagoon of an atoll, which is about 10 miles in length in an E-W direction and 6 miles in breadth. The depth in Bramble Haven, as far as it was sounded, were found to be from 10.9 to 37m, sand and coral. The water was smooth and sheltered from every direction by the surrounding reefs awash.

Bramble Haven has four entrances, but the only safe one is at the SW corner, which is 0.75 mile wide, with depths of from 10.9 to 18.3m.

Duperre Islets consisting of five low, wooded, uninhabited islets and a sand cay, lie on the N side of Bramble Haven. The middle islet is located about 11 miles E of Lejeune Islet. Punawan, the E islet, is about 30m high to the tops of the trees.

Vessels can take good anchorage about 0.25 mile NE of the middle of Duperre Islet in a depth of from 12.8 to 18.3m.

The E part of Bramble Haven reef was reported to lie 0.3 mile E of the charted position.

**Jomard Islands** (11°15'S., 152°08'E.), consisting of two islands, which are wooded and uninhabited, lie at the S end of Jomard Entrance.

Pana Waipona, 26m high, is the largest and W most of the islands. A steep-to reef, with two partially submerged wrecks on it, extends about 1 mile S of the island. The fringing reef extends about 91m from the W side of the island.

A light stands on the W extremity of Pana Waipona Island.

A bank, with a depth of 37m was reported to lie about 2.75 miles WNW of the light structure.

Pana Rai Rai, the E island, lies 2 miles ENE of Pana Waipona Island. The island lies on the NW end of Uruba Reef. A shallow spit, with submerged rocks off the end, extends about 0.7 mile NNW from the island.

**8.4 Jomard Entrance** (11°15'S., 152°07'E.), a deep, clear channel between the E part of the barrier reef surrounding Bramble Haven and the W side of Uruba Reef. It is used by vessels trading between Australia, China, and Japan.

The passage is about 5 miles in width, with depths of over 183m. Pana Waipona Island lies toward the E side of midchannel with depths of less than 274m between it and Uruba Reef.

The tidal currents run through Jomard Entrance at the rate of 3 to 4 knots; the flood sets S by E, the ebb N by W. The currents cannot be allowed for with absolute certainty. In the NW part of the entrance there are tide rips.

Discolored water was reported about 60 miles S of Jomard Entrance.

**Directions.**—Deep-draft vessels, N through Jomard Entrance, may pass on either side of Pana Waipona Island and should then steer to pass between Lunn Island and **Pana niu** (10°49'S., 152°11'E.), the W most islet of the Torlesse group. Vessels should then pass E of Bunora Island, and W of Hastings Island, then to Bougainville or Goschen Straits. The courses and distances along this track can best be seen on the chart.

## Barrier Reef—East of Jomard Entrance

**8.5** East of Jomard Entrance, the barrier reef encircles many of the islands of the Louisiade Archipelago. One part of the barrier reef extends in an E direction for about 30 miles as a much broken and partly submerged obstacle. There are some islands and reefs near Jomard Entrance. The Sunken Barrier, is a reef lying E of these islands with considerable depths in places. The character of the reef changes completely E of this submerged portion, and for over 80 miles runs in an ESE direction, maintaining a solid and almost unbroken front, to a point 12 miles E of Tagula Island.

The other part of the barrier reef runs in a NE direction for about 36 miles from Jomard Entrance. Then it runs in a SE direction and eventually connects with the first branch E of Tagula Island.

**Tides—Currents.**—The tidal currents run with considerable force through the passages in the reefs and generally set straight through. West of Jomard Entrance the South Subtropical Current generally sets W. However the currents in this area are variable with rates up to 2 knots and the direction may be influenced by the NW Monsoon.

On the Sunken Barrier, E of the **Duchateau Islands** (11°17'S., 152°22'E.), the currents were observed to run as much as 4.5 knots, the strength of the flood setting SSW and the ebb NNE. This velocity was only apparent during strong SE winds. The rate, at other times, is about 2 knots.

On the Sunken Barrier the first portion of the flood sets about SW, gradually changing its direction to the S, the last quarter running to the SE; then, with only a short period of slack water, the first of the ebb makes to the NE, gradually changing to N and NW. The change of current coincides very nearly, with the times of H and LW, but in the passages the currents may continue to run for perhaps an hour longer. It was reported, that under certain conditions of wind, the currents in the passages may overrun H or LW at the shore by as much as three hours. The currents cannot be allowed for with absolute certainty.

In the E part of the Louisiade Archipelago the flood current runs SW and the ebb in a contrary direction, but these are modified by the reefs and the trends of the coast. The current turns, approximately, at H and LW by the shore.

Through the narrow openings the tidal currents run from 3 to 5 knots, and this is more especially the case in the passages through the outer barrier reefs, where they cause overfalls and tide rips. From three days before to three days after full and new moon there is not much change in the strength of these currents. During this period they have their maximum strength, and there is little or no interval of SW. In the intervening period their rate diminishes considerably and suddenly.

**Montemont Islets** (11°18'S., 152°18'E.) are two small, bush-covered islets, lying on the barrier reef in a position about 7 miles SE of Pana rai rai.

Iataui, the W islet, 12.2m high, lies on the N edge of a small coral reef. A smaller reef lies 1.5 miles W of Iataui Islet. It is surrounded by foul ground except on its S side. The passage between these two reefs, which are steep-to on their S sides, should not be attempted as the bottom is uneven, with heavy overfalls and tide rips.

A reef, with a least depth of 7.3m, lies about 1.5 miles N of Iataui Islet.

Pana Boba, the E and larger islet, is 15.2m high and lies in the center of a larger crescent-shaped reef. Rocks and foul ground extend about 1 mile from the N and NW sides of Pana Boba Islet. The E edge of the crescent-shaped reef, on which the sea breaks heavily, is a mile from the islet, and foul ground extends 0.25 mile farther E.

There is a channel across the barrier reef between the SE end of **Uruba Reef** (11°16'S., 152°12'E.) and the small reef about 3 miles SE of it, with depths from 10.9 to 14.6m. The channel is narrowed to a width of 1.5 miles by a spit with depths of 7.3m or less, extending E from Uruba Reef. A reef, with a depth of 9.1m lies in the SE part of the channel.

Vessels can take fair anchorage off the N side of Montemont Islands, outside the limits of the rocks and foul ground, in depths of from 22 to 28m, sand and mud.

**8.6 Duchateau Islands** (11°17'S., 152°22'E.), lying NE of Montemont Islands, consist of three low wooded islets, which are inhabited.

Pana bobai ana, the W most and largest islet, is 23m high, and fringed by a sunken reef. This reef extends about 0.25 mile from the SE side of the islet and 183m from the N side. The NW side of the reef is broken, affording landing on the sandy beach.

Hacker Patch and Ellery Patch, two reefs, with depths of 7.3m, lie, respectively, about 1.25 and 0.75 mile N of the N extremity of Pana bobai ana.

Pana rura wara and Kukuluba, the two E islets, lie on the N and NW edges of a reef which dries, located about 0.5 mile E of Pana bobai ana. Foul ground lies off the N and NW sides of this reef.

A narrow channel, lies between the reefs surrounding Pana bobai ana and Pana rura wara Islets, with depths of from 7.3 to 10.9m. The channel is poor, because of the heavy swell and overfalls caused by the strong tidal currents. A reef, with a depth of 3m lies in the N entrance.

There is a channel about 1.75 miles wide between the edges of the reefs surrounding Pana bobai ana Islet and the E Montemont Islet. It is clear of dangers, the charted depths are between 10.9m and 20m. Tide rips occur at the S end of this channel.

Vessels can take anchorage, sheltered from the SE Monsoon, about 0.5 mile N of Pana rura wara Islet, in depths of from 31 to 35m, sand and shells.

The change of the tidal currents coincides very nearly with H and LW, but in the channels the currents may continue to run for perhaps an hour after H and LW by the shore.

The flood current sets to the S and the ebb to the N.

**Anchor Patches** (11°20'S., 152°34'E.), consisting of 3 patches with a least depth of 7.3m over them, lie about 11 miles ESE of the Duchateau Islands. Shoals, with depths of from 3.7 to 9.1m, lie between Anchor Patches and the reef, awash, at the SE end of Sunken Barrier, about 5.5 miles SE.

It is not advisable to cross the barrier reef E of Anchor Patches unless quite certain of the vessels position.

**Duchateau Entrance** (11°18'S., 152°28'E.).—The best approach from the S and W to the inner waters N of the barrier reef is over the Sunken Barrier between the Duchateau Islands and Anchor Patches. The edge of the reef surrounding the E most Duchateau Island may be clearly seen, and immediately E

of this reef the barrier may be crossed in depths of from 12.8 to 29m. Duchateau Entrance, with a least depth of 14.6m at its S end, lies about 5.5 miles E of Duchateau Islands. Another passage, with depths of more than 18.3m, lies about 2 miles farther E. The depths over other parts of the Sunken Barrier are from 7.3 to 18.3m.

## Calvados Chain

**8.7 Calvados Chain** (11°10'S., 152°45'E.) is a long succession of mountainous islands extending in a general ESE direction from **Panasia Island** (11°08'S., 152°20'E.) and terminating with Hemenahi Island, about 43 miles E of Panasia.

The larger islands are densely wooded, especially on their S sides. They are sparsely populated with most of the villages located on the N sides of the islands.

Vessels must exercise caution when navigating among these islands, as the reefs are all difficult to see except in very good light conditions.

There is a passage, with depths of over 9.1m, leading into the inner waters of Louisiade Archipelago. It is about 3 miles wide and lies between the reef extending N from Pana rai rai, the E of the Jomard Islands, and the reef extending 9 miles SW from Panasia Island, about 11 miles NE.

Mabb Patch, with a depth of 5.5m, lies in the middle of the above navigable channel in a position about 2.5 miles N of Pana rai rai Island.

Kei keia Reef, 3.5 miles in length and 2 miles in breadth at its SW end, lies in a NE and SW direction. The NW side of the reef is steep-to, but foul ground extends about 2.5 miles from its S and SE side. The area should be avoided.

Kei keia Reef is separated from Pana Vara vara Islet Reef, located E of it, by Howai Tinua Passage, which is heavily encumbered with shoals and useless as a channel.

**Pana Vara vara Islet** (11°08'S., 152°18'E.), lying 10 miles NE of Pana rai rai, is rocky and wooded with a sharp summit 105m high. A sand spit extends from the N end, on the E side of which there is a village and a good landing place. The islet stands on the SE end of a reef. A channel, about 0.5 mile wide, lies between Pana Vara vara and Horrara gowan Reef. This channel is clear of dangers, though somewhat tortuous, with depths of from 12.8 to 33m. The channel is not recommended for general use, because the S approaches are encumbered with reefs extending 2 miles SE of Pana Vara vara.

Vessels passing through the channel should keep to the SW edge of the fringing reef off Panasia Island in order to avoid the foul ground farther to the SW. There are shoals with least depths of 1.8m in this area.

The tidal current sets through this channel with great strength, forming strong eddies.

**8.8 Panasia Island** (11°08'S., 152°20'E.) is rugged and composed of cliffs, nearly perpendicular, with ravines between them. The summit, 161m high, is near the center of the island. The island is 2 miles in length and 0.5 mile in width at its E end. The other portion of the island is narrow, terminating in a rocky point at the W end.

**Horraragowan Reef** (11°06'S., 152°18'E.) extends about 4 miles NW of Panasia Island and is 1.5 miles in width. The drying outer edges enclose a lagoon in which there are numerous shoals. The E side of Horraragowan Reef is broken and not safe to approach when transiting Cormorant Channel.

Ehiki Islet, 15.2m high and wooded, lies near the N end of this lagoon. Nasakoli Islet lies on the W side, about 1 mile N of the W extremity of Panasia Island.

**Tawal Reef** (11°04'S., 152°21'E.), an extensive horseshoe-shaped reef, lies separated from Horraragowan Reef by Cormorant Channel. The enclosed lagoon is open to the S, but the entrance is encumbered by several reefs. One of the Sloss Islets lies on its NE edge.

**No ina Islet** (11°05'S., 152°21'E.), small and wooded, lies on the NE side of Cormorant Channel and 3.25 miles N of the E end of Panasia Island. It is situated on the W end of a small reef separated from Tawal Reef by a channel 0.4 mile in width.

A reef, with a least depth of 7.3m, lies about 1 mile SSE of No ina Islet. During flood current there are heavy overfalls over this reef.

**Cormorant Channel** (11°05'S., 152°20'E.), about 1.5 miles wide, lies between Tawal Reef and Horraragowan Reef. The least depth is about 28m. A reef, with a depth of 9.1m, lies nearly in mid-channel, about 2 miles NNE of the E side of Panasia Island.

The tidal currents run through Cormorant Channel with considerable force, the flood setting SE and the ebb NW.

**Sloss Islets** (11°03'S., 152°23'E.) are two wooded coral islets lying about 1 mile apart in an E and W direction. Rara, the W islet, 35m high, lies on the NE edge of Tawal Reef. Panaroba the other islet, 33m high, lies on the NW edge of the reef lying between Tawal Reef and Utian Island Reef.

**8.9 West Brooker Passage** (11°03'S., 152°24'E.), separating the two reefs on which the Sloss Islets stand, has a width of 0.33 mile in the middle, but widens from 0.7 to 0.8 mile at each end. The reefs on either side of this channel are steep-to, except W of Panaroba Islet, where shoal water extends a short distance into the passage.

In the S half, on the W side of the channel, a narrow ridge with depths of 7.3m or less extends about 0.75 mile SSE of the SE extremity of Tawai Reef. Foul ground extends about 0.5 mile S from the S end of the reef forming the E side of the channel. These spits are usually marked by overfalls and tide rips.

**Utian Island** (Brooker Island) (11°03'S., 152°27'E.), 140m high at its S end, conical and wooded, lies about 4.75 miles ENE of No ina Islet. The island is located in the middle of a lagoon enclosed by a coral reef, the edges of which, generally, dry. There are two bays on the N side of the island. A ridge traverses the island throughout its length, rising to a height of 106m at the W end. There is a boat channel into the lagoon SW of the W extremity of the island. This channel, though encumbered with reefs, has depths of from 12.8 to 18.3m.

**East Brooker Passage** (11°03'S., 152°26'E.) lies between the reef surrounding Utian Island and the reef on which Panaroba stands. The S half of this channel is divided by a pear-shaped reef, which may be passed on either side. Shoal water extends 0.33 mile S and SE of the reef. The preferred

passage lies to the W of this reef, with depths of from 51 to 59m.

The tidal current runs through East Brooker Passage at the rate of from 5 to 6 knots at springs, the flood setting SSE and ebb in the opposite direction.

**Caution.**—Approaching from S, it is not desirable to take either of the Brooker Passages on the ebb, as the vessel is likely to become uncontrollable. The shoal water off the S edges of the reef render caution necessary, as they cannot always be seen. The W passage is the better of the two, being wider and, therefore, having less strength of current.

Anchorage is not available in the vicinity of the islands and reefs described above. The N, or lee sides are too steep and the S sides too exposed to wind and sea during the SE trade. In the channels these disadvantages are aggravated by the strength of the tidal currents.

**Panarora Island** (11°07'S., 152°30'E.), about 4 miles SE of Utian Island, is rocky with a 164m peak near its E end. The island is conspicuous from E, appearing as a lofty conical tower. The island is fringed by a reef extending farthest offshore on the NW side, where there is a village.

Haikuri Shoal, with a depth of less than 1.8m, coral, lies about 1 mile NW of the NW end of Panarora Island. It breaks heavily with any swell. The shoal is steep-to on its SE side, with a deep channel between it and the reef surrounding Panarora Island. Shoals, with depths of 9.1m and 2.7m lie, respectively, about 0.5 mile N and 0.75 mile NNE of Haiku iri Shoal.

A shoal, was reported to lie about 1 mile S of the E extremity of Panarora Island.

**8.10 Pana udu udi Island** (11°03'S., 152°29'E.), 119m high, lies about 1.25 miles E of Utian Island. Toloi awa Islet, 73m high, lies close off the SE end of the island.

Two reefs, separated by a deep channel, extend about 2 miles S from Pana udu udi Island.

**Spire Islets** (11°05'S., 152°29'E.) are two small coral islets, standing on a small reef close off the SE corner of the reef surrounding Utian Island. The islets are 0.25 mile apart and covered with bushes from 6.1 to 9.1m in height.

A deep channel, which is from 0.3 to 0.5 mile in width and 3 miles in length, lies in a NNW and SSE direction between the reefs encircling Utian and Pana udu udi Islands.

The best entrance to this channel from the S is close E of Spire Islets, avoiding Haiku iri Shoal and the shoals N and NNE of it. The tidal currents in the channel run very strong, the flood setting to the S and the ebb to the N.

**Gulewa Island** (11°03'S., 152°31'E.), lying about 1 mile E of Pana udu udi Island, has a peak near each end. The S peak, 96m high, is covered with trees. The N peak is low and bare. The island is cultivated and has a village in the cove on the SE side.

Tobaiam Islet, 44m high, lies close off the S extremity of Gulewa Island. Sibumbang Islet, 23m high, lies about 0.75 mile NE of the N extremity of the same island.

**Aiwa Buna Reef** (11°02'S., 152°31'E.) forms the N side of the lagoon in which lie Pana udu udi and Gulewa Islands. It is 4 miles in length and steep-to on its N side. In the lagoon, which has not been closely examined, there are depths of from 18.3 to

26m and numerous reefs throughout. Two passages lead into the lagoon, one with a depth of 7.3m to the N of Pana udu udi Island and the other to the W of Tobaiaam Islet, but neither of them can be recommended for a vessel.

Hana Hawawan Reef consists of series of reefs extending about 2.25 miles in a NNE direction from Tobaiaam Islet, leaving a narrow passage between its N end and the E end of Aiwa Buna Reef.

**8.11 Saru nom nom Islet** (11°02'S., 152°33'E.), 15.2m high and wooded, is situated on the N end of a reef which lies E of Gulewa Island.

**Pana Tatoni Islet** (11°03'S., 152°34'E.), 26m high, is situated about 0.8 mile SE of Saru nom nom and on the W edge of a reef about 0.6 mile in length.

**Horakiraki Passage** (11°01'S., 152°33'E.), an opening in the barrier reef about 0.5 mile in width, lies close E of Aiwa Buna Reef. The E part of the passage is encumbered with reefs, but there is a fairway on the W side which may be used with safety by small vessels with local knowledge. The only danger is a reef, with a depth of 3.6m, lying 183m N of Hana Hawawan Reef.

**Directions.**—The central and highest tree on Pana Tatoni Islet, in range with the summit of **Panua Keikeisa Islet** (11°06'S., 152°36'E.), bearing 141°, leads directly through the channel. The E extremity of Pana Tatoni Islet in range with the S extremity of **Ninan Islet** (11°04'S., 152°35'E.), bearing 138°, leads close SW of the coral heads on the NE side of the passage, but rather close to the NE corner of Aiwa Buna Reef. This reef is steep-to, distinctly visible, and can be rounded by eye. This latter range is probably preferable, as the summit of Panua Keikeisa is not easy to see over Pana Tatoni.

**Caution.**—The narrowest part of the channel is between this reef and a coral head, with a depth of 5.5m, lying 0.15 mile to the E. Here the tidal current runs with considerable strength in a somewhat oblique direction, necessitating strict attention to the range marks, and a careful lookout for the patches, which will usually be visible.

**Howaho aimo Passage** (11°03'S., 152°32'E.), leads into Horaki raki Passage, between the SE side of Hana Hawawan Reef and the W side of the reef on which Saru nom nom Islet stands. There is a small reef, which nearly dries, in the middle of the channel, about 0.75 mile SW of the S extremity of Saru nom nom Islet, which narrows the channel to 0.2 mile. The edge of the reef on the E side is fairly steep, and on this side is the best passage. A tongue of shoal water extends 0.15 mile in a NW direction from the N end of Saru nom nom Islet Reef.

The E extremity of Pana rora Island, in range with the W extremity of **Venariwa Island** (11°04'S., 152°32'E.), bearing 203°, leads through the channel between the reef and the edge of the reef on the E side.

**8.12 Moturina Island** (Motorina Island) (11°05'S., 152°34'E.) rises to a pyramidal hill, 301m high, at its W end. It is densely wooded, and of irregular shape. The hill is most conspicuous when viewed from the SE. It appears flat-topped from the SW.

The SE side of the island forms a bay, fringed by a reef, on which the sea breaks heavily. A reef, lies about 0.5 mile off the

middle of this side of the island. Several villages are located on the shores of the bay. The E side, which is fringed by a reef, but without any off-lying dangers, is exposed to the prevailing wind. There are depths of 3.6m and 7.3m extending 1 mile offshore in the middle of the N coast. On the SW side, about 0.5 mile NW of the S extremity, there are submerged rocks, some of which break, with other shoal depths, about 0.2 mile NW of it. There is an anchorage in this area in 7.3m.

Vessels can take sheltered anchorage in Riman Bay, on the NW side of Moturina Island, in a depth of 18.3m, sand. Vessels should bring Moturina Peak in range with a rocky point about midway between the entrance points, bearing 159°, and the NW point of Moturina Island in range with the W summit of Ululina Island, bearing 241°. This anchorage is the best in this part of the Calvados Chain, and is out of the influence of the tidal currents.

Anchorage is also available on the SW side of Moturina Island between the reef fringing shore and off-lying shoals, in depths from 11 to 18m.

**Ninan Islet** (11°04'S., 152°35'E.) lies about 0.5 mile N of the NE point of Moturina Island. The islet has a peak at each end, the N and higher, is wooded with an elevation of 53m. Shoals, with a depth of 5.5m, lie between Ninan Islet and Moturina Island.

**Ululina Island** (11°05'S., 152°32'E.) lies W of Moturina Island, from which it is separated by Ara gum gum Passage, which is about 0.25 mile in width. The wooded summit, 99m high, stands on the E end of the island. On the W end of the island, where a village is situated, there is a grassy peak, 51m high.

A reef extends about 0.7 mile W from the W end of the island. A shoal, with depths of from 5.5 to 7.3m extends 0.2 mile from the NE side of the island. Foul ground, which does not break in calm weather, extends 0.4 mile S from the SE side of the island. A dangerous rock lies between the W end of Ululina Island and the S side of Venariwa.

**8.13 Ara gum gum Passage** (11°05'S., 152°33'E.) is 0.2 mile wide at the S end between the foul ground extending S from Ululina Island and the reefs lying off the SW side of Moturina Island. The passage is 0.15 mile wide between the islands with depths of from 12.8 to 16.5m.

The tidal currents set strongly through Ara gum gum Passage, the ebb to the N and the flood to the S. The range marks are good, and the channel presents no great difficulty.

**Directions.**—Vessels approaching Ara gum gum Passage from the S should keep the E extremity of Ululina Island in range with the SW end of Saru Nomnom Islet, bearing 002°. This range leads 183m E of the foul ground lying S of Ululina Island, and between it and the shoals to the SE, crossing the connecting barrier in a depth of 12.8m. When the SW extremity of Ululina Island is in range with the NE point of Utian Island, bearing about 298°, steer 015°. When the SW point of Moturina Island bears 167°, bring this point astern on this bearing, which leads midway between the fringing reef on the Moturina side and the shoal extending from the NE side of Ululina Island, in depths of 5.5 to 7.3m.

**Venariwa Island** (11°04'S., 152°32'E.), lying NW of Moturina Island and close N of Ululina Island, is covered with grass and 152m high. The island presents a sharp peak when

seen from the NW or SE, but from other directions it appears more or less flat-topped.

The S and W sides of the island are fringed by a reef. A rock, which dries 1.5m, lies about 91m S of the S extremity of the island. There are rocky patches lying awash 0.2 mile SW of this drying rock.

Gowan Passage, between Venariwa and Ululina Islands, is only 91m wide between the rocks awash off the SW end of Venariwa Island and the edge of the shoal, with depths of 3.6 to 5.5m, extending N and W from Ululina Island. The passage is not recommended.

**Gua awana Passage** (11°04'S., 152°32'E.), lying between Tobaia Islet and Venariwa Island, about 0.85 mile SE, is deep in the fairway.

The tidal currents run with considerable strength through Gua awana Passage. The flood setting S and the ebb to the N. These general directions are modified by the trend of the reefs.

**Emerald Shoal** (11°08'S., 152°33'E.), with a least depth of 4.5m, lies about 1.5 miles S of the S extremity of Moturina Island. It lies in the fairway of vessels making for Boiu Passage from the W, and must be approached with care, as there is no good clearing mark for it.

Two shoals, with depths of 10.9m, lie 0.25 mile apart, about 3.25 miles SE of Emerald Shoal, in the SW approach to Migemma Gemma Passage.

**Bramble Patch** (11°10'S., 152°30'E.), with a least depth of 4.9m, lies about 5 miles SW of the S extremity of Moturina Island. A shoal, with a depth of 7.3m, lies about 2.5 miles SE of Bramble Patch. A bank, with a least depth of 16.5m, lies about 5 miles WSW of Bramble Patch.

The S peak of **Gulenwa Island** (11°03'S., 152°31'E.), open E of Pana rora Island, bearing 000°, leads E of Bramble Patch, and W of the 7.3m shoal.

**8.14 Panua Keikeisa Islet** (11°06'S., 152°36'E.), wooded and 40m high at its N end, lies about 0.75 mile ESE of the SE point of Moturina Island. The islet is surrounded by a reef extending 0.5 mile E from its NE extremity, with a rock, 15.2m high, on its outer edge. Shoal water extends about 0.5 mile S from the islet. In the middle of the passage between Panua Keikeisa Islet and Moturina Island there is rock, 0.9m high, lying on the N end of a bank about 1.25 miles long, with a least depth of 7.3m.

**Laiwan Islet** (11°07'S., 152°38'E.), lying about 1.75 miles E of Panua Keikeisa Islet, is flat-topped and wooded, and 30m high to the tops of the trees. A bank, with a depth of 5.5m, on the outer edge of which there is a rock 18.3m high, extends about 0.5 mile SW from the SW end of the islet. A bank, with depths of 3.6 to 5.5m, extends 0.4 mile NNE from the NE end.

**Boiu Passage** (11°07'S., 152°37'E.), between Panua Keikeisa Islet and Laiwan Islet, is about 1.25 miles wide between the reefs on either side. A shoal, with a depth of 20m, lies near the middle of the S end of the passage. A shoal, with a depth of 12.8m, lies about 1.5 miles NE of the NE extremity of Laiwan Islet.

The tidal currents set strongly through this passage, causing heavy overfalls and tide rips, frequently dangerous to boats.

**Bonna wan Island** (11°08'S., 152°39'E.), 102m high, and covered with grass, lies on the N end of a reef, lying about 1.75 miles SE of Laiwan Islet. A reef extends 0.5 mile W from the

SW point of the island and the same distance S from the S extremity. Shoal water, with depths under 5.5m, extends 0.5 mile SE from the extremity of the latter reef. A detached islet, 9.1m high, lies on the reef off the SW point of the island.

**Migemma Gemma Passage** (11°08'S., 152°39'E.), between Laiwan Islet and Bonna wan Island, is about 1.25 miles wide, deep and clear of dangers. Tidal currents set strongly through this passage, causing heavy overfalls and tide rips, frequently dangerous to boats.

**8.15 Bagaman Island** (11°08'S., 152°41'E.), the E part of which is named Paba бага, lies close E of Bonna wan Island. It is thickly wooded, except on some of the N slopes, and there is a village on its W side. The W part of the island rises to an elevation of 219m, the E part to 149m.

Aurobu Islet, 45m high, rocky and wooded, lies about 0.4 mile S of the E entrance point of the bay on the S side of the island. A rock, 8.2m high, lies 183m S of the W entrance point of the same bay.

**Pana mun Passage** (11°08'S., 152°40'E.), between Bonna wan and Bagaman Islands, is about 0.33 mile wide between the fringing bank on either side. Depths of 7.3 to 9.1m are found in the narrow channel. The tidal currents set strongly through this passage.

Vessels can take anchorage in the NE part of Pana mun Passage, off a village on the W side of Bagaman Island, in a depth of 20m, sand. Vessels should anchor with the two points on the SW side of the island in range, bearing 198°, and the N point of Bonna wan Island in range with Laiwan Island, bearing 302°. This anchorage is not affected by the tidal currents, but frequently heavy squalls come off the land.

Vessels can also obtain anchorage in the middle of the E part of the bay on the N side of Bagaman Island in depths of from 26 to 29m, sand and coral. Vessels should anchor with the NE entrance point of the bay in range with the N point of Bobo eina Island, bearing about 065°. The bay on the S side of the island is too exposed for safe anchorage, and the approach to it is partially obstructed by a sunken reef extending E from Bonna wan Island. This reef extends 2.25 miles SE of Bonna wan Island and includes depths of 4m and a rock awash.

**Gedge Shoals** (11°12'S., 152°41'E.), divided into two parts by a deep channel, lies about 2.5 miles S of Bagaman Island. On the SE side there is a least depth of 5.5m, and on the NW part, 6.4m.

**Webb Patch** (11°13'S., 152°39'E.), with a depth of 6.4m, lies about 4.5 miles SSW of the S extremity of Bagaman Island.

**Yule Patches** (11°15'S., 152°42'E.) consist of three coral reefs, the E most of which has a least depth of 3.6m and lies about 5.75 miles S of the E entrance point of the bay on the S side of Bagaman Island. The W and middle reefs, with depths of 7.3m, lie about 2 miles SW and 3.75 miles WSW of the 3.6m shoal mentioned above.

**8.16 Bobo Eina Island** (11°08'S., 152°44'E.), thickly wooded and 243m high, lies 1 mile E of Bagaman Island.

Gilia Islet, 79m high, and covered with grass, is connected by a reef with the W side of Bobo Eina Island. A clear passage about 0.2 mile wide lies between Gilia and Bagaman Island. A rock, which breaks, lies about 183m SW of Gila.

**Wori wori Patches** (11°06'S., 152°44'E.), with depths of 5.5m and 7.3m, sand and coral, lie within 0.75 mile NNW of Hana Manawi Point, the N extremity of Bobo Eina Island. Depths of 24 to 28m, between the point, which is steep-to, and the two patches. These patches always show well.

**Stanton Patch** (11°05'S., 152°43'E.), with a depth of 5.5m, lies about 1.75 miles NNW of Hana Manawi Point.

Two reefs, with depths of 7.3m and 6.4m, lie, respectively, about 1.25 miles S and 1.5 miles SW of Bobo Eina Island.

Vessels can take anchorage on the W side of Bobo Eina Island in a depth of 26m, sand and coral. Vessels may anchor, with the E extremity of Gilia Islet bearing 187°, and the N extremity of Bagaman Island in range with the summit of **Moturina Island** (11°05'S., 152°34'E.), bearing 285°. This anchorage is affected by the tidal currents, as they set strongly through the passage and over the reef on either side of Gilia Islet.

**Mabneian Islet** (11°08'S., 152°46'E.), wooded and 73m high, lies on the N end of a reef, about 1 mile E of Bobo Eina Island. Pana Kuba and Leiga are two wooded islets, 64m and 47m high, respectively, and 0.15 mile apart, lying on the S end of the same reef. Shoal water extends about 0.3 mile SW from Leiga Islet.

**Kivi kivi Passage** (11°08'S., 152°45'E.), lying between Bobo Eina Island and Mabneian Islet, is a safe channel, about 1 mile wide. The tidal currents set strongly N and S through the passage. These tidal currents sweep round Mabneian Islet, causing a breaking sea in the passage.

**Pana numara Island** (11°10'S., 152°47'E.), 131m high, lies 0.5 mile SE of Leiga Islet. The shores of the island are generally steep-to, except at the W end, from which shoal water extends 183m. A small village stands on the NE side of the island. Kurupan Islet, 45m high, lies close off the NE extremity of Pana numara Island.

Bahil Passage, between Leiga Islet and Pana numara Island, is over 0.5 mile wide, and clear of dangers.

Vessels can take good anchorage in Hoba Bay, on the N side of Pana numara Island, in a depth of 27m, sand. This anchorage is sheltered from the prevailing wind and not affected by the tidal currents.

**8.17 Yaruman Island** (11°09'S., 152°48'E.), 87m high, and densely wooded, lies about 0.6 mile NE of the NE point of Pana numara Island.

**Panangaribu Island** (11°08'S., 152°49'E.) 90m high, and densely wooded, lies about 0.2 mile E of Yaruman Island. The channel between these islands is clear of dangers in mid-channel. The tidal currents run through this channel with considerable force, causing a heavy breaking sea.

Nunuan Islet, 61m high, and wooded, lies about 183m S of Panangaribu Island.

**Panantanian Island** (11°09'S., 152°50'E.), 125m high, and densely wooded, lies about 1 mile SE of Panangaribu Island. Shoal water extends about 0.3 mile N from the N end of the island. There is a village on the NW side, but landing is difficult, except at HW, when the reef is covered.

**Pornani Passage** (11°09'S., 152°49'E.), lying between Nunuan Islet and Panantanian Island, is about 0.75 mile wide, with depths of from 22 to 29m. The shores of the passage are

steep-to, but when the tidal current is against the wind there is a heavy breaking sea.

**Pana Krusima Island** (11°10'S., 152°52'E.), wooded and 109m high near its S end, lies about 1.75 miles E of Panantanian Island. The S part is fringed by a reef, which on the E side, is steep-to, and extends about 0.35 mile offshore. There are some islets on the reef, one which is 4.5m high, lying about 0.4 mile S of Su waian Point, the N extremity of the island. A reef, with depths of from 3.6 to 7.3m, extends one mile S from the island. The summit of Bagaman Island in range with the S extremity of Pana numara Island, bearing about 287°, leads SW of this reef.

**Pori Passage** (11°09'S., 152°51'E.) lies between Pana Krusima and Panantanian Islands, about 1.75 miles W. A shoal, with a least depth of 9.1m, lies near the middle of the S entrance of Pori Passage, about 0.6 mile SE of the SE extremity of Panantanian Island. Another shoal, with a depth of 11m, lies 0.5 mile SSE of this 9.1m depth. The N approach is encumbered by Reiga Shoals.

**8.18 Reiga Shoals** (11°08'S., 152°51'E.) lie on a crescent-shaped bank, which connects the N point of Panantanian Island with the N point of Pana Krusima Island. The shoalest part, with a depth of 7.3m, lies about 1.5 miles N of Panantanian Island. A shoal, with a depth of 9.1m, lies about 1 mile NW of the N point of Pana Krusima Island.

The bank, which has general depths of from 12.8 to 18.3m, is marked by heavy tide rips. The shoal spots should be avoided, as the depths may be less than charted.

**Tauara Shoal** (11°07'S., 152°54'E.), with a least depth of 2.7m, coral, lies about 1.75 miles NE of the N extremity of Pana Krusima Island. This shoal shows clearly in a good light.

**Dawson Banks** (11°12'S., 152°48'E.), consisting of three banks extending for a distance of 5 miles in a WNW and ESE direction. A shoal, with a least depth of 3.6m, lies about 3 miles SSW of Panantanian Island. Shoals, with depths of 7.3m and 5.5m lie, respectively, near the NW and SE ends of the bank.

**Dayman Banks** (11°15'S., 152°49'E.), consisting of three shallow banks, lie S and parallel to Dawson Banks. The central and largest bank, with a least depth of 2.7m, lies about 5.25 miles S of Panantanian Island. The other two banks, with depths of 5.5m and 7.3m lie, respectively, about 4.5 miles SSW and 6.5 miles SSE of Panantanian Island.

**8.19 Sullivan Patch** (11°16'S., 152°47'E.), with a least depth of 4.5m, lies about 6 miles S of Pana numara Island. A shoal, with a least depth of 5.5m, lies about 2.25 miles SE of Sullivan Patch.

**Kuanak Island** (Abaga gaheia Island) (11°10'S., 152°55'E.), 181m high near its S end, lies about 1.75 miles E of Pana Krusima Island. A ridge extends N from the summit terminating in a sharp, wooded hill, about 167m high. The S shores of the island are bold and cliffy.

**Gigila Island** (11°10'S., 152°57'E.), 128m high and wooded, with some grassy slopes on the N side, is connected to the SE part of Abaga gaheia by a reef. The two islands form a bay on the N side, but is not a good anchorage.

Waia Islet, 50m high, lies close S of the E extremity of Gigila Island.

A reef, with a depth of 5.5m, lies about 0.75 mile S of Waia Islet.

**Uli Bonna Bonna Passage** (11°10'S., 152°58'E.), between Gigila Island and Yakimoan Island, located about 0.75 mile E of it, is clear of dangers, except for a reef which extends about 0.15 mile from the SE side of Gigila Island. It is reported to be a good passage.

**Taufaur Islet** (11°09'S., 152°54'E.), 82m high, and covered with grass, lies 0.15 mile NW of the NW extremity of Abaga gaheia Island, and is connected to it by a reef.

Einamu Islet, 42m high, and wedge-shaped, lies about 0.5 mile W of the S extremity of Taufaur Islet. Shoal water extends about 183m N and E from the islet, but the channel on either side is clear of dangers.

Vessels can take anchorage in the outer portion of the western bay on the N side of Abaga gaheia Island, known as **Robinson Anchorage** (11°09'S., 152°55'E.), in depths of from 24 to 29m, sand and coral. Vessels anchor with the two N points of the island in range, bearing 097°, and the W hill 99m high, bearing 221°. The shores of the bay are fringed by a reef. A rock, with a depth of 1.8m, lies about 183m off the point on the SW side of the anchorage.

**Ward Rock** (11°07'S., 152°56'E.), with a depth of 2.7m, lies 2 miles NE of the N extremity of Taufaur Islet.

Power Patch, a coral head with a depth of 5.5m, lies about 3 miles NNE of Taufaur Islet.

**Musters Patches** (11°15'S., 152°53'E.), consisting of three shoals, with depths of from 6.4 to 9.1m, lie about 4.75 miles SSW of the S extremity of Abaga gaheia Island.

**8.20 Conflict Patches** (11°14'S., 152°55'E.), with depths of 3.6 to 4.5m, lie about midway between Musters Patches and Abaga gaheia Island. They extend in a WNW and ESE direction for a distance of 3.5 miles. The NW patch lies about 1.75 miles S of the S extremity of Abaga gaheia Island.

**Pana wina Island** (11°10'S., 153°01'E.), the largest island of the Calvados Chain, is about 1.25 miles E of Gigila Island. Two ridges of hills, one on either side of the island, run N and S, the highest part being near the S end, where the W ridge rises to an elevation of 288m, and the E to 243m.

A bay, with depths of from 22 to 31m, lies on the S side of the island. It appears that the creek at the head of this bay runs to the N and connects with the bay on the N side, thus dividing the island.

A reef extends about 183m from Boiama Point, the E entrance point of the bay and S extremity of Pana wina Island. A spit, with a depth of 3.7m, extends about 183m beyond the reef. Koia kun, a conspicuous hill, 243m high, lies about 0.5 mile N of the point.

Pipidai Point, the SE extremity of Pana wina Island, is low, bold, and covered with grass. Foul ground extends about 0.5 mile NE and 0.25 mile SE from the point.

The N coast, which is generally lined with mangroves and fringed by a reef about 0.3 mile wide, is indented by a shallow bay.

On the NW side of the island is another bay, with depths of from 12.8 to 22m. The bay is sheltered from the SE winds. The tidal currents run with considerable force in the area, the flood setting to the SW and the ebb in the opposite direction. The island is inhabited.

Yakimoan Island, 91m high, is separated from the W extremity of Pana wina Island by Ui gari Passage. A fairly steep-to reef, with Taval Rock on its outer extremity, extends about 0.4 mile NE from Yakimoan Island.

Ui gari Passage, about 0.25 mile wide, is narrow, with a steep-to reef extending from both sides. The tidal currents run with considerable strength through this passage.

Vessels can take anchorage about 0.35 mile N of Yakimoan Island, with the N extremity of Gigila Island bearing 263°, in a depth of 14.6m, sand. Though protected from the wind and sea, this anchorage is, to some extent, exposed to the strength of the tidal currents.

**8.21 Beagle Rock** (11°13'S., 153°00'E.), with a depth of 1.8m, lies about 1.5 miles WSW of Boiama Point, the S extremity of Pana wina Island. The S peak of Pana Krusima Island, bearing 291°, just open S of Abagagaheia Island, leads N of this danger.

**Hemenahēi Island** (11°10'S., 153°04'E.), the E most of the Calvados Chain, lies 0.3 mile E of the NE point of Pana wina Island. The island is surrounded by mangrove swamps, the only convenient landing place being on the NE side.

A ridge of grassy hills, from 61 to 73m high, traverses the island. The island is considered unhealthy.

A shoal, with a depth of 1.8m, lies about 0.5 mile ENE of the E extremity of the island.

## Barrier Reef—North of Calvados Chain

**8.22** The barrier reef extends from Horaki raki Passage in a NE direction for about 10 miles, where it reaches its most N point; thence it extends in an ESE direction to Sabari Island, a distance of about 26 miles.

**Pana sagu sagu Islet** (10°58'S., 152°37'E.), low, wooded, and 36m high to the tops of the trees, lies on the barrier reef, about 6 miles NE of Horaki raki Passage.

A clear passage, about 0.35 mile wide, lies immediately N of the reef on which Pana sagu sagu Islet stands.

Shoals, with depths of 5.5m and 9.1m lie, respectively, about 0.5 mile E and 1.25 miles ESE of Pana sagu sagu Islet. Vessels using this passage should pass N of these two shoals, as the depths are more regular on that side, and the edge of the barrier is steep-to.

The tidal currents run with considerable strength through this passage, the flood current setting toward the reef on which Pana sagu sagu Islet stands.

**Bushy Islets** (10°56'S., 152°39'E.), a group of wooded islets, from 13.7 to 20m high, lie on the outer edge of the N extremity of the barrier reef, which is steep-to on its NW and W sides. The NE islet lies about 4 miles NE of Pana sagu sagu Islet, and on the NW side of Debagarai Passage.

**Basses Islands** (10°57'S., 152°43'E.) are a group of low coral islets, with trees from 18.3 to 30m high, lying on the E side of Debagarai Passage. Gumaian, the E most and largest island, lies 7 miles E of Pana sagu sagu Islet, and forms the NW side of Wuri wuri Passage. Aba evara, the W islet of the group, is situated about 2.25 miles W of Gumaian. A small reef, with a depth of 5.5m, lies about 0.5 mile SW of Isu raua raua, the S islet, located about 0.5 mile S of Aba evara.

**Debagarai Passage** (10°56'S., 152°42'E.), the opening in the barrier NW of the Basses Islands, is 1 mile wide between the reefs on either side. The passage is obstructed in the middle by a large shoal, with depths from 7.3 to 11m, and possibly less. There is a deep but narrow passage between this shoal and the edge of the reef on the NW side of the channel. The tidal current swirling over the point of the reef makes it difficult to distinguish the edge of the shallow water.

In the channel SE of the shoal there are two patches, with depths of 5.5m and 9.1m, located, respectively, about 0.2 mile N and 0.5 mile NW of Aba evara Islet. There may be less water on these shoals, and as the tidal currents are strong, with heavy overfalls, the channel should only be used under very favorable conditions.

**Tawa tawa mal Reef** (11°04'S., 153°00'E.), the NE portion of the barrier reef, extends from the Basses Islands in a ESE direction for 39 miles to Hudumu Iwa Passage. The reef dries in patches and has numerous boulders on its outer edge, some of which are from 0.9 to 4.5m high. The N side of the reef is steep-to, but the S or inner side has, in many places, shoals extending for some distance.

There are three ship channels through Tawa tawa mal Reef between Basses Islands and the NW extremity of Sabari Island, namely, Wuri wuri, Duna labwa, and Chubudi Passages. The reef SE of Sabari Island is impenetrable to ships of any size until Hudumu iwa Passage is reached.

**Wuri wuri Passage** (10°58'S., 152°46'E.), between Gumaian Island, 27m high, and Leiga Islet, 3 miles ESE, is the safest and easiest opening to enter in this part of the barrier reef. A shoal, with a least depth of 3.6m, lies near the middle of the passage, dividing it into two parts. In the channel NW of this shoal the depths are irregular, and the tidal currents are strong. A detached reef lies SW of, and parallel with, the reef on which Leiga Islet lies, and a bank, with depths of 9.1 to 10.9m, lies within 0.6 mile W of the NW end of the detached reef. There is a deep channel, about 1 mile wide, between this bank and the shoal near the middle of the passage.

Pearce Patch, with a depth of 5.5m, lies in the S fairway of Wuri wuri Passage, about 2.5 miles SW of Leiga Islet.

**8.23 Siwai wa Island** (11°03'S., 152°57'E.), 12.2m high with some bushes, lies on the NW extremity of a reef, about 2 miles W of Duna labwa Passage. Shoals, with depths of from 4.5 to 5.5m lie, about 1.75 miles S of Siwai wa Island. A shoal 1.8m deep lies 1 mile SW of this island.

**Duna labwa Passage** (11°04'S., 152°59'E.), 0.325 mile, with a depth of 10.9m in the fairway, lies about 2 miles E of Siwai wa Island. It may be recognized by a sand cay with some bushes on it, 3m high, located on the reef which forms the E side of the passage. The reef on the W side of the passage is steep-to.

The tidal currents set directly through the channel, forming heavy tide rips and overfalls on the bar.

**Myriad Shoals** (11°06'S., 152°59'E.), a group of coral heads, with depths of 2.1 to 9m, lie from 1 to 2.75 miles S of the reef on the E side of Duna labwa Passage.

**Sabari Island** (11°07'S., 153°06'E.), the NW end of which lies 8 miles ESE of Siwai wa Island, is 4 miles in length by 0.5

mile in breadth. The island is low and densely wooded, the tops of the trees having an elevation of about 55m. There is a village near the SE end of the island.

The coast line of the island is low and cliffy, with an occasional small sandy beach. Near the middle of the island, on the S side, there is a shallow basin, with a reef extending across its entrance. Northwestward of this opening a chain of islets fronts the coast.

Mabui and Pana kuba Islets, 30m high, lie at the outer end of a chain of islets and rocks extending 0.4 mile NW from the NW extremity of Sabari Island. Rara haiwa Islets are two islets, located close off the SE end of Sabari Island.

**8.24 Chubudi Passage** (11°06'S., 153°02'E.), about 2 miles NW of the NW extremity of Sabari Island, is about 0.2 mile wide. A reef, with a least depth of 2.7m, lies in the SE part of the passage. The fairway, which is deep, lies W of this reef.

The tidal currents set directly through the passage and cause tide rips and overfalls.

**Hiscock Reef** (11°07'S., 153°01'E.), which nearly dries, lies about 1 mile SW of the S extremity of the reef located on the E side of Chubudi Passage, and in the fairway of the S approach to the passage. Reefs, with depths of 3.6m, lie, respectively, about 1 mile N and 0.25 mile E of Hiscock Reef. A reef, with a depth of 5.5m, lies about 0.25 mile S of Hiscock Reef, with foul ground between.

**Hanover Rock** (11°08'S., 153°00'E.), with a depth of 1.8m, lies about 1.25 miles NNW of the N point of Pana wina Island.

**Blind Rock** (11°08'S., 153°01'E.), with a depth of 2.7m, lies 0.8 mile NNE of the N point of Pana wina Island. A rock, with a depth of 1.8m, lies between Blind Rock and the fringing reef of Pana wina Island. The depths between Hanover and Blind Rocks are about 7.3m as charted.

**Galley Rock** (11°08'S., 153°02'E.), with a depth of 2.7m, lies about 1.75 miles NNE of the N point of Pana wina Island.

**Tides—Currents.**—Westward of Pana wina Island the flood current sets SW, with a velocity of 1 knot, the ebb NE, with a velocity of 0.75 knot. Northward of the island the flood current sets SE, with a velocity of 1 knot, the ebb WNW, with a velocity of 0.5 knot.

**Directions.**—The dangers described above render navigation S and E of Chubudi Passage somewhat intricate. The best track for vessels bound E of Chubudi Passage, is N of Hiscock Reef. Vessels from the SW, and proceeding E should use the passage between Hanover Rock and Hiscock Reef. A vessel using this passage should steer for the N extremity of Hemenaei Island, bearing 105°, which leads between Blind Rock and Galley Rock. When the SW end of Hemenaei Island bears 153°, and is open clear of Pei-i Point, the NE extremity of Pana wina Island, she should steer for the SE extremity of Sabari Island, bearing 094°, which leads 0.5 mile N of the N extremity of Hemenaei Island. These directions should be used with the greatest caution because of the limited survey and numerous uncharted dangers.

**Caution.**—Vessels using these passages through the barrier reef must exercise caution, because of the limited surveys, and strong tidal currents and rips passing through them.

## Pana Tinani Island

**8.25 Pana Tinani Island** (11°14'S., 153°10'E.), the W end of which lies 3 miles E of Pana wina Island, is 10.5 miles in length by 2 to 3 miles in breadth. A ridge of hills extends the whole length of the island, with the exception of about 2 miles of low wooded land near its NW end. These hills rise abruptly from the S coast and slope down gradually to the N and NE. The island is well wooded, with numerous groves of coconut palms near the sea. The island is inhabited.

Mount Guyuba, 338m high, lies about 4 miles W of the E extremity of the island.

The NE coast is mostly flat, with the exception of four slight indentations, behind each of which the land is flat and swampy toward the foot of the hills. This coast is difficult to approach, owing to the fringing reef and the numerous patches along its whole length.

The SE coast of Pana Tinani Island is comparatively bold and backed by a steep range of hills.

Pana muti Point, the E extremity of the island, is covered with mangroves and has a ridge sloping down to it. A reef extends about 0.65 mile E from the point and foul ground about 183m beyond.

Heihuti Bay, located on the SE side of the island, is fringed by a narrow reef, which, toward the head, extends about 0.25 mile offshore.

Vessels can take anchorage during the NW Monsoon in Heihuti Bay in depths of from 22 to 24m, sand and clay.

The SW coast of the island is irregular, consisting of four projecting hilly points with several bays between them. Vessels can take anchorage in these bays. The coast is fringed by reefs and there are some off-lying islets and dangers.

Gudau Peninsula, the S extremity of the island, is 83m high. Hatilawi Harbor lies close W of the peninsula.

Vessels can take anchorage during the SE Monsoon in Hatilawi Harbor, about 0.35 mile N of its S entrance point, in depths of 16.5 to 18.3m, mud.

**Ni eivi Reef** (11°18'S., 153°10'E.) lies S of Gudau Peninsula and is separated from it by Doga siu siu Passage. A sandbank, which dries, is situated on the SE end of the reef.

Doga siu siu Passage, which is clear of dangers, has a least depth of 20m, and is 0.75 mile in width.

The tidal currents run through this passage with a velocity of 2 to 3 knots, the flood setting to the WNW and the ebb to the ESE.

**Directions.**—The S extremity of **Osasai Islet** (11°21'S., 153°20'E.) in range with the S extremity of **Hei wok Islet** (11°19'S., 153°14'E.), bearing 112°, leads through Doga siu siu Passage in a depth of 14.6m. This range leads rather close to Ni eivi Reef, a vessel will be more in the fairway by bringing the S extremity of Osasai over Hei wok and keeping in a depth of 20m.

**Bounce Point** (11°14'S., 153°06'E.), the W extremity of an islet 134m high, situated 5 miles NW of Hatilawi Harbor, is a reddish-colored cliff 21.3m high. A cut channel lies between the above islet and the mainland, to which it was attached by a low neck of land.

A grass covered islet 44m high, and a grassy peaked islet 61m high, lie, respectively, off the E and S side of the above islet.

Imadi Bay, 3.5 miles NW of Hatilawi Harbor, provides anchorage in the SE part of the bay about 0.25 mile, 339° from the E entrance point, in a depth of from 16.5 to 18.3m, mud.

A reef which dries, lies 1 mile WSW of the E entrance point of Imadi Bay. There are depths of 2.7m just N of this reef.

**8.26 Islands and angers SW of Pana Tinani Island.**—**Wanim Island** (11°16'S., 153°06'E.) rises to a height of 119m at its N end. This island, which is encircled by reefs, lies 4.75 miles W of Hatilawi Harbor.

A bay is formed on the W side of the island where anchorage may be taken in a depth of 29m, coral and sand, with the SW extremity of the island bearing 187°, distant 0.35 mile. This anchorage is out of the tidal influence, and during the SE monsoon the water is smooth, though strong gusts of wind come down over the land.

Sibumbang Islet, lying 0.5 mile S of Wanim Island, is situated in the center of a reef, 0.3 mile in diameter. The islet has an elevation of 29m; there are a few trees on it. In the channel between the surrounding reef and the reef extending S from Wanim Island there is a 9.1m patch; the depth is probably less than that charted.

An islet, 116m high and wooded, lies at the S end of Pakabuk Reef, 2.75 miles S of Sibumbang Islet. Except off the NW end of Pakabuk Reef where a spit extends for 0.2 mile, the reef is steep-to; there is a sand cay near the middle.

Popomweni Passage, between Sibumbang Islet and the N extremity of Pakabuk Reef, is 1.5 miles in width. It is encumbered with Green Patch, with a least depth of 4m, on the N side of the fairway, about 0.6 mile S of Sibumbang Islet and by a 3.7m patch 1.5 miles SSE of the islet.

Sei Hauho Reef lies 1.5 miles W of Pakabuk Reef, and is separated from it by a deep channel. Sei Hauho Reef, dries in patches at LW and is steep-to on its E side. Shoal patches, with a patch awash, extend 1 mile S and foul ground extends 1.5 miles W of the reef.

**8.27 Brierly Reefs** (11°18'S., 153°00'E.), lie W of Sei Hauho Reef, and extend in an E and W direction about 5 miles. The general depth over the reefs are from 2.7 to 9.1m, and some spots dry at LW. These reefs form the E part of the N extremity, of a large area that has not been examined. There is a 3.7m shoal between Sei Hauho Reef and Brierly Reefs.

Owen Stanley Bank, situated W of Wanim Island, lies 2.25 miles N of Sei Hauho Reef and Brierly Reefs and is parallel to these reefs. A reef lying at the E end of the bank dries at LW, and Sandfly Rock, 4 miles W, at the western end of the bank, has a depth of 1.8m. Other dangers than those charted may exist, therefore mariners are cautioned not to cross the bank.

The northern extremity of Wanim Island in range with the 338m high peak on Pana Tinani Island, bearing 093° leads close N of the bank; Sibumbang Islet, in range with the southernmost peak on Pana Timani Island, bearing 096°, leads S of the bank. There are two rocks, dangerous to navigation, on the N side of the Owen Stanley Bank, just S of the above mentioned bearing.

**8.28 Southwestern coast of Pana Tinani Island.**—From Bounce Point, on the islet close offshore, the coast trends in a NW direction 2.25 miles to **Haugili Point** (11°12'S., 153°05'E.), the W extremity of Pana Tinani Island. Haugili Point is bold and descends abruptly from a flat-topped grassy hill 85m high.

The coast between these two points recedes 1 mile and forms a bay which is divided into two parts by a grass-covered islet 84m high. The islet is connected with the mainland by a reef and the bay N of the islet is encumbered by foul ground extending 0.9 mile S from Haugili Point.

That part of the bay SE of the islet is called Buvara Bay; it is fringed by a reef which extends from a few meters to 0.15 mile from the shore, skirting the shore 0.25 mile N of Bounce Point.

During the SE monsoon vessels may obtain anchorage in the S portion of Buvara Bay in depths from 18.3 to 22m, sand and clay. The best berth, out of the tidal influence, is with Bounce Point bearing 165°, distant 0.35 mile.

**Bridge Shoals** (11°13'S., 153°04'E.) is comprised of a series of coral patches from 2.7 to 5.5m, lying from 1 to 1.5 miles SE, S, and SW of Haugili Point. They impede the approach to Buvara Bay when coming from the N or W.

About 0.75 mile NW of Bridge Shoals are two rocky patches with depths of 3.7m; 0.5 mile farther NE is the extremity of shallow water extending from Pana Tinani Island.

Sibubum Islet, bearing 143°, leads 0.5 mile SW of Bridge Shoals.

A narrow, wooded islet 30m high is situated on the fringing reef off the NW point of Pana Tinani Island, about 1.25 miles NNE of Haugili Point. A reef, awash at LW, lies 0.6 mile W of the islet. A tongue of shoal water with depths of from 7.3 to 9.1m extends 0.3 mile SW from the reef.

**Maga Maga Passage** (11°11'S., 153°04'E.) leads between Hemenaei and Pana Tinani Islands. There are depths of 11 to 18.3m in the fairway over a width of 183m, between the edge of a bank, with patches awash, lying 0.5 mile N of the N extremity of Pana Tinani Island and a bank with depths of 3.7 to 5.5m, situated on the N side of the fairway about 0.2 mile farther N.

This passage should only be used by vessels having local knowledge. Vessels from S should bring themselves to a position midway between Bridge Shoals and the point about 2 miles WNW; steer 024° until within 0.2 mile of the edge of the fringing reef S of Hemenaei Island, then alter course to the NE keeping at a distance of 183m off this reef which is always plainly visible. As soon as the N point of Pana Tinani Island opens N of the islet lying W of it, bearing about 097°, the course may be altered to 075° until the eastern extremity of Hemenaei bears 007° when a 052° course will lead out through the N entrance.

Vessels coming from the NW are cautioned to give a berth to the depth of 1.8m situated 063° 1 mile distant from the E extremity of Hemenaei Island.

Note that the tidal currents run through this passage with a velocity of 2 to 4 knots, and have very short periods of slack water, the flood current sets SW and the ebb NE. The passage should not be attempted during the first three hours of either flood or ebb.

## Tagula Island

**8.29 Tagula Island** (11°30'S., 153°26'E.), the NW end of which lies 1.75 miles S of Pana Tinani, is the largest of the Louisiade Archipelago, being 39 miles long and 8 miles wide. A wooded mountain range extends the length of the island, with the summit near the center.

**Mount Madau** (11°22'S., 153°12'E.) is the most conspicuous landmark on the NW end of the island. It is thickly wooded and rises to a height of 296m high. Ridges extend N and W from it, and beyond these ridges, the land is flat, wooded country intersected by numerous streams. To the E the main ridge extends as the backbone of the island. There are deep valleys where streams flow through rocky gorges and discharge into Coral Haven, some of these being navigable by small boats for a distance up to 1 mile.

**Mount Gangulua** (11°25'S., 153°16'E.), lies 5 miles SE of Mount Madau. It is 439m high and thickly wooded.

**Mount Riu** (11°31'S., 153°26'E.) is the summit of the island and rises to a height of 806m high. It is the largest mountain in the range.

**Mount Arumbi** (11°34'S., 153°41'E.), the most SE mountain of the range, is doubled topped, 350m high, and slopes gradually down to Cape Siri, the SE extremity of the island. Southwest of the mountain, the hills slope gradually to the sea, with drainage into the Iyuba River, a stream which discharges into Dumage Bay.

**Coral Haven** (11°19'S., 153°19'E.) is an extensive harbor bounded to the N and E by Tawi and Rawa Reefs, and to the S and W by Tagula and Pana Tinani Islands. The haven offers good shelter and affords a good anchorage, but it is encumbered with islands and reefs, making navigation somewhat intricate.

The haven is accessible from the N by Hudumu Iwa Pass, from the NW by the lagoon channel N of Pana Tinani, from the W by the channel between that island and Tagula, and from the E by Yuma Passage, which leads into Gold Rush Channel.

**Nimoa Island** (11°19'S., 153°15'E.), the largest island in Coral Haven, lies about 1.5 miles SE of Pana Tinani. This well wooded and fertile island attains an elevation of 139m and has a few villages on its shores. There is a 3.7m patch 1.25 miles E of the S point of Nimoa Island. A rock 0.9m high lies 0.5 mile farther W.

Pana Hoba Islet, 14.7m high and rocky, is situated on the middle of a reef which extends 1.5 miles E from the NE extremity of Nimoa Island. There are a few trees on its summit. About 0.5 mile N of the islet is a coral patch awash, and another 3.7m patch lies 0.5 mile NE of it.

**8.30 Middle Reef** (11°17'S., 153°17'E.) is about 1 mile long and 0.25 mile wide. It lies in the NW part of Coral Haven. Except at the W end, the edges are foul and shoal water extends 0.8 mile S from the reef toward Pana Hoba Islet, leaving between them a navigable channel 0.4 mile wide. A coral patch awash lies in the center of this channel.

Anchorage may be taken off the W side of Nimoa Island. The bay should not be entered farther S than to have Sibubum Islet in range with the S point of Gudau Peninsula,

bearing 281°, or farther E than to have the E extremity of Pana Tinani in range with the N point of the bay, bearing about 002°. In this position there is a depth of 20.2m, sand and clay, with good shelter from SW winds.

**Caution.**—Vessels should not get E or S, respectively, of these alignments as the shores of the bay are much encumbered with reefs and coral patches.

**Bulami Passage** (11°19'S., 153°11'E.), the W entrance to Coral Haven, is divided into passages by Nievi reef. Doga Siusiu, the N passage, was previously described in paragraph 8.25. Bulami, the S passage, is 0.5 mile wide between the S side of Nievi Reef and the reef extending 1 mile W from Bobo-hai Point, the NW extremity of Tagula Island. It is deep and clear of dangers. The tidal currents set at the rate of 2 to 3 knots.

The coast from **Bobo-hai Point** (11°20'S., 153°12'E.) to Nepenthes Point is bordered by mangroves and a narrow fringing reef. There is a small wharf on the N coast of Tagula Island, with a least depth of 4.6m alongside, about 1 mile ESE of Bobo-hai Point. A ridge of low, bare hills, the outer peak and lower slopes of which are wooded, terminates at Nepenthes Point. West of the point is a bay having depths of from 12.9 to 22m close up to the fringing reef, but its N part is obstructed by reefs. A small reef lies close N of Nepenthes Point, and a patch, awash, lies 0.675 mile, bearing 300° from the same point.

**Muhua Bay** (11°22'S., 153°18'E.) lies close E of Nepenthes Point. In the E part of the bay the shore reef projects 0.4 mile N from the mangroves and is broken up into patches. The Sahai River flows into the bay. Anchorage may be obtained in the bay in a depth of 22m, mud.

**McGregor Reefs** (11°21'S., 153°16'E.), lying about halfway between Nepenthes Point and about one mile off the coast of Tagula Island, comprise a cluster of coral patches which is partly dry and extend 0.75 mile in an E and W direction. A bank with depths of 14.7 to 16.6m extends 0.75 mile in an easterly direction from these reefs; and between them and the coast there is a ridge having depths of 11.1 to 16.6m.

**8.31 Minister Patch** (11°20'S., 153°16'E.), with a depth of 6.4m, lies 0.4 mile N of the E end of McGregor Reef. A bank with a depth of 17.4m extends 0.75 mile E from the patch.

**Hely Bank** (11°21'S., 153°20'E.), on which there are two coral heads with depths of 2.7 to 4.6m, has general depths of up to 18.4m and lies 1.5 miles NNE of Nepenthes Point.

**Escape Rock** (11°21'S., 153°20'E.), a coral head with a depth of 2.2m, is situated 2 miles NE of Nepenthes Point and at the W extremity of a line of patches extending 1.5 miles W of Rawa Reef. There is a 5.5m shoal 1.5 miles, bearing 030°, off Nepenthes Point.

**Rawa Reef** (11°20'S., 153°24'E.), which is about 4.5 miles in length, forms the SE side of Coral Haven. Foul ground extends 0.5 mile from the inner edge of the reef. The reef curves E at its N end and fringes the S side of Yeina Island.

**Osasai Islet** (11°22'S., 153°20'E.) is 69m high and situated on the SW end of Rawa Reef.

**Yeina Island** (11°20'S., 153°27'E.) is 5 miles long and 1.5 miles wide; it lies between Rawa Reef and Tawi Reef. A grassy ridge extends along the length of the island and attains a height

of from 37 to 79m. The island is fringed with mangroves, but the E end is rocky with sandy beaches. There is a village on the NE coast.

Meiwa Islet, 24m high, lies 0.35 mile off the E extremity of Yeina Island. There are two rocks, 3.1m high, the same distance E of the islet.

Tawi Reef, the W part of this reef forms the NE limits of Coral Haven. It is a continuation of Tawa Tawa Mal Reef, from which it is separated by Hudumu Iwa Passage. The inner edge almost connects with Rawa Reef, and several patches extend 1 mile W from the channel which separates them. The N edge of the reef is broken and irregular and has narrow passages through which boats may pass.

Romilly Bank, lies immediately within Hudumu Iwa Passage. The bank, a narrow ledge of coral, extends 1.25 miles in an E and W direction and has depths of 2.8 to 4.6m.

**Hudumu Iwa Passage** (11°15'S., 153°19'E.), the N entrance to Coral Haven, is divided into two channels by a detached reef with foul ground extending S from it. The W channel, the better of the two, is about 183m in width and carries depths of 14.7m, but the reefs on either side are shelving. From the inner edges of these reefs, shoals extend 0.35 mile SW. Within the W horn of the detached reef there is a rock just awash at HW.

The E channel, which lies 0.5 mile from the other, has a depth of 11.1m, but the E part of Romilly Bank, which has not yet been closely examined, stretches partly across its S end. The tidal currents in the channels run at the rate of 3 to 5 knots.

**Directions.**—Bring the S extremity of Pana Tinani Island in range with the N extremity of Dadda hai Islet, bearing 252°, which leads to the entrance of the W channel of the passage. Having approached the entrance, bring the S extremity of Nimoa Island (the point of which will appear low and indistinct) just open NW of Pana Hoba Islet, bearing 229°, this will be in range with the center of the passage and exactly underneath a gap between two nipples in the skyline of the hills on Tagula Island.

Having entered Coral Haven and proceeding W, the best route is N of Middle Reef, thence out by Doga Siusiu Passage S of Pana Tinani Island.

**8.32 Yuma Passage** (11°21'S., 153°23'E.), the E entrance lying 2.5 miles S of the W end of Yeina Island, is a narrow, deep, and intricate channel, winding for 4.5 miles between Rawa Reef and the reef E of it. It connects with Gold Rush Channel about 1.25 miles S of Osasai Islet. The reefs on either side are steep-to, with three sharp turns in the passage. The channel has depths of from 38 to 56m, but at the S end there is a charted depth of 7.4m. This passage is dangerous for vessels of any size to attempt, on account of the strength of the tidal currents, which run at a rate of 3 to 5 knots. It is reported to be a good passage for vessels up to 300 grt.

**Marx Reef** (11°24'S., 153°27'E.) is a detached reef, steep-to on all sides, lying in the bight of the reef between Yeina Island and the N side of Tagula Island.

**Tides—Currents.**—In Coral Haven the first quarter of the flood sets SW, gradually changing its direction to the S, and during the last quarter to the SE. The first quarter of the ebb sets NE, changing at the last quarter to NW. These changes are most marked during spring tides and are similar to those

observed in the W part of the archipelago near the sunken barrier.

**Gold Rush Channel** (11°23'S., 153°20'E.) is the S entrance to Coral Haven; though deep, it is very intricate and suitable only for small boats. The channel is 8 miles in length and lies between the fringing reef of Tagula Island and the S side of Rawa Reef. Because of strong tidal currents and the many shoals, the channel is not recommended. It is only suitable for small craft.

**8.33 North coast of Tagula Island.**—The N coast from Muhua Bay trends ESE for 10 miles to a point below Mount Ima and forms the S side of Gold Rush Channel. The coast in this area is mostly wooded with a range of low hills, and the fringing reef closely follows the shore line.

The Feiori River is the largest on this coast and flows in the sea about 4.5 miles E of Nepenthes Point. The river can be used by small boats for nearly 1.5 miles from the entrance and many small villages are found in this area.

The channel across the bar, at the mouth of the river, is to the E of the mangrove islet, the outer edge of the bar is steep-to. There are a number of locks and reefs off the entrance to the river, which can best be seen on the chart.

Immediately E of the Feiori River, the coastal channel opens out to a basin, 2 miles in diameter, in which there are numerous patches awash. There is anchorage, 0.3 mile N of the entrance to the Feiori River, in a depth of 29.3m, mud.

**Rabuso Creek** (11°29'S., 153°33'E.) is an inlet situated 7 miles E of the eastern entrance to Gold Rush Channel. It is entered through an opening about 64m wide in the fringing reef, and extends in a S direction for about 0.7 mile.

**Boboa Islet** (11°29'S., 153°35'E.), a mangrove islet on the barrier reef, lies 1.5 miles E of the entrance to Rabuso Creek. A rock is situated 73m within the edge of the reef and nearly covered at HW, lies on the E side and serves to indicate the approach to the inlet.

There is anchorage between the two entrance points of the inlet, in a depth of 20.2m, mud, with swinging room of 137m. The inner part of the inlet has depths of 14.7 to 18.4m. Small craft can anchor in 16.5m near the head of the creek, 0.15 mile E of the village, lying on the W side. There is a small wharf at the SW head of the creek, and another abreast of the village, both with depths of about 2.5m alongside.

The coast E of Rabuso Creek trends eastward for 8.5 miles and then in a SE direction for 7 miles to Cape Siri, presenting no remarkable features and being mostly low and lined with mangroves.

East of Rabuso Creek, the fringing reef assumes the character of a barrier, gradually widening its distance from the land and sweeping with a uniform curve around Cape Siri at a distance of from 8 to 12 miles. It encloses an extensive lagoon, the N and E portions of which have not been examined. At 10 miles, bearing 052° from Cape Siri, there is a passage, about 0.15 mile wide and open on a 204° bearing, that leads into the lagoon, but it has not been examined or navigated. A reef is reported just inside the opening of this passage. There is an opening for small craft about 4 miles E of Rabuso Creek. There is anchorage inside for vessels up to 100 grt. The lagoon within

the barrier reef is reported to be navigable by vessels up to 100 grt.

**8.34 South coast of Tagula Island.**—**Cape Siri** (11°37'S., 153°47'E.), the SE extremity of Tagula Island, is low, wooded, and rises towards the NW. A village is located on the point. Between Cape Siri and Cape Baganowa, about 13 miles W, the coast is fringed by a reef which extends up to 1.5 miles offshore. The lagoon inside the barrier reef has only been partially examined, but appears fairly clear of dangers. There are some coral patches lying about 2 miles off the fringing reef between Cape Siri and Point Lamada, located 6 miles W.

Lawik Reef is the name given to the S part of the barrier reef. This reef sweeps around Cape Siri trends W and passes S of Cape Baganowa at a distance of about 3 miles.

**Cape Baganowa** (11°39'S., 153°33'E.) is the S most point of Tagula Island. The cape, which forms the heel of a peninsula of the same name, is dominated by a conical hill 149m high. There is a large village on the SW side of the peninsula. A sunken rock lies 3 miles ESE of Cape Baganowa.

There are two openings in the barrier reef S of Tagula Island, namely, Dejei Radi pass and Smiths pass.

**Dejei Radi Pass** (Johnston Pass) (11°41'S., 153°31'E.) is about 0.75 mile wide and deep. The summit of Mount Imau bearing 025°, just open NW of the W extremity of Baganowa Peninsula leads through the pass.

The tidal currents set through Dejei radi Pass with a velocity up to 3 knots. The flood current sets to the SW, the ebb to the NE, and both somewhat diagonally across the channel.

**Dumaga Bay** (11°37'S., 153°33'E.) is formed between the W part of Baganowa peninsula and the mainland. Anchorage may be taken in Dumaga Bay in a depth of 25.6m, mud, about 0.5 mile offshore, with the 149m conical hill on Baganowa peninsula bearing 131° and the W extremity of the peninsula 221°.

**Directions.**—Dumaga Bay is somewhat difficult of access and the approaches have not been thoroughly sounded. Due to the strong tidal currents and the irregular bottom the passage between the peninsula and the Fairfax Reefs is only practicable during SW and with the reefs clearly visible.

The clearest approach appears to be from W, skirting the fringing reef at a distance of 0.2 to 0.3 mile and anchoring as directed above.

**Fairfax Reefs** (11°38'S., 153°31'E.) are a group of sunken rocks which lie from 1 to 2 miles W of the S entrance point of Dumaga Bay. There is a deep channel 0.4 mile wide between them and the reef fringing the peninsula.

Venama Islet lies close offshore on the fringing reef on the N side of the W entrance to Dumaga Bay.

A detached reef, awash, with a channel 0.3 mile wide between it and the coastal reef, lies 0.5 mile NE of Fairfax Reefs and 0.6 mile W of the peninsula. A 2.7m shoal lies about 0.2 mile NW of the detached reef and is connected to it by a ridge of shallow water. Another shoal, with a depth of 5.5m lies 0.4 mile NNE of the detached reef.

**8.35 Liji liji Bay** (11°35'S., 153°26'E.) lies 6 miles WNW of Dumaga Bay and provides anchorage in 25.5m, sand, with Juru Point, the S entrance point, bearing 176°, distant 0.8 mile.

A reef, the edge of which is steep-to, extends 0.5 mile W of Juru Point.

Baumum Bay, located close W of Liji liji Bay, does not appear to afford any anchorage. A reef and foul ground extend about 1 mile SSW and S from the E entrance point of the bay to a position about 1 mile SE of Heibura Point, the W entrance point.

**Pantawi Point** (11°33'S., 153°21'E.), a low point, is situated about 4.5 miles W of Bauman Bay, behind which there is a series of rocky peaks on the ridge sloping down from Mount Riu, the summit of Tagula Island. The coastal reef extends 1.75 miles offshore from a position 1 mile E of the point. Also 0.5 mile SE of the S extremity of the reef is a coral reef, awash.

Bada bada Bay, a deep bight in the coastal reef lies close W of Pantawi Point. The bay affords anchorage in the middle part, in depths from 14.6 to 18.3m, sand. This anchorage is protected from SE by the reef extending SW from Pantawi Point.

**Maduwa Point** (11°30'S., 153°16'E.) is the SW tip of a narrow peninsula which has two peaks 0.75 mile apart. The SW of the peaks is 184m high, and the NE, named Mount Bousquet is 235m high.

Hinai Bay is entered between Maduwa Point and a point about 5 miles SE. The bay appears to afford anchorage clear of a rocky patch in the middle; the inner part of the bay has not been closely examined. Both sides of the bay are fringed by reefs which extend in long tongues. The Hula River discharges into the head of the bay.

**Caution.**—Hinai Bay must be approached with caution as a long line of patches extends 1.5 miles SE from the S extremity of the reef extending from Maduwa Point. From this point there is a gap 0.75 mile wide and then the reef continues for 1 mile further SE. The gap probably provides the best entrance into the bay as the shoals may be seen on either side. Also passage E of the patches appeared clear, but it has not been examined. Rocky patches situated within the bay are 2.75 and 3.75 miles E of Maduwa Point.

**8.36** The channel used for navigation between Maduwa Point and Cape Baganowa is narrowest S of Pantawi Point. At this position, a series of yellow patches near the inner edge of the barrier reef begins. The most N of these lies about 3 miles S of Pantawi Point. However, there are quite a few of these patches between the above and the barrier reef, and these may best be seen on the chart. The inner edge of the barrier reef between Smiths Pass and Dejei Pass has been traced 3 miles W.

Tidal currents between this part of the barrier reef and Tagula Island set to the SW on the flood and to the NNW on the ebb.

**Smiths Pass** (11°40'S., 153°14'E.), which is the second opening in the barrier reef S of Tagula Island, is located about 10 miles S of Maduwa Point. The pass is 0.75 mile wide, with a least depth of 9.1m, and is clear of dangers. Three coral patches lie within the pass on the W side. Close outside the barrier reef, about 3.5 miles W of the pass is an extensive reef.

**Bousquet Bay** (11°29'S., 153°16'E.) is entered between Point Maduwa peninsula on the E and the mainland to the W.

Both the bay and its approach are encumbered with reefs which are best shown on the chart.

Hui-Waditimo Islet, a mass of dead coral, lies in an approximate position 7 miles WSW of Maduwa Point. This islet covered with a few bushes lies on the E end of a reef which has not been examined.

**Samumu Reefs** (11°30'S., 153°09'E.) are situated 4.5 miles W of Maduwa Point and is about 6 miles in width.

**Shallow Bank** (11°30'S., 153°14'E.) is a coral patch with several rocky heads, with depths less than 1.8m. This bank, which lies about 2 miles W of Maduwa Point, is 0.3 mile in length. About midway between the bank and the point is a reef which dries on its E side. West of Shallow Bank and between it and Samumu Reefs, is a reef which always shows. The channel between Shallow bank and the reef W of it is 0.75 mile wide. The W extremity of Iyin Islet bearing 004°, leads through this channel.

**Iyin Islet** (11°27'S., 153°14'E.), lying 3.75 miles NW of Maduwa Point, is about 0.5 mile offshore. The islet consists of a grassy ridge of hills 52m high, surmounted by a clump of trees on its SW end.

There is a good, but confined anchorage, in 12.8m, sand and mud, off the W side of Iyin Islet, with the NW entrance point of the bay N of Iyin Islet bearing 049°. This anchorage is in smooth water and out of the influence of tidal streams.

Onagom Reef, which is steep-to, lies almost midway between Panaman and Iyin Islets.

Panaman Islet, located 3.5 miles W of Iyin Islet, is 61m high, thickly wooded, and uninhabited. The islet lies on the S edge of a reef, under the name Bagana, which extends in patches for 2 miles, NW and over 1 mile N and NNE from the islet.

Bilobei Reef, fairly steep-to and located 1.5 miles N of Panaman Islet, is horseshoe shaped with an opening to the NW.

There is a clear channel, with a depth of 22m in mid-channel, between Bilobei Reef and the shore reef of Tagula Island.

Inskip Reefs, a series of reefs, awash, lie 2.75 to 5.5 miles NW of Panaman Islet.

**Caution.**—The area between Inskip and Samumu Reefs on the N and the barrier reef on the S is cluttered with many reefs and shoals.

**8.37** A mangrove covered coast trends NW 5.5 miles from the W entrance point of the bay N of Iyin Islet to Panawadai Point. The broad coastal reef fringes the coast, extending off it in places for a distance of up to 1 mile.

**Hosiai Point** (11°24'S., 153°11'E.) divides the two small bights that are located between Iyin Island and Panawadai Point. The two bights are encumbered with detached reefs and dangerous patches. The coastal reef extends only a short distance off the heads of these bights on either side of Hosiai Point; while extending about 1 mile off Hosiai Point.

**Guide Reef** (11°22'S., 153°09'E.), a rocky patch which usually shows well, has depths from 1.8 to 3.7m and lies about 2 miles W of Hosiai Point. A sunken rock lies about 0.75 mile SW of the reef.

**Shark Reef** (11°24'S., 153°08'E.), a coral patch which dries, is located 3.5 miles W of Hosiai Point. Two shoals, with depths from 2.7 to 9.1m and 3.7 to 4.6m, lie respectively, 1.5 miles SW and 0.5 mile W of Shark Reef. A shoal with a depth of 4m,

and a shoal with a depth of 5.5m, lie about 2.75 miles W and 2.5 miles WNW, respectively of Shark Reef.

An anchorage for small vessels with local knowledge is located in the S part of the bight, on the NW side of Hosiai Point, sand and mud, in depths from 11 to 12.8m. This anchorage is sheltered from SE winds and tidal currents.

The above anchorage is approached with **Mount Madau** (11°22'S., 153°12'E.) bearing 055°, and leads between patches of reefs. When the SW hill over Maduwa Point comes in range with the summit of Iyin Islet bearing 139°, vessels may drop the anchor in 11m. Also small vessels with local knowledge may anchor in the bight on the SE side of Hosiai Point in a depth of 14.6m. Vessels should keep Maduwa point bearing about 142°, taking care not to shut out the point behind Iyin Island.

**Directions.**—Vessels proceeding along this coast may pass NE of Bilobei Reef and SW of Guide Reef. The N shoulder of the 235m hill on Maduwa Point open SW of Iyin Islet bearing astern about 127° leads NE of Bilobei Reef and SW of Guide Reef.

The coast of Taluga Island N from Panawadai Point for 1.25 miles to Hohunawei Point and then NE for 1.5 miles to Bobo-hai Point, is fringed by a reef nearly 1 mile wide.

**8.38 Bobo-hai Point** (11°20'S., 153°12'E.) is the NW extremity of Taluga Island. There are a few villages at this end of the island, but the inhabitants appear not to be numerous.

**Vehi Reef** (11°21'S., 153°09'E.), which dries, lies about 3 miles SW of Bobo-hai Point.

Reef Two is located about 6.5 miles WSW of Bobo-hai Point. The reef is steep-to and has a drying sand bank on its end.

Remora Reef, whose position is approximate, lies about 9 miles WSW of Bobo-hai Point.

## Rossel Island

**8.39 Rossel Island** (Yela Island) (11°22'S., 154°10'E.) is the most E island of the Louisiade Archipelago. Rossel Island, which is known to the Tagula islanders as Rua, lies nearly 19 miles NE of Tagula Island.

**Mount Rossel** (11°21'S., 154°14'E.) lies near the E end of the island and is 838m high. This precipitous peak has steep ridges extending to the N and W, but descends in more gentle slopes SE to Cape Deliverance, the E extremity of the island. The SW ridge has two conspicuous peaks each 549m high. The E peak, Mount Mo, is flat-topped; the W peak is conical. At the W extremity of the island is a conspicuous conical peak 347m high.

Rossel Island is thickly wooded and nearly the whole S coast is a dense forest. The higher parts of the island are almost constantly cloud capped during the SE monsoon. Rossel Island was reported to give a good radar return from a distance of 28 miles.

**Rossel Lagoon** (11°18'S., 153°48'E.) is over 25 miles in length from the NW point of Rossel Island to Rossel Passage at the W end. The barrier reef encircling this lagoon is narrow and has four passages through it W of the island. The barrier reef on the S side of the island is unbroken E of Rossel

Passage. General depths in the lagoon range from 37 to 64m, but numerous scattered shoals lie in it. Few of these shoals dry and the larger ones are usually awash. Since the water is so clear the shoals can usually be distinguished in good light.

**Rossel Passage** (11°21'S., 153°39'E.), at the W end of Rossel Lagoon, is the only safe passage for a vessel of any size. This passage is about 0.9 mile wide between the point of the barrier reef on the NW side, and the edge of a coral reef awash on the SE side. Between this coral reef and the W end of the S barrier there is another coral reef, awash, leaving a clear passage of about 0.2 mile on either side of it. The channels are clearly visible and the reefs are steep-to. The sea breaks heavily on both of these reefs and also on the barrier reef.

Tidal currents within Rossel Passage are fairly strong and set straight through, the flood to the SW, the ebb to the NE.

Just within Rossel Passage, anchorage has been taken in the lagoon, with the boulder on the N barrier reef bearing 303°, distant 2 miles.

**Caution.**—Vessels entering Rossel Lagoon must exercise caution because the area has not been adequately surveyed.

In the barrier on the N side of the Lagoon there are three passages or openings; Swinger Opening is the larger passage; the two smaller passages are called Boat Channel and Narrow Passage. Narrow Passage, which is the E of the two smaller passages, is narrow but apparently clear. However since neither of the two smaller passages have been examined, they are not recommended for use.

**Swinger Opening** (11°16'S., 153°58'E.), whose entrance lies about 6 miles W of the NW point of Rossel Island, is about 0.25 mile wide, and deep. West Point, in range 171° with Ngea Islet (Tree Islet), leads to the entrance of Swinger Opening. A narrow horn of reef on each side of the opening extends for more than a mile in a SSW direction.

**Directions.**—Vessels approach the W entrance to Rossel Passage steering 052° and pass the extremity of the reef on the W side of the channel at a distance of about 0.4 mile. A course of 063° should then be steered to pass between two coral reefs, about 0.65 mile apart and distinctly visible, about 4 miles NE of the entrance. When about 0.5 mile beyond the most S coral reef alter course to 091° and pass about 0.33 mile S of a small reef lying about 4 miles from the last turning point and 0.2 mile S of a reef lying 3 miles further. When 1 mile beyond this reef alter course to 098°, passing N of a reef with two sunken rocks near it and S of two reefs, nearly awash, with a submerged rock close S of the reef. This course passes 0.25 mile N of a reef lying 5.25 miles WNW of West Point. When abeam of this reef alter course to 113° for the anchorage in Tryon Bay. This heading passes between Pawsey Reefs and a small reef lying 1.25 miles NNW.

**Caution.**—Navigation within Swinger Opening is intricate, and with a tidal current of 2 to 4 knots it cannot be taken without considerable risk. In addition Swinger Opening has not been completely surveyed.

**8.40 West side of Rossel Island.**—The W side of the island is deeply indented between Gwainyu and West Points. Mbeawe Bay, entered between Gwainyu Point and Mbeawe Point, about 1.5 miles S, is apparently deep.

**Wola Island** (High Island) (11°18'S., 154°02'E.), 91m high, is located 1.5 miles W of Gwainyu Point and is grass covered, flat-topped, and steep-to.

**Yonga Bay** (11°20'S., 154°05'E.) is entered between Mbeawe Point and Mboibi Point, 3.5 miles WSW. The S shore, which is rocky, consists of alternate bays and coves, none of which affords a desirable anchorage, the water being deep, with a rocky and uneven bottom. The largest and most W of these coves is Dixon Bay (Kwaya Bay).

About 2 miles from the head of Yongga Bay and within the middle is a 5.5m patch with some rocky and foul ground about 0.5 mile SE of it. These dangers make access to the inner part of the bay somewhat difficult.

**Tyron Bay** (Chambine Bay) (11°21'S., 154°01'E.), which lies W of Dixon Bay, is entered between Mboibi Point and West Point. Tyron Bay is protected from all winds, except those between N and W. A reef, which nearly dries and may be difficult to see, lies 0.5 mile SW of the N entrance of the bay, with which it is connected by foul ground. Rocks with depths less than 1.8m extend 0.2 mile W of the reef. The S part of the bay is clear of dangers.

Pawsey Reefs, which nearly dry, lie about 1.5 miles NW of West Point. In the middle of these reefs is a rock a few feet high.

**Anchorage.**—Anchorage in a depth of 22m, sand, can be taken 0.25 mile N of Wola Island. Anchorage may also be taken in Tyron Bay in a depth of 25.6m sand and mud, with the N entrance point bearing 348° and the S entrance point bearing 261°. This part of the bay is clear of dangers.

**8.41 South side of Rossel Island.**—The S coast is rocky, steep and rugged between West Point and Southwest Point (Vamba Point), 4 miles SE.

**Ngea Islet** (Tree Islet) (11°24'S., 153°59'E.), which is 12.2m high, lies 1.25 miles S of West Point and on the barrier reef.

The reef E of Ngea Islet assumes a fringing character, extending from 0.5 to 1 mile offshore as far as Govia Bay. Govia Bay, which lies 5 miles E of Southwest Point, is filled with reefs, except in its outer part where there may be a boat entrance. Between this bay and the SE end of the island is Nyebe Bay and off the SE end the coastal reef extends nearly 2 miles offshore. The sea breaks heavily on the reef during the SE monsoon.

Several unexamined passages, from 183m to 0.4 mile wide, indent the reef off the S side of Rossel Island. The principal passages, which are reported suitable for small vessels only, are called Ye, Dowa, and Gware Passages.

**Gwe Passage** (11°25'S., 154°01'E.) is 2 miles ESE of Ngea. The W side of the passage is marked by a beacon. The passage, 91 to 137m wide, is marked by stakes and leads N for about 0.45 mile and then opens into a lagoon extending WNW for 1 mile to a boat channel connecting to Rossel Lagoon. The village of Pambwa is on the E shore of the lagoon. It was reported that a 500 grt vessel entered Gwe Passage on a course of 135° with the District Officer's house ahead; this is a prominent building with a corrugated iron roof about 0.15 mile NW of a windsock at an airstrip. At about 0.15 mile beyond the entrance beacon course was altered to 000° and anchorage was obtained at the E end of the lagoon off the village in 12 to 18m. Landing can be made at the NW end of the airstrip.

**Gware Passage** (11°25'S., 154°12'E.) is about 0.15 mile wide with reefs on both sides, which normally break heavily. Two reefs lie about 0.3 mile within the entrance, but passage between the reefs is clear. The W reef was marked by a beacon.

Gware Passage leads to an anchorage off Abeleti (Iwole), a plantation and trading post, located 2 miles E of Nyebe Bay. There are two prominent white houses on a hill at Abeleti, but the W house was reported obscured by foliage. This anchorage was made with the W reef beacon in line with the E white house, bearing 010°, and anchorage in a depth of 15.2m was taken 183m S of the beacon. Anchorage has also been taken in a depth of 9.1m, about 183m NE of the beacon.

**Rossel Spit** (11°27'S., 154°23'E.), a triangular barrier reef which fronts the coast and contains many reefs, lies between the SE point of Rossel Island and Cape Deliverance, 3 miles NNE.

**Cape Deliverance** (11°23'S., 154°13'E.), a low, rocky point, is dominated by a hill 244m high, which slopes gradually to the coast. Diama Islet lies on the coastal reef close E of the Cape.

**Adele Islet** (Loa Boloba) (11°27'S., 154°24'E.), 40m high, lies 8 miles ESE of the Cape and marks the E extremity of the spit. A light, from which a racon transmits, marks the islet.

The outer edges of Rossel Spit are apparently steep-to, although a bank with a depth of 100m was reported to lie about 0.8 mile E of Adele Islet. There is a light on this islet. A stranded wreck lies on the edge of the reef 2.75 miles WSW of Adele Islet.

A very strong WNW current has been experienced when rounding Adele Islet from N. There are eddies in these waters extending 3.5 miles E of Adele Islet. From Cape Deliverance E there is an opening into the N side of the reef 2 miles wide, which leads into the lagoon. However, this opening has not been surveyed and is reported to be encumbered with shoals. Two partially submerged wrecks lie on the reef 2.75 miles E and 3.5 miles ESE of Cape Deliverance.

**8.42 Northeast coast of Rossel Island.**—The coast NW of Cape Deliverance is composed mostly of mangroves and fronted by a coastal reef to a distance of about 1 mile.

**Pwennegwa Harbor** (11°22'S., 154°17'E.), the only opening in the fringing reef on the E coast which has been examined, is entered 1.5 miles N of Cape Deliverance. The opening is about 0.75 mile long and 0.13 mile in width at the entrance. Coral flats on either side dry at LW. A boulder, probably always uncovered, lies about 183m S of the S entrance point of the reef.

Anchorage may be taken in depths from 16.5 to 18.3m mud, near the head of the harbor, about 0.2 mile offshore.

Observation Rock, 3m high, lies 2 miles NNW of the entrance to Pwennegwa Harbor and 0.5 mile offshore. Close SE of the rock is an opening in the reef which widens toward its head, where anchorage might be taken by small vessels with local knowledge.

Warunga Passage is an opening in the coastal reef 1.5 miles NW of Observation Rock.

Heron Opening whose entrance lies about 3 miles NW of Observation Rock, is a lagoon-like opening in the reef. This reef encumbered opening provides anchorage for Jinya (Ginyo) mission station, the largest settlement on Rossel Island. Heron Islet, 9.1m high, lies on the NW entrance point of the

opening. A boulder lies on the SE entrance point. Foul ground exists 0.4 mile ENE of Heron Islet. It was reported that navigation through Heron opening was possible for small craft proceeding in favorable light conditions.

**8.43 North coast of Rossel Island.**—From **Te Point** (Ie Point) (11°18'S., 154°13'E.), the low N part of the island, the coast trends 9 miles W to **Gwainyu Point** (11°18'S., 154°04'E.), the NW extremity of the island. Wu Bay is located 5 miles E of Gwainyu Point. This stretch of coast is fronted by a reef. Between the coast and the reef there is foul ground, which is very dangerous.

**Relief Opening** (11°17'S., 154°10'E.), about 0.2 mile wide, is the only opening in this reef and lies about 3.5 miles WNW of Te Point.

**Pocklington Reef** (10°48'S., 155°44'E.) lies about 83 miles ENE of Cape Deliverance. Several rocks with heights between 0.9 and 3m lie along its length. The wreck on the NE end of the reef provided a good radar response. There is no anchorage in the vicinity of the reef.

**Manuga Reefs** (Protectorate Reefs) (11°00'S., 153°21'E.) consist of two separate reefs awash at LW. The reefs are separated by a shallow passage about 0.5 mile wide.

The SE reef, which is apparently steep-to, has on its outer edges a few black boulders which dry about 1.5m.

On the NE edge of the NW reef there is a sandy islet with some bushes on it, about 6.1m high. A cay, 0.6m high, with grass on it, lies 0.5 mile SE of the above islet.

**Renard Islands** (10°52'S., 153°04'E.) are a group lying on separate reefs, the most E of which lies 11 miles NW of Manuga Reefs. On the N side shallow water extends for a distance of 2 to 3 miles and the S side of the chain is steep-to. The islands are inhabited.

**Kimuta Island** (10°51'S., 152°59'E.), which is 84m high, is the largest and most W of the group. The coast is generally rocky with occasional sandy beaches. Ridges of hills extend through the island, grassy at the W end and wooded at the E end.

Bagaium Islet, 9.1m high, lies close S of the W end of the island and on the reef which fringes the island.

Niva Beno Islet, 26m high and wooded, lies 1.25 miles E of and on the same reef as Kimuta Island. There is a village at the W end of the islet. Several rocks and islets lie on the reef E of the islet. Topuna, an islet 20m high, being at the E extremity of the reef.

Baiwa, Pana wadai, and Pana roran Islets make up a small group of low bushy rocks and islets on a separate reef about 1.5 miles N of Kimuta Island. The area from the N edge of the reef surrounding these islets curving around toward the E extremity of the reef surrounding Kimuta and Niva Beno Islet has not been examined.

Oreia Islet, 27.4m high and wooded, lies about 3.5 miles SE of Niva Beno islet. Oreia Islet is situated near the W end of a reef on which is Nirut Islet. Between Oreia and Topuna Islets there is a passage about 2.25 miles wide with depths from 4.9 to 5.5m. However shoal patches and strong tide rips are found across this passage.

The islet which is the most E of the Renard Group is Epoko Islet. This islet, which is about 6m high and covered with bushes, lies 3.75 miles E of Oreia Islet. Epoko Islet lies on the

N edge of a reef whose SE side is steep-to, but shoal water projects 4 miles WNW from it.

Anchorage in a depth of 7.3m may be taken by small craft during the SE monsoon at the head of a bight formed by the horn of a reef extending 0.6 mile offshore, on the N side of Kimuta Island, the largest of Renard Islands.

## Misima Island

**8.44 Misima Island** (Misimai Island) (St. Aigan Island) (10°41'S., 152°44'E.) is a mountainous and densely wooded island situated 10.5 miles NNW of Kimuta Island.

Mount Koia Tau, a rounded peak 1,036m high, is located 7 miles E of the W extremity of Misima and is the summit of the island. The higher peaks of this ridge are frequently cloud-capped during the SE monsoon. A series of conspicuous hills from 305 to 437m high are located on the S part of the N extremity of the island. There are several villages, most of which are on the N side of the island.

**8.45 South coast of Misima Island.**—**Cape Ebor**a (Cape Ebola) (10°38'S., 152°31'E.), the W extremity of the island, is a sharp rocky point. A rock lies awash close off the point, but otherwise it is steep-to. The land rises rapidly to an elevation of 762m E of the Cape.

From Cape Ebor the rocky coast trends ESE for 7 miles to Bagga Bagga, a steep cliffy point. Close E of Bagga Bagga Point a bay indents the coast to a distance of about 0.25 mile. A cove and a large village lie 2.75 miles E of the same point. A promontory, which forms the S extremity of the island, lies 5.5 miles E of the cove. About 6 miles ENE of this promontory is the low cliffy point forming the W entrance point of Bwagadia Harbor.

It has been reported small craft may take anchorage in a bay about 1 mile ESE of Cape Ebor. Also there are several coves on either side of Bagga Bagga Point which might provide shelter to small craft.

**Maika Harbor** (10°42'S., 152°48'E.) is formed by a small inlet. The entrance, about 91m wide, is well defined and marked by light beacons.

The harbor is dredged to 8.5m and is suitable for vessels up to 90m in length and 6m in draft. Winds of 15 to 20 knots and waves of 1.5 to 2m occur throughout the year. The SE Trade Wind curls around the island and tends to blow from SW into the harbor.

Pilotage is not available. Port radio is VHF channel 16 from 0600 to 1600.

Leading lightbeacons, in line 336°, lead into the harbor. A dangerous rock lies about 50m SE of the light beacon W of the entrance.

No anchorage is available within 30 miles of the harbor. Depths up to 300m exist immediately outside the harbor. Anchoring is prohibited E of the E light at the harbor entrance as a pipe extends 0.15 mile to seaward.

There is one berth, 60m long, available. The axis of the wharf is 155°/335°. Vessels berth either port or starboard side-to, but the former is not recommended for vessels over 60m long due to difficulty of turning in the harbor.

If an anchor is required for berthing it is recommended that, during the approach, it be walked back until one shackle is on deck and when it touches the bottom it is paid out as required.

**Bwagaioia Harbor** (10°41'S., 152°51'E.) (World Port Index No. 53180) entrance is well-defined and marked by a light on its W entrance point. The harbor is a narrow inlet formed between the coast, which is bordered by mangroves N of the cliffy point, and the W side of a reef extending about 1 mile S from the head of the inlet. Although the entrance is less than 91m wide, it and the harbor are clear of dangers. The wharf has an alongside depth of 3.7m. Bwagaioia is the Sub-District headquarters for the Louisiades and has communication by air with Port Moresby.

It was reported that small craft with local knowledge anchor in the harbor with the stern made fast to the trees on the W side of the harbor, heading S. Swinging room is restricted.

A red cyclone mooring buoy is moored in the harbor; a white marker buoy indicates the position of the mooring buoy anchor.

Managun Islet (Managon Islet), 27m high, and tree covered lies on the SE extremity of the fringing reef forming the E side of the above inlet. Gigira Islet, 18.3m high, lies 0.5 mile W of Managun Islet and on the S edge of the same reef.

**8.46 North coast of Misima Island.—Cape Henry** (10°40'S., 152°53'E.) is the E extremity of the island. From the cape a line of cliffs, 30.5 to 61m high, trends 6.5 miles NW to Rokia Point.

**Rokia Point** (10°37'S., 152°47'E.), the N extremity of the island, is a low point. Between Rokia Point and Cape Ebor, about 16 miles W, the coast is rocky in places with stretches of sandy beaches.

The N coast has not been surveyed, but due to the great depths within 1 mile offshore, it is improbable that there is any anchorage, except in Rijak Bay (Treachery Bay), 1.25 miles SW of Rokia Point. This anchorage, off Sagara, is reportedly used by small vessels during the SE monsoon. Anchorage may be had off Liag (Liak) village in 14.6 to 18.3m, just W of a reef which extends about 0.15 mile offshore.

## Deboyne Islands

**8.47 Deboyne Islands** (10°44'S., 152°22'E.), lying SW of Misima Island, are a group of islands and barrier reefs enclosing lagoons.

**Panaete Island** (Panniet Island) (10°41'S., 152°21'E.), situated about 8.5 miles WSW of Misima Island, is the largest and most N of the group. The island, which is thickly wooded, is crescent shaped and has a single conical peak, 221m high, near its W side.

The N coast of the island is bold, steep-to, and about 30.5m high, gradually diminishing to about 6.1m high at the S extremities. The principal villages are on the S coast, which is shoal to approach and dries in sand flats for some distance offshore. Panaete Island has the largest population in the Louisiade Archipelago.

Small vessels can take anchorage off the E coast of Panaete Island 0.75 mile N of Pana-uya-wana Islet, in 33m, sand and coral. This anchorage, situated about 183m offshore, is suitable only when the wind is from NW to SW.

A thin ridge of coral reef extends SW for 6 miles from the SW extremity of Panaete Island to the N side of W passage. This ridge forms the NW barrier of Deboyne Lagoon.

From the SE extremity of Panaete Island, a reef, through which there are four openings, extends 9.5 miles SE to the N part of S passage. On this reef are some wooded islets and sand cays. Of the four openings in the reef, the two N openings are not navigable as they open into shallow water and foul ground.

From W passage the barrier reef projects about 12 miles E. At this point it is separated by S passage from the above reef extending SE from Panaete Island. There are three openings in this 12 mile section.

The three above sections of the barrier reef enclose Deboyne Lagoon.

**Pana-uya wana Island** (10°44'S., 152°25'E.) lies on a reef which extends SE from the SE extremity of Panaete Island.

Passage Islet, 12m high, lies about 6 miles SE of Pana-uya wana and on the N edge of a reef. There is a passage N of Passage Islet which is 0.2 mile wide with depths up to 10m. However a 5.5m patch lies in mid-channel and tidal currents from 3 to 4 knots set through the passage.

Rara Island, 26m high and wooded, is located upon a reef 1.5 miles S of Passage Islet.

White beacons stand about 2.25 miles SE of Pana-uya wana Island near Losai Island; on the N extremity of Passage Island, and on the NW extremity of Rara Island.

**8.48 Redlick Passage** (10°48'S., 152°30'E.), about 0.7 mile wide, lies between the NW tip of Rara Islet and the S end of Passage Islet reef. A rock with a depth less than 1.8m and a patch with a depth of 4.6m, lie within 0.4 mile NNW of the NW tip of Rara Island. In the N part of the channel there are depths of about 5.5m. The reef on the N side of the passage is plainly visible.

The tidal currents in the passage set through at a considerable rate, but the channel is easily navigated.

**South Passage** (10°51'S., 152°31'E.) lies between the E end of the reef forming the S side of Deboyne Lagoon and the NW side of the atoll where Redlick Islands lie. The passage is wide and deep except for an 11m patch which lies in the middle. A white beacon marks the W side of South Passage and a red beacon stands on the reef 1.25 miles farther WSW.

Tidal currents were observed moving at 4 knots, setting along the axis of the channels of the passage.

**Nibub Islet** (10°51'S., 152°26'E.), 9.1m high and marked by a beacon, lies 3.5 miles SW of Rara Islet, on part of the S barrier reef.

There are three navigable channels through the S part of the barrier reef. Nibub Passage, which is most E of the three, lies close W of Nibub Islet and is marked by a beacon. This channel is 0.2 mile wide with a least depth of 6.4m. The most E of the remaining two passages is 0.45 mile wide, but a spit, with a least depth of 2.7m, extends to the middle of the passage from the reef on the W side. Sunken rocks lie about 0.25 mile N of this spit. There is a red beacon on the W side of the reef extending 2.25 mile W from Nibub Passage.

**Nivani Passage** (10°49'S., 152°52'E.), which is the third channel, is also the most W of the three. This passage is about 0.4 mile wide and deep in the middle. Shoals and foul ground project 1.5 miles NW from the reef on the E side of the passage.

**West Passage** (10°48'S., 152°17'E.), about 9 miles W of Nibub Islet, is 1.25 miles wide and unobstructed with deep water close up to the reefs. A least depth of 16.5m has been reported in the passage.

**Tides—Currents.**—A strong tidal rip occasionally sets across West Passage at the seaward limits of the reef. These rips are easily seen and do not present a hazard due to the width of the entrance. The rip was observed to set to the S during the ebb and to the N on the flood current.

**8.49 Deboyne Lagoon** (10°48'S., 152°24'E.), roughly triangular in shape, has a number of shoals in the N part, which are best shown on the chart.

Panapompom Island, 157m high and wooded, lies nearly in the middle of the lagoon, about 2 miles S of Panaete Island. There is a village on the NE side of the island. Panapompom Island is joined to Panaete Island by foul ground, and is completely surrounded by reefs and shoals which are best shown on the chart.

Nivani Island, 94.5m high, small, grassy, and partly wooded, is situated about 0.5 mile S of Panapompom Island and marked by beacons. The channel between the islands is shallow. Reefs and foul ground project off the S and W sides of the island. A depth of 8.2m lies about 0.5 mile S of the E extremity of the island. A depth of 2.7m marked by a beacon lies about 2 miles SE of Panapompom Island. A depth of 3.7m lies 0.5 mile N of this beacon.

Anchorage may be taken during the SE monsoon off the W side of Nivani Island in a depth of 5.5m.

Tidal currents in the vicinity of Panapompom and Nivani Islands are negligible, but gradually increase to the E and to the W.

**Redlick Islands** (10°50'S., 152°33'E.) comprise a chain of low, bushy islets, lying on the N edge of a reef situated SE of Deboyne Lagoon and separated from it by South Passage, previously described in paragraph 8.46. This large reef, the edges of which are steep-to, has a deep lagoon within with no entrance. Upon the E edge of the same reef, and 3.5 miles SE of Redlick Islets, is an islet 12m high.

Mabui Islet, 27.4m high to the tops of the trees, stands on the NE side of a reef between the SE side of the atoll on which Redlick Islets lie, and the NW side of the barrier reef N of the Calvados Chain. There is a deep channel on either side of the reef.

**Torlesse Islands** (10°49'S., 152°13'E.) are a group of low, wooded, inhabited islets, which lie on a reef about 4 miles W of the Deboyne Lagoon. The three main islets of the group are Pana-niu, about 30.5m high, Bonna-bonnawan, and Tinolan. There are several rocks on the E and SE sides of the reef. The center of a bank, with a least known depth of 101m, lies about 3.5 miles W of Pana-Niu.

Tidal currents with a N set of 4 knots have been reported in the N approach between Torlesse Islands and Deboyne Lagoon.

**Directions.**—Vessels may enter Deboyne Lagoon from the E or the W. Passage into the entrance, and then the lagoon, through either Redlick or West Passage, presents no difficulties, subject to the usual precautions. Both of these passages are well defined, and Redlick Passage, though narrow, may be taken with care.

**Caution.**—An area about 70 miles in length and width within the W part of the Louisiade Archipelago has not been surveyed. Vessels regularly navigate this area on certain well known tracks, and the following islands and dangers are known to exist.

### Islands and Dangers at the West End of Louisiade Archipelago

**8.50 Conflict Group** (10°46'S., 151°48'E.), located about 13.5 miles W of the Torlesse Islets, is an extensive atoll.

Nearly all of the islands are situated on the N side of the atoll, there being but three on the S side. The largest islands are apparently at the extremities, Irai (Ilai) and Panasesabeing at the W end, and Aurioa (Aroroa) and Muniara at the E end. Panarakiim (Panarakuum), Ginara, Panaboal (Panibari) and Tabulagoal (Tubinagurm) are the largest on the N side. Itarmarina and Quesal (Kisa) are the two islands within the lagoon.

There are many passages, some of them deep, leading between the islands forming the atoll into the lagoon. This lagoon provides a possible anchorage in depths of about 27.4m or less.

**Emerald Reef** (10°38'S., 151°34'E.) lies NW of the W end of the Conflict Group. A depth of 12.8m was obtained 6.75 miles NW of Panasesa Island, in what appeared to be the bight of a reef. From this position a portion of the reef was found to extend 4 miles NW, and the other SE for probably a greater distance. Many tide rips prevented the limits of the reef from being clearly ascertained. However, W of the 12.8m patch the reef appeared to be nearly awash.

Reefs extend NW from the W end of the Conflict Group apparently connecting with Emerald Reef. Two shoals, with depths of 13.1 and 8.2m, were reported to lie about 8 miles WNW of the W extremity of Irai Island.

A ridge with but little water over it, extends 2 miles W from the NW tip of Emerald Reef and is probably part of the same reef. A coral patch with a depth of 12.8m, lies 9 miles N of the above NW tip. A group of three reefs and shoal waters are located about 4 miles NW of the NW tip of Emerald Reef.

**Lunn Island** (10°47'S., 152°00'E.) lies about 5 miles E of the Conflict Group. The island is 24m high and fringed by a reef. A light is shown from the E end of the island.

Bunora Islet is situated about 15 miles NNW of Lunn Island. Sarupai Islet lies about 4.5 miles WNW of Bunora Islet.

A coral shoal, whose position is approximate, is charted 10 miles WNW of Sarupai Islet.

**Directions.**—Vessels usually enter the lagoon via Ship Pass, SE of Irai Island. Vessels steer 046° for Itamarina Island. Once inside the lagoon a course of 088° with Lunn Island ahead, takes a vessel through the lagoon to pass out by the passage just N of Muniara Island. A depth of 7.3m was reported on the Muniara side of this passage.

Another passage from W, reportedly used by a small vessel, is to enter between Panasesa and Gabuga butau Islands. A depth of 5.5m was reported between these islands. Vessels then pass close to the fringing reef on the N side of Itamarina Island. Course should then be shaped to pass S of Quesal Island to the passage just N of Muniara Island.

There is deep clear water on the seaward side close up to the reef forming the S side of the lagoon. Also deep clear water exists between the E end of the Conflict Group and Lunn Island.

Vessels should exercise caution when navigating within the lagoon due to the incomplete nature of the survey information. In the passage between Bunora and Sarupai Islets the bottom suddenly shoals off to 60.4m, indicating the possible existence of undetected dangers in this vicinity.

Anchorage can be taken off the E side of Panasesa Island by small vessels in 9.1m. Vessels have approached this anchorage through the passage between Panasesa and Gabugabutau Islands.

**8.51 Bonvouloir Islands** (10°23'S., 151°57'E.) and reefs extend in a curve about 20 miles in a NW and SE direction. These islands are inhabited.

**East Island** (10°24'S., 152°06'E.), 198m high and densely wooded, is the most E of the group. This island lies about 26 miles NE of the Conflict Group. There are great depths off the N

side of the island at a distance of from 0.5 to 0.75 mile. It was reported that East Island lay 0.5 mile N of its charted position.

Discolored water with probable depths of from 32.9 to 36.6m extends off the E end of East Island.

A shoal, with a depth of 6.7m, lies about 1.75 miles W of East Island. A reef, on which the sea breaks, lies about 5 miles W of the island. A shoal with a depth of 11m lies 0.6 mile N of the reef. A 9.1m patch lies 6 miles W of the island.

Anchorage may be obtained in a depth of 31m, broken coral and sand, about 0.3 mile from the NW side of East Island.

**Hastings Island** (10°20'S., 151°52'E.), 222m high, is bold and densely wooded. A bank, 0.75 mile in length, lies off its NW point and discolored water has been observed off its E end. A light marks the SW extremity of the island.

**Strathord Islands** (10°15'S., 151°52'E.) are a group of low, wooded islands connected by a reef. These islands are situated about 4 miles N of Hastings Island. A light is shown from the N extremity of the Strathord Islands. The passage between the Hastings Island and Strathord Islands appears to be clear of danger.