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SECTOR 2 — CHART INFORMATION

SECTOR 2

NORTHERN MOLUCCAS—HALMAHERA, OBI, AND SULA ISLANDS

Plan.—This sector describes the W coast of Halmahera with the islands off it, including Bacan and Obi Islands, and then the E coast of Halmahera with the islands on the W side of Halmahera Sea, including Batanme.

Northern Moluccas

2.1 The Northern Moluccas include Halmahera and its adjacent islands, Bacan Islands and Obi and its adjacent islands, Bacan Islands and Obi Islands near the S end of Halmahera, and Pulau Mayu and Pulau Tifore, which are about midchannel between Halmahera and Sulawesi. These islands are covered with rich tropical forests with many coconut plantations along the coasts.

This group of islands is separated from the N part of Sulawesi by the Molucca Sea and the Molucca Passage, which extends to the N. Djailolo Passage separates the group from the islands off the NW end of New Guinea. Ceram Sea separates the group from the islands to the S.

Pulau Maju (Pulau Mayu) (1°19'N., 126°23'E.) is marked by a light shown from its W extremity. The island, which lies about midway between Halmahera and the NE end of Sulawesi, is hilly. At its center it is 413m high and has a smooth rounded appearance. The island is reported to be a good radar target. During the S monsoon, anchorage may be obtained in a depth of about 40m off the N side of the island. Kampung Pasir Putih is on the W extremity of the island; the best landing place is E of it. A sunken wreck is reported to lie about 30 miles NE of Pulau Maju.

Pulau Tifore (1°00'N., 126°00'E.), about 24 miles SW of Pulau Maju, is lower than the latter island, but rises to a 183m hill in its NW part. It has been reported to be a good radar target at a distance of 24 miles. Gureda, an islet 98m high, is off the NW end of Pulau Tifore and is connected to it by a drying reef. A reef, with a depth of 2.4m and marked by discoloration, is close off the middle of the SW side of the island. The village of Kampung Balibi is on the NE coast; fresh water is available.

Tides—Currents.—The currents near the above islands and in the open areas such as the Molucca Sea are dependent on the winds. During the S monsoon they set to the NNE; as a rule they do not exceed a rate of 0.6 knot but may attain a rate of 2 knots at times. During the N monsoon they set to the ESE and may also attain a rate of 2 knots, but generally do not exceed 0.75 knot. The currents are stronger W of the islands during the S monsoon, and stronger E of the islands during the N monsoon.

Halmahera

2.2 The sparse scattered population of Halmahera are of the Alfuren and Papuan types and to a great extent they dwell on the coast. The N part of the island is the most populated.

Coconut culture and forest produce are the principal means of livelihood; fishing is only carried on in the rivers.

The island, although the largest of the Northern Moluccas, is the least important and consists of four long narrow peninsulas with deep intervening gulfs. It is in the N part of the group and is about 190 miles long in a N-S direction.

Mountain chains intersect all four peninsulas. The chain of mountains on the W side is of volcanic character, but Gunung Gamkonora, 1,567m high, is the only active volcano.

Off-lying islands.—**Kepulauan Loloda Utara** (North Loloda Island) (2°13'N., 127°47'E.), W of Tanjung Bisoa, the N extremity of Halmahera, are moderately high and consist of four large inhabited islands—Pulau Doi, Pulau Tuakara, Pulau Dagasuli, and Pulau Salangadeke, and several smaller islets in their vicinity. Pulau Doi, the largest, is 330m high, and has been reported to be a good radar target up to a distance of 23 miles. Extensive reefs extend both N and S from Pulau Salangadeke, the southernmost island. The group is separated from the Halmahera coast by a clear channel with a least width of 2.25 miles. Except for reefs extending from the islands and a 5m shoal 0.5 mile N of the W part of Pulau Dagasuli, the channels between the islands are clear. Local knowledge is necessary.

Vessels call at these islands for ebony. They have no definite anchorages, but anchor in the most convenient place for picking up their cargo.

Anchorage is available in 60m in a small bay at the village of Kampung Dama on the S side of Pulau Doi. The W shore of this bay has a fringing reef, but the NE shore is clear. Local knowledge is necessary.

West Coast of Halmahera

2.3 Tanjung Bisoa (2°13'N., 127°57'E.), the N extremity of Halmahera, to Pulau Diti the coast trends in a SW direction and is rocky and steep with perpendicular cliffs formed by mountain spurs in places. Occasionally intervening sandy beaches will be found. Tanjung Bisoa has a fringing reef, but may safely be rounded at a distance of 1 mile; otherwise the coast is steep-to.

Tides—Currents.—At **Kampung Asimiro** (1°59'N., 127°45'E.) there is both a diurnal and a semidiurnal tide, but the latter predominates. Neither the spring highs nor the spring lows of the two coincide. The highest water level occurs in May and November; the lowest in June or July and in December or January; the maximum rise and fall that can be expected are, respectively, about 0.75m above and 0.75m below mean sea level.

Pulau Diti (1°57'N., 127°43'E.) is a thickly-wooded coral island near Halmahera coast about 22 miles SW of Tanjung Bisoa. E of the island the coast forms a small bight, where there is anchorage in 29m of water. Local knowledge is necessary.

From Pulau Diti the coast trends SSW for 18 miles to Teluk Loloda, and has a wild and inhospitable aspect. It should be given a wide berth by large vessels especially during the monsoons, when rollers are experienced near the coast. Between the various points, which are formed by steep spurs of mountain range, narrow beaches with small villages are found. There is usually anchorage off these villages, but landing is difficult.

The only good shelter for small vessels is in Teluk Barataku, behind a rocky reef extending from the S point. Depth here is 73m. At the villages of Kampung Pumadada and Kampung Gamkahe, 2.3 and 5 miles S respectively, of Pulau Diti, the anchorages are entirely open.

2.4 Teluk Loloda (1°41'N., 127°33'E.) is formed by Kepulauan Loloda Selatan (South Loloda Islands) and the mainland of Halmahera. The three main islands, Pulau Kahatola, Nusa Sidanga, and Nusa Adui, 226m, 222m, and 151m high, respectively, are uninhabited. The double top of Nusa Adui, when seen between the other two, appears conical. Of the mountain peaks in the interior of Halmahera Gunung Loloda, 6 miles ESE of the bay, is conspicuous when seen from any direction. It has a rounded summit 1,094m high, and close S of it is another lower peak.

Anchorage.—Vessels can anchor S of Doeta Seta, which is off the mainland of Halmahera, in 29 to 66m. A waterfall on the E side of Pulau Kahatola or the summit of that island bearing 273° leads into an anchorage. Vessels should not go too far in, however, as the E part of the bay has many submerged reefs.

In Teluk Loloda are numerous reefs and an extensive shoal bank is in its E and S parts. Both the N and S entrances are clear except for the reefs skirting the islands. The passage E of Nusa Adui is not recommended because of the numerous rocks and reefs in it. Sungai Loloda flows into the N side of Teluk Loloda, but is navigable only by native canoes. Kampung Loloda is a short distance up the river.

Directions.—Large vessels navigating from S to N keep in midchannel between Pulau Kahatola and Nusa Adui until the N point of Nusa Adui is passed; then steer N, keeping near the shore of Nusa Kahatola to avoid the shallW and shore reef of Doeta Seta to the E. This passage is deep and easy. The shore reefs are steep-to and show up well. Current is negligible.

Between **Tanjung Rongi Mhe** (1°38'N., 127°32'E.), at the S end of Teluk Loloda, and Tanjung Bobo, about 37 miles SSW, the coast is high and too steep to be accessible except in the bights, where it is low and can be identified by the plains extending inland from them. The active volcanoes form the highest peaks of this desolate and mountainous land.

Tanjung Ligua Ma Dehe (1°33'N., 127°30'E.), 6 miles SSW of Tanjung Rongi Mhe, is high and projects some distance to the W. Close to its S side are some conspicuous rocks. The coast immediately N of the point is rocky; then almost to Teluk Loloda it forms a bight with a narrow sandy beach.

2.5 Gunung Gamkonora (1°23'N., 127°32'E.), 1,567m high and the highest peak along this stretch of coast, is still an active volcano and emits a constant cloud of smoke. Between

this peak and Gunung Loloda is another peak, Ibu, which is 1,383m high. About 3 miles NE of Tanjung Bobo is the cone-shaped peak of Jailolo (Djailolo), 1,036m high and with a lower peak on its W side. Several other peaks are near the coast between this peak and Gunung Gamkonora.

In the bight between the hills SE of Tanjung Ligua Ma Dehe and Tanjung Duko, abreast of Gunung Gamkonora, the coast is generally low, so that the lone conical hill, Ngidi Matjin, 117m high and midway between the two points, forms a conspicuous mark. South of Tanjung Duko the coast is rocky.

Ibu River discharges 3.5 miles S of Tanjung Ligua Mahe Dehe. Anchorage may be had in 12.8m off the mouth of the river about 0.5 mile from the shore, with Tanjung Ligua Mahe Dehe bearing 348° and the peak of Ibu 092°. It is open to W winds, and in a NW monsoon a vessel should not go closer in, as the swell may rise suddenly. In the SE monsoon, vessels may anchor 0.15 mile closer, in depths of 9.1m. North of the anchorage the bottom is stony, but to the S it is sandy.

Teluk Sahu (1°09'N., 127°24'E.) is a large bight with a steep beach on which is the village of Kampung Susupu. When anchoring in front of the village it is advisable to keep in depths of 29 to 40m because rollers come up with the slightest W wind. Small vessels find shelter in the heavily sanded mouth of a small river which enters the sea S of Susupu. The narrow plain with Teluk Sahu is fertile and thickly populated.

Salo Island (1°05'N., 127°24'E.), close W of the high coast between Teluk Sahu and Tanjung Bobo, is very conspicuous.

2.6 Teluk Jailolo (Teluk Djailolo) (1°02'N., 127°28'E.), entered between Tanjung Kailupa and Tanjung Guai, a point 3.25 miles SE, is deep. The most conspicuous hills are Jailolo, 1,036m high, and three small hills at Tanjung Guai, 199 to 250m high. Babua, a small coral islet 18m high, is 0.5 mile NW of Tanjung Guai. The village of Kampung Jailolo, on the N side of the bay, cannot be seen from offshore. A light is reported to be exhibited from a metal framework tower at Jailolo.

The shores of Teluk Jailolo are fringed with drying reefs and shoals which extend, in places 0.6 mile offshore; beacons mark the edge of the reef in places near Kampung Jailolo.

Directions.—A vessel approaching Teluk Jailolo from S should keep Buku Kiematubu (Kie Matubu), the 1,757m peak of Pulau Tidore, bearing 186° astern until near Babua, which can be rounded closely. After passing Babua, continue on into the bay with Babua and Buku Kiematubu in range 190° astern. The current in Teluk Jailolo is negligible.

Teluk Tofiri (0°59'N., 127°30'E.), the next bight S of Teluk Jailolo, has a low shore and is encumbered with dangers. Tofiri, a sandbank above water is 2 miles offshore about 3 miles S of Tanjung Guai. A reef which dries and a 5.8m shoal are 0.7 and 0.9 mile, respectively, NNE of Tofiri. Babua in line with the mountain Jailolo, bearing 338°, leads NE of these dangers.

Several shoals with depths of 1.8m or less are within 0.75 mile of the coast.

Tanjung Sidangoli (0°53'N., 127°30'E.), about 7 miles S of Tanjung Guai is the N limit of Teluk Dodinga. South and E of this point a number of low mangrove-covered islands and reefs front the coast.

Pasir Lamo (0°53'N., 127°27'E.), a shoal with 4m and steep-to, is about 2 miles W of Tanjung Sidangoli.

2.7 Teluk Dodinga (0°49'N., 127°33'E.), between Tanjung Sidangoli and Tanjung Oba, is separated from Teluk Kau on the E coast of Halmahera, by a narrow isthmus on which is the village of Kampung Dodinga. A footpath leads from Kampung Dodinga through a long defile across the isthmus to Kampung Bobane Igu on Teluk Kau.

About 3 miles W of Kampung Dodinga are several detached reefs which extend up to 2 miles offshore. Another 2.7m shoal lies 7.5 miles W of Dodinga. A reef, marked by a beacon is in the S part of Teluk Dodinga about 2.75 miles N of Tanjung Oba. Two shoals, 6.8m and 9m, are 0.35 mile NE and SE, respectively, from the beacon; two other reefs, 8.2m and 10m are 1 mile NW of the beacon; and still another group of reefs is about 1 mile ENE of the beacon. There is good anchorage in the inlet at Kampung Dodinga. It is easily approached by steering 078° for the two hills close S of the village. The current in Teluk Dodinga is negligible.

Pulau Ternate, Pulau Tidore, and their nearby islands are described beginning in paragraph 2.14.

Pulau Pilongan (Pulau Pilongga) (0°44'N., 127°37'E.), a rock 41m high and partially covered with vegetation is about 4 miles W of Tanjung Oba, and 1 mile off the E coast of Pulau Ternate. The channel is clear on either side of this rock.

S of Teluk Dodinga, from Tanjung Oba to **Tanjung Dobegasi** (0°33'N., 127°31'E.), a distance of about 11 miles, the coast is low, but steep and clean, and can be approached to a distance of 0.5 mile. Tanjung Dobegasi is low and fringed by a narrow coast reef.

2.8 Pasir Raja (Pasir Radja) (0°36'N., 127°28'E.), 3.5 miles NW of Tanjung Dobegasi, consists of a small cay covered with sand and broken coral, with a drying atoll close N.

Between Tanjung Dobegasi and **Tanjung Saselata** (0°21'N., 127°39'E.), the N point of Teluk Payahi, the hills follow the coast line. About 2 miles NW of Tanjung Saselata are three hills known as Karambuku, of which the W most is 296m high. The N part of this coast is clear and has only a narrow coast reef extending from it; the S part is fronted by a number of reefs and islands.

Close S of Tanjung Dobegasi is the village of Kampung Akelamo, off which there is anchorage in 66m about 0.25 mile from the shore. About 6 and 7 miles farther S are two inlets with the villages of Kampung Jehu and Kampung Lola, off which there is anchorage in 37m and 27m, respectively.

An uncharted reef, marked in 1944, by a beacon with a flag, and its outer edge by a beacon, is close offshore near Tanjung Nyarigiro (Tanjung Njarigiro).

Kepulauan Woda (0°23'N., 127°35'E.) is a group of islands about 5 miles NW of Tanjung Saselata. The islands are separated from the coast by a good channel which leads to the village of Kampung Gita. Gita is located on the E coast of the group. There is good anchorage in 31m, mud, ENE of Pulau Guratu, the island closest to the mainland. Local knowledge is necessary.

2.9 Teluk Payahi (Bay of Pajahi) (0°18'N., 127°42'E.) is an indentation of the coast between Tanjung Saselata and Tanjung Safi, 6 miles to the SE. Anchorage in 29 to 40m, over mud, is available off the village of Kampung Payahi (Pajahi) on the NE shore of the bay. A flagpole with a concrete base is

on the beach at the village. South of the village the coast hills are covered with jungle and coconut palms. A waterfall is 3 miles S of the village.

Takat Main Main (0°18'N., 127°37'E.), consisting of two reefs with depths of 3.7m and 5.8m over them, are 3 miles SW of Tanjung Saselata. A drying patch is about 1.5 miles SE of Tanjung Saselata, and a 0.9m shoal is 1 mile NE of the patch. Two shoals of 1.3m and 1.8m lie within 1.5 miles S of Tanjung Saselata.

From **Tanjung Safi** (0°16'N., 127°43'E.), the coast trends S for 29 miles to Tanjung Tokaka. This stretch has a monotonous appearance with few conspicuous mountains. Lenggiua, E of Tanjung Safi, is 800m high. North of this peak the mountain range ends in a steep drop, making a conspicuous gap between it and the 406m summit close N of it. Lenggiua is also conspicuous because of the gap separating it from Sinopa, a 782m mountain S of it. Tabrain is a 672m summit 4 miles S of Tanjung Safi, which can be seen from all directions. Southeast of this peak is a range of peaks of which the highest, Dufuk, is 786m high. At the S end of this range is the very conspicuous peak, Dukur, 620m high. The next conspicuous hills are two summits 475m and 570m high, 5 and 4 miles, respectively, N of Tanjung Tokaka. Then the hills rise to another ridge in a SSE direction.

Nassau Reef (Takat Lem Lem) (0°12'N., 127°35'E.), 9 miles SW of Tanjung Safi, is a small circular reef with a depth of 1.2m and great depths surrounding it. Under moderately favorable conditions this reef has been seen at a distance of 0.75 mile and from a height of 16m, when it appeared as a small green spot. A ripple shows on it from time to time. The channel on either side of this reef is deep and clear.

Anchorage.—Vessels can anchor in 27m off a small beach at Kampung Maidi, about 8.5 miles S of Tanjung Safi. Local knowledge is necessary. Coconut palms are near the village, but mangroves line the coast N and S of it.

Between **Tanjung Uwama** (0°06'N., 127°41'E.) and Tanjung Batu Lobang, a conspicuous rocky cliff about 5 miles S, the coast forms a bay in which is the village of Kampung Lifofa. Vessels can anchor in 29m; local knowledge is necessary. The drying sandbank 0.5 mile S of Tanjung Uwama and the 1.8m reef further to the E are generally easily seen.

Kampung Batula (0°01'S., 127°42'E.), about 2 miles S of Tanjung Batu Lobang, cannot be seen from seaward, but close to the SW there is a flagstaff, a shed with a metal roof, and a round-topped tree S of a river mouth, all of which are easily identified.

Temporary anchorage may be obtained with local knowledge off Kampung Batula in 29m. Other temporary anchorages are at Kampung Semo, in 38m, and off Kampung Meloku, in 37m, about 5 and 9.5 miles, respectively, S of Kampung Batula.

Tanjung Tokaka (0°13'S., 127°40'E.), with the village of Kampung Tokaka on it, is low and has a river mouth close N of it.

Selat Patinti (Patientie Strait)

2.10 Selat Patinti (0°30'S., 127°49'E.), separating Pulau Bacan (Batjan) and Halmahera, is 7.5 miles wide at its N entrance between Tanjung Dolit and Pulau Gilalang (Batu Sambo). The channel, which is the usual route for vessels between Ternate and New Guinea, is deep and clear, but very

restricted by Kepulauan Kusu, a chain of islands in its N part. In the S entrance is the dangerous 2.1m shoal, **Middle Sand** (Gosong Tengah) (0°45'S., 127°57'E.), near the E edge of a bank extending from the SE of Pulau Bacan. The drying reefs in the strait can be recognized by a strong discoloration of the water, but the other shoals show very little or no discoloration.

Tides—Currents.—The vertical tidal movement is not of much importance as the shores and any dangers are steep-to. Tidal information can, however, be obtained under Teluk Gane and Sabatang Road, which are discussed in paragraph 2.11 and 2.21, respectively. The currents in the wider parts of the strait are weak, but they are rather strong in the channels between Kepulauan Kusu. In the tidal streams between Kusa and Pokal velocities of 4.5 knots have been observed at spring tide. At neap tide velocities up to 3 knots have been observed, but there is no distinct relation between the currents and the vertical tide movements at Sabatang Road.

Directions.—When entering Selat Patinti from N pass about 2 miles W of Tanjung Dolit, and then steer about 160° up to Kepulauan Kusu. Then pass on either side of **Pulau Pokal** (0°26.3'S., 127°43'E.) and set a course for **Tanjung Buobe** (0°40'S., 128°00'E.). Leave this point 1 or 2 miles on the port hand and steer to pass 1 mile W of Nusa Dowora-Lamo. This course will lead clear of Middle Sand.

The E shore of Selat Patinti from Tanjung Tokaka to **Tanjung Tawa** (0°43'S., 128°04'E.), a distance of 39 miles, has nothing conspicuous about it except the mountain peaks a short distance inland. North of Kepulauan Kusa is a group of mountains, of which Buku Uwatcain (Oewat Tjain) is 1,263m high and can be seen in all directions. Pasegal, at the SE end of the group, is 871m high and is especially conspicuous from the W and SW. Near Tanjung Malabuha, 21 miles SE of Tanjung Tokaka, are three conspicuous hills, 245 to 259m high. Near Tanjung Buobe another range of mountains rises rapidly from the hills both at its N and S ends. Gogosoma, the S and most distinctive peak of this range is 950m.

Both N and S of Kepulauan Kusu the coast is clear and steep-to, except for a 4.6m shoal nearly 1 mile S of **Kampung Oha** (0°30'S., 127°55'E.).

Anchorage.—**Gurua Boso** (0°18'S., 127°44'E.) is a small inlet 7 miles SE of Tanjung Tokaka. It has a least depth of 6.4m in the entrance channel, but deepens to 11 to 13.7m inside. It affords excellent shelter to small vessels. The only other anchorage on this coast is off Kampung Saketa, in a small bight about 15 miles SE of Tanjung Tokaka, in depths of about 28m. There is a post office in Kampung Saketa. Local knowledge is necessary.

Kepulauan Kusu (0°20'S., 127°44'E.) are a string of hilly and heavily wooded islands lying on a ridge of less than 184m that extends across Selat Patinti. Pulau Saleh Besar, the largest, rises to a height of 330m. Deep channels separate these islands, but the one between the N end of Pulau Saleh Besar and Halmahera has several rocks and shoals in it. The channels used for through navigation, on either side of Pulau Poka, which is marked on its summit by a light, are deep and clear.

West Coast of Halmahera (Continued)

2.11 The W coast of Halmahera trends generally SE from Tanjung Tawa for nearly 26 miles to **Tanjung Libobo** (0°55'S.,

128°27'E.), the S extremity of Halmahera. It can be identified by a hill 172m high, standing 2 miles within the point and by Babi, a low wooded islet thickly covered by vegetation, close SE. This stretch of coast is low, with hills rising a short distance inland. Tawaigili, 11 miles NW of Tanjung Libobo, is 273m high and fairly conspicuous.

Tides—Currents.—At Kampung Gane Di Dalam, there is both a diurnal and a semi-diurnal tide, but the latter predominates. Neither the spring highs nor the spring lows of the two tides coincide. The highest water level occurs in June or July and in December or January, the lowest between July and September and between January and March; the maximum rise and fall that can be expected are, respectively, 0.4m above and 0.4m below.

The currents are strong in the vicinity of this end of the island; when opposed by the wind, a rough sea may be raised. This is also true for the passage between the point and Pulau Babi, and also for the wider passage between Halmahera and Pulau Damar.

Anchorage.—Temporary anchorage may be obtained by vessels with local knowledge, in depths of 24 to 29m close off Kampung Gam Ma Gugu, about 8 miles ESE of Tanjung Tawa.

A small vessel with local knowledge may obtain safe anchorage in Teluk Gane, about 10 miles ESE of Tanjung Tawa and fronted by Kepulauan Dowora. The coast of Halmahera on either side of this bay can be safely approached to a distance of 1 mile. A narrow coastal reef, marked by discoloration, extends from both entrance points. Kampung Gane Di Dalam is just within the W entrance point, and can easily be identified from S by its large mosque. Local knowledge is necessary at both these anchorages.

Teluk Boleh Madjiko, entered about 3 miles S of Teluk Gane, affords sheltered anchorage during the SE monsoon.

2.12 Kepulauan Dowora (0°50'S., 128°08'E.) is a group of islands on the E side of the S entrance of Selat Patinti, about 22 miles NW of Tanjung Libobo. **Nusa Doworalamo** (Dowara Lamo) (0°51'N., 128°05'E.), 320m high and the SW island of the group, has a rounded summit with a saddle formation when seen from SW; about 1 mile ESE of this island is a 9m reef. **Sori** (0°53'S., 128°08'E.), about 3 miles ESE of this island, is a wooded rocky island surrounded by rocks. Pasir Bale is on a reef 1 mile N of Nusa Doworalamo. Nusa Mano and Nusa Waringin, about 4 and 5 miles, respectively, NE of Nusa Doworalamo, each have a distinctive tree on them. The channel between this island group and Halmahera is deep and clear, although there may be quite a current.

Pulau Damar (Pulau Salomakie) (1°01'S., 128°23'E.), a tree-covered island, is about 5.25 miles SW of Tanjung Libobo. Kampung Kukupang, standing on piles on the NW extremity of the island, has the only trace of civilization or buildings except for the islets Katinai Besar and Katinai-Ketjil (Kecil), which are within 1.25 miles of the NE coast. Anchorage can be obtained both E and W of Katinai Besar.

Tapa, an island with low hills close off the SW side of Pulau Damar, is separated from Pulau Damar by a very narrow channel with a least depth of 14.6m and clear of dangers. The channel between Tapa and Pulau Joronga is also deep and clear of dangers.

Pulau Joronga (Djoronga) (1°06'S., 128°23'E.), nearly 2 miles S of Pulau Damar, is a low thickly-wooded island which rises to heights of 221m and 235m in two hills at its S end. From the S, the S hill appears flat, with a conspicuous crown of trees at the center. At the village of Kampung Waringin, on the S side of the E end of the island, there is a conspicuous plume-shaped tree. The island of Kubi, near the S side of Pulau Joronga, is a hill with a double top 156m high. Small hills are also found on Pulau Orangkaya (Orang Kaja) and on Pulau Gumutu, 2.5 miles W of Kubi; with few exceptions the small islets near Pulau Joronga are low and wooded and for the most part connected to each other by drying reefs.

Batu Anyer (Anjer) or Black Rock, 7.9m high, is the remains of an old crater and is composed of dark volcanic stone and old coral; part of it extends underwater in the form of a horseshoe. This rock is 4 miles SE of Tanjung Domoro ma doto, the SE extremity of Pulau Joronga. Batu Anyer is on the W end of a bank extending 5.5 miles further E. The depths here are between 29 to 126m. Another bank, located 5 miles N of Batu Anyelow watter contains depths ranging from 35 to 113m.

2.13 Ganone (Little Geelmuiden) (1°05'S., 128°18'E.), an islet with a small hill on which there is a tree with a round top, is 1.75 miles W of the W end of Pulau Joronga. Two shoals, slightly marked by discoloration with depths of 7m and 8.8m, are 1.5 miles SW and NE, respectively, of the islet. Strong currents may be experienced near the islands occasionally.

Pulau Woka (Great Geelmuiden), 4.3 miles NW of Ganone, consists of 2 islands connected by a coral reef. At the W end of the NE island, a 108m hill gives the group the appearance of a hat with a broad brim. The hill is planted with coconut and banana trees, and has two large conspicuous trees with white trunks. The shores of the low water island are fringed with mangroves. The atoll has a depth of 35m, but a rock with a depth of 1.5m is in the entrance. There is no anchorage near the island.

Loleodjaha (Pulau Loleodjaha) (Five Islands) (1°01'S., 128°09'E.) consists of several small islets on the edges of two drying reefs, 3 miles W of Pulau Woka. Most of the islets are no more than strips of sand with shrubs; on the northernmost are a few coconut palms. The islets are difficult to distinguish at night.

Islands West of Halmahera

2.14 Pulau Hiri (0°54'N., 127°19'E.), N of Pulau Ternate and from which it is separated by a clear channel nearly 1 mile wide, is about 1.75 miles long and rises to a conical peak 685m high. Several rocks above-water are off the NW side. The small bight E of the N end of the island is recommended as an anchorage for vessels with local knowledge.

Pulau Ternate (0°47'N., 127°23'E.), about 1 mile SSE of Pulau Hiri, is composed almost entirely of Gunung Ternate, a conical volcano 1,721m high. Except for the narrow coast reef the shores are steep-to with no off-lying dangers. Vessels can find anchorage almost anywhere under favorable conditions. The lower slopes of the island are planted with coconut palms and fruit trees.

Ternate Roads is an open roadstead on the SE side of Pulau Ternate. Gamme Lamo Channel, between Pulau Ternate and Pulau Tidore and the S approach to Ternate Road, has a least depth of 33m in the fairway.

Ternate (0°47'N., 127°23'E.) (World Port Index No. 52510) lies about 2 miles NE of the SE extremity of Pulau Ternate. Water is available here but provisions are scarce. Principal exports are copra, shells, cacao, spices, resins, and dried fish. There is a Coast Radio Station at Ternate.

Winds—Weather.—From July to October the winds usually blow from SW to SSW; during the other months of the year the winds blow from W and NW to NE. East winds are very rare. There is a sea breeze near the island but no land breeze. Heavy squalls occur occasionally. Even during the dry monsoon, showers occur from time to time. South winds cause a broken sea when the currents set to the S.

Tides—Currents.—A strong current sets through the roads, at times reaching a rate of 1.5 knots. High water is accompanied by a current setting to the N and LW by a current setting to the S.

Aspect.—A light is shown from a white mast near the root of the pier. A minaret stands in the S end of the town.

An oil depot, marked by a light, and which has a mooring buoy which can handle vessels up to 10,000 dwt, lies on the S side of Pulau Ternate about 4.5 miles WSW of Ternate.

A 374m long concrete pier can accommodate vessels up to 10,000 dwt, with a maximum length of 100m and a maximum draft of 7m.

The Yani Wharf was reported to have a breadth of 12m and an alongside depth of 7.6m in 1993. A 25-ton mobile crane is available. There is also a wooden jetty for sailing vessels.

Pilotage.—Pilotage is compulsory. Government pilot is available. The vessel's ETA should be given 6 hours in advance through Ternate Coast Radio Station or direct by VHF to the pilot station. Radio frequency information is obtained on VHF channels 12, 13, 14 and 15.

Anchorage.—Good anchorage may be obtained in depths of about 65m, about 0.3 mile E of the pier. Vessels should not anchor closer in, because the tides may be erratic and the coast reef is difficult to distinguish. From December to April, there may be a heavy swell in the roadstead.

2.15 Pulau Tidore (0°42'N., 127°25'E.), separated from Pulau Ternate by Gamme Lamo Channel, about 1 mile wide, is entirely of volcanic formation. Buku Kiematabu (Kie Matubu), on the S half of the island is a regular cone 1,757m high. On the N half the mountains are lower and irregularly-shaped. Along the coasts are several scattered villages with cultivated slopes behind them. The principal village, Kampung Soa Siu, on the SE coast, is easily recognized by its white houses and a mosque. The coast reef fronting the village has been elevated artificially by a barrier, at the end of which is a small pier with a signal mast. A light shows 0.3 mile SW of Soa Siu.

Anchorage.—It is difficult to find anchorage off Kampung Soa Siu; the best method is to approach the pier with anchor cable veered out to 61m then proceed until the anchor catches hold. There is a wooden jetty, about 61m long, about 1.75 miles NNE of Kampung Soa Siu. Better anchorage can be found about 0.5 mile N of Soa Sui in 18m. Fair anchorage may

be obtained anywhere N of the parallel of the Buku Kiematabu summit.

Gamme Lamo Channel (Selat Gamelamo) is the passage that separates Pulau Ternate and Pulau Tidore. A nasty sea may occur in the W entrance, especially when the wind is from the SW and the current sets SW. A tidal range of about 1.9m in the channel induces currents up to about 6 knots.

Pulau Maitara, about 1 mile in diameter and separated from the NW side of Pulau Tidore by a clear but narrow channel, has a conical peak, 386m high. It is covered with coconut palms on its E side and is fringed by reefs on the N and S shores, extending about 0.25 mile out. These reefs are marked by discoloration. Anchorage may be obtained off the villages on the coast.

Pulau Pilongan (Pilongga), more than 1 mile off the E coast of Pulau Tidore, is a partly wooded rock 42m high. It was reported to be conspicuous even at night. The channel between it and Pulau Tidore can be used at all times. A small saddle-shaped formation on the N slope of Pulau Hiri, in range with the NE point of Pulau Ternate, bearing 317°, will lead NE of the islet.

2.16 Pulau Mare (0°35'N., 127°24'E.), 340m high, is 2 miles S of Pulau Tidore and is separated from that island by Selat Mare, a deep channel clear of dangers in its fairway. Tanjung Kovo, the S end of the island, is 113m high, and is connected to the hilly land NE by a low ridge; it is quite conspicuous. In the bight E of this point vessels will find anchorage in 57m off the village of Kampung Kovo. There is also anchorage in 50m off the village of Kampung Mare, on the NE side of the island, where there is a pier. A 12.8m shoal is 0.5 mile E of the E side of the island.

Pulau Moti (0°27'N., 127°24'E.), about 5 miles S of Pulau Mare, is a hilly island 980m high. Except for a very narrow coast reef and a 1.8m shoal close off the SE side, it is steep-to. Between its highest peak and a lower summit to the NW there is a saddle formation which is quite conspicuous from the W. The only anchorage is in 42m off the village of Kampung Kotta on its NE side.

Pulau Makian (0°20'N., 127°24'E.), about 3.5 miles S of Pulau Moti, is steep-to on all sides. It has a crater near the center with a pointed peak on one side rising to a height of 1,428m. The saddle between the central heights and the 1,428m summit to the S is very conspicuous when seen from the W or E.

Anchorage.—The only good anchorage is in 29 to 61m, sand, off the village of Kampung Ngofakiaha on the NE side; this anchorage can also be used during the N monsoon. Cargo is loaded by surf-lighters N of the village. Fresh water and stores are not available. There is a small pier for boats. Rollers may occasionally be troublesome at this landing place.

Anchorage can also be obtained farther seaward in depths of about 100m, but the bottom is most irregular and uneven.

2.17 Kayoa Islands (0°03'N., 127°26'E.), consisting of Pulau Kayoa (Kajoa) and Pulau Laluin and nearby smaller islands, are 8 to 24 miles S of Pulau Makian. They have the appearance of one rather flat island with a few elevations. **Tigalalu** (Tigalulu) (0°04'N., 127°25'E.), a peak near the middle of the W side of Pulau Kayoa, 455m high, is the highest

peak of the group. With few exceptions the waters surrounding the islands is deep and clear right up to the drying coastal reef. Pulau Miskin, a small islet off the N point of Pulau Koyoa, is 50m high and very conspicuous. Pulau Djire is a small wooded rock, 7m high, located on the narrow coastal reef near Tanjung Wot Oko, near the NE point of Pulau Kayoa. A 4.6m reef, located 2.7 miles S of Tanjung Wot Oko, extends 0.5 mile off the NE coast. On the S extremity of Pulau Laluin, a spit with a depth of 6.9m extends 1 mile out. Laluin is connected with Tanjung Guruapin, about 2 miles N, by a reef which dries in places. Many coconut plantations are on the island, but the population is small.

Anchorage may be obtained in Guruapin Roads, S of Tanjung Guruapin, but a troublesome swell can develop quickly here. The approach channel is marked by beacons. An inner roadstead anchorage here is limited to a depth of 2.4m in the approach.

Kepulauan Goraitji (Guraichi Islands) (0°01'N., 127°11'E.), W of Kayoa Islands, includes Pulau Taneti and the scattered islands up to 17 miles N of it. They are sparsely populated, but coconut plantations are found on nearly all of them. Although waters in the vicinity are deep, anchorage may be found in several places; the bottom is composed of gray-green clay. There is a fairly strong current dependent on the wind. Local knowledge is necessary.

Pulau Taneti (0°06'S., 127°14'E.) is the largest island of the group. The hills of this island, which rise to a height of 234m, are not very conspicuous, but a tree on a small hill on the SW point is visible. A 9.1m shoal, seldom marked by discoloration, is about 0.75 mile N of the N part of the island.

Pulau Tolimao (0°01'S., 127°10'E.), about 5 miles NNW of Pulau Taneti, is a hilly islet entirely covered by coconut palms. The reefs extend 2 miles E of this islet and are well marked by discoloration. Detached shoals are 2 and 3 miles E of Pulau Tolimao, with depths of 2.8 and 5m, respectively.

Pulau Lilai, about 2.5 miles E of Pulau Tolimau, is 172m high with coconut palms on its summit. Pulau Temomadafa (Temo Ma Dafa), about 1 mile S of Pulau Tolimau, is lower than that island, and has a distinctive round-topped tree on its NW end.

Pulau Gumorga (Pulau Gunange) (0°02'N., 127°13'E.), 144m high, is N of Pulau Lilai. On the SE end are the villages of Kampung Tagono and Kampung Akedabo. A 5.5m shoal, slightly marked by discoloration, lies 1.5 miles S of Gumorga.

Anchorage.—Larger vessels anchor in about 73m off Kampung Tagono with the E point near Kampung Akedabo bearing 013° and the S point near a shed bearing 337°.

Pulau Siko (0°04'N., 127°09'E.), about 8 miles NW of Pulau Gumorga, slopes gently on the S side but presents a rocky wall, 149 to 250m high to the N and E. Pulau Tamakumafatu (Tomaka Ma Fatu) 1.5 miles to the SE, and Pulau Gafi, 1.75 miles to the NE, have similar formations. Adu, nearly 1 mile E of Pulau Gafi, consists of a group of rocks with a sharp summit and is covered by trees.

Pulau Laigoma (0°08'N., 127°13'E.), about 4.5 miles E of Pulau Siko, is a horseshoe-shaped ridge of hills up to 119m high. Tamo Tamo, about 1 mile W of Pulau Laigoma, is a steep rock with only a few shrubs on it. Between Pulau Laigoma and Tamo Tamo, a rock only slightly above-water, is marked by heavy surf with the least sea. Within a radius of 0.5 mile of

Tamo Tamo are 3 shoals with depths of 8.2 and 11m; are marked by rollers.

Caution.—Wolf Rock (Terumba Gora) ($0^{\circ}12'N$., $126^{\circ}54'E$.), 12 miles WNW of Pulau Siko, can only be seen at LW, when from close range, it appears as a circular yellow rock about 9.1m in diameter. When the sea is comparatively smooth, this rock may be recognized from a distance of 2 miles, but during a heavy sea it is not so easily recognized. The depths around the rock vary from 20.1 to 50m.

Goweba lies at the outer end of a chain of islets and rocks extending 1 mile W from the NW end of Pulau Siko.

Bacan Islands

2.18 Bacan Islands, off the W side of the S end of Halmahera and on the N side of Selat Obi, include Pulau Bacan (Batjan), Pulau Mandioli, Pulau Kasiruta (Tawali Besar), and the Latalata Islands. The highest point in these islands is a 2,110m summit on the S part of Pulau Bacan. Buku Sibela, the range on which this summit is located, is quite conspicuous because two valleys separate it from the other parts of the island lying to the N and SE. The 765m and 824m peaks of Buku Kabau, on Pulau Kasiruta, are conspicuous because of their distinctive form. The 590m and 641m summits at the NE end of Pulau Bacan are also easily recognized; the former has a small but conspicuous grove of trees on it.

Tides—Currents.—The currents in Bacan Islands do not usually exceed a rate of more than 2 knots.

Caution.—In the narrow passages between the Bacan Islands the mariner should never depend on discoloration for the marking of reefs; during strong tidal currents the shoals are sometimes marked by strong ripples and whirlpools on the side opposite to the direction from which the current is setting. Off the more open parts of the coast the water is very clear during the transition periods between the monsoons; the bottom can be plainly seen at depths up to 16m. When the sea is calm the detached reefs are not marked by discoloration. During the strength of the monsoons, both outside the group and within the islands, the water is choppy and discoloration cannot be depended on to identify reefs.

Latalata Islands ($0^{\circ}16'S$., $127^{\circ}04'E$.), at the NW end of the Bacan Islands, are hilly; the highest point, on Pulau Latalata, is 423m high. The only danger in the channel between Latalata Islands and Pulau Kasiruta is a 2.7m shoal off the NW side of Pulau Kasiruta. Pulau Latalata and Pulau Muari, the two largest of the islands, are separated by a narrow channel, with a least depth of 11m. A light is exhibited from Pulau Latalata, in position $0^{\circ}15.5'S$., $127^{\circ}0.8'E$. Pao-kecil, S of Pulau Latalata, the S most and smallest of the island group, is a very conspicuous cone. In the channel between Pao-kecil and Pao Besar, just to the N, is an 7.8m shoal.

Tolimago ($0^{\circ}09'N$., $127^{\circ}11'E$.), a rocky islet with trees on it, is midway between Pulau Muari and Pulau Taneti.

Tuapen ($0^{\circ}12'S$., $127^{\circ}02'E$.) is a group of rocks 2.5 miles NW of Pulau Latalata; the three largest are 49m high. An 8.2m shoal is 1 mile S of these rocks.

Anchorage.—The best anchorage is in 49m in a small bay on the E side of the N entrance to the channel between Pulau Latalata and Pulau Muari. Anchorage can also be obtained off the village of Kampung Busua on the E side of Pulau Muari, 2

miles SW of Tanjung Hufau. During the favorable monsoon, anchorage is available in Teluk Gomo, on the NW side of Pulau Muari, and in Teluk Bobo, on the SW side of Pulau Latalata. Local knowledge is necessary for these anchorages.

The N side of Bacan Islands is irregular but steep-to. The currents along this side are weak, but some precaution is necessary at the N entrance to Selat Sabaki, which is discussed in paragraph 2.26. There are several anchorages on this side, but the water is fairly deep. Detached dangers include a 4m shoal off of Vuile Point, on the NE side of Pulau Kasiruta, and a 8.2m shoal 1 mile NE of Tanjung Geti, on the NE shore of Loid Bay.

Tawali Kecil ($0^{\circ}14'S$., $127^{\circ}18'E$.), about 1.75 miles N of Vuile Point, is 115m high and steep-to, except on the SW side.

2.19 Pasir Bale ($0^{\circ}14'S$., $127^{\circ}26'E$.), a drying reef which is steep-to, is 7.5 miles E of Tawali Kecil. A small part of it is reported to be above-water at all times and some shrubs are on it. A black beacon is located on this reef.

Teluk Loid, a large bight in the N coast of Pulau Bacan, has high land on both sides. The islands, Nusa Raloid and Nusa Babi, 180m and 158m high, respectively, are on the W side of the bay. A small islet, Nusa Deket, is near the S end of Nusa Raloid. The channels between these islands and the coast is clear.

Anchorage is available in 28m off the village of **Kampung Geti** ($0^{\circ}21'S$., $127^{\circ}29'E$.) close W of Tanjung Geti.

Batu Sombo (Pulau Gilalang) ($0^{\circ}18'S$., $127^{\circ}33'E$.) is located about 1.5 miles E of Tanjung Seki, the N extremity of Pulau Bacan. It is separated from the NE end of Pulau Bacan by Gilalang Strait, a very narrow but deep channel. A large wooded rock is on a drying reef at the E point of Gilalango.

The E side of Pulau Bacan, forming the W side of Selat Patinti (Patientie Strait), is steep-to for the most part. On Tanjung Bilulu, the SE extremity of the island, two hills are conspicuous, especially from the N and NE. Middle Sand (Gosong Tengah), a dangerous 2.1m shoal, is 3.5 miles NE of Tanjung Bilulu. Vessels transiting Selat Patinti should steer well clear of this shoal.

From Tanjung Gilalang the coast of Pulau Bacan trends SE for 11.5 miles to Tanjung Tuada (Ruige Point). The only detached dangers are those in the small bay 2.5 miles SE of Tanjung Gilalang, the reefs N of Tanjung Goro Goro, and the reefs in Sabatang Roads. Kepulauan Kusu, NE of Tanjung Tuada, has been previously described in paragraph 2.10.

2.20 Sabatang Roads ($0^{\circ}26'S$., $127^{\circ}39'E$.), about 2 miles NW of Tanjung Tuada, affords anchorage in 13.7 to 16.4m between a drying reef N of a flagstaff and a 5.8m shoal patch outside of the 10m curve. The flagstaff and a large tree in back of the village are conspicuous. Local knowledge is necessary.

Tides—Currents.—At Sabatang Roads the maximum rise and fall of tide that can be expected are, respectively, about 0.75m above and 0.4m below mean sea level.

The coast between Tanjung Tuada and Teluk Babang, about 10 miles SW, is clear and steep-to. Three off-lying islets, Kairu, Bori-kecil, and Bori, are close to the coast. The coast is lined with coconut palms, jungle, and mangrove. **Bori Island**

(0°35'S., 127°36'E.) has a conspicuous flat hill; it is wooded, and its shores are fringed with mangroves.

2.21 Teluk Babang (0°37'S., 127°36'E.) affords anchorage in a depth of 51m, mud, off the village of Kampung Babang. The only danger in the bay is a rock which dries about 0.1m located 0.5 mile E of the village. A black beacon marks this area. Sindapp, a 536m flat-topped conical hill NW of the bay, and the mouth of Kali Sajung are conspicuous. A road runs from Kampung Babang to Labuha, on the W shore of Pulau Bacan.

A pier, serving an oil depot, is situated 0.25 mile SE of the village; lights are shown from the root of the pier and 0.4 mile NW of the pier.

Teluk Lapan (0°42'S., 127°40'E.) is the next bay SE of Teluk Babang. These two bays form the head of a large indentation on the E coast of Pulau Bacan. Pulau Gamudja, separated from the W shore of the bay by a clear channel, is easily identified. There is a prominent yellow patch on the slope of the land near here caused by hot springs emitting steam and sulphur vapors. Anchorage can be obtained in 46m in a small bight close N. Anchorage is also available in 58m off the village of Kampung Songa, at the head of the bay and W of a river mouth. A road runs from this village across the island to Kampung Wajaua.

Anchorage in 46m can be obtained off the village of Kampung Tutupa, about 11 miles E of Kampung Songa. Rocks extend up to 0.75 mile offshore from a position about 1 mile NW of Kampung Tutupa.

Between Kampung Tutupa and **Tanjung Bilulu** (0°47'S., 127°54'E.), about 6 miles to the SE, are several dangers, the outermost of which is an 11.9m shoal, 1.75 miles offshore.

Two bays, Teluk Bilulu and Teluk Kapalmaloleo, are SW of Tanjung Bilulu. Anchorage can be obtained in 44m, mud and sand, off the village of Kampung Kapalmaloleo on the latter bay. A shoal of 5.9m is located close off Tanjung Kapalmaloleo, the point separating the two bays.

The S coast of Pulau Bacan is sparsely inhabited and of no importance except to passing vessels. The charted dangers include a reef 1.8 miles S of Kapalmaloleo, a 10.9m shoal, 2.7 miles further SW off of Tanjung Lemo, and a 2.3m shoal 1 mile W of Tanjung Liaro. Another 10.9m shoal is located 1.25 miles S of Tanjung Silang and the N side of Silang Bay is shoaled. No details of the currents are available, but opposite Selat Patinti and Selat Bacan, a set in or out may be experienced.

Buku Bibinoi (Zoutberg) (0°46'S., 127°43'E.) is a conspicuous peak 11 miles W of Tanjung Bilulu; it has the appearance of a perfectly-shaped cone and is 960m high. Hills are very close to the coast except at the head of Teluk Wajaua where the land is lower. A small but conspicuous rocky island is off Tanjung Maregarango.

Teluk Silang and Teluk Wajaua, in which are the villages of the same names, may afford anchorage.

Selat Bacan (Batjan Strait)

2.22 Selat Bacan (0°48'S., 127°23'E.), together with Selat Sambaki (see paragraph 2.26) to the N, forms a direct route through the Bacan Islands. Selat Bacan is wide and deep at its

S entrance between Tanjung Manggo, the SE extremity of Pulau Mandioli, and Tanjung Maregarango, the SW extremity of Pulau Bacan (Batjan), about 9 miles ESE; farther N it is cut up into narrow channels by the Obit Islands.

The inter-island vessels using Selat Bacan follow the Pulau Bacan side of the passage; then they use Selat Ujung Masaran (on the E side of Pulau Obit), then Selat Batu Ampat and Selat Sambaki, leaving the latter passing E of Pulau Toduku.

On a clear day the double-topped summit, 812m high, of Buku Maribenu can be seen from the entrance. Buku Amasing, 1,038m high with a rounded summit, is often hidden by clouds.

Tides—Currents.—As a rule the currents in Selat Bacan and Selat Sambaki seldom exceed 2 knots, although in narrow passages a current of 3 knots is possible during spring tides. Slack water occurs at the time of H and LW at Ternate; a N set is experienced when the tide is rising at that place and a S set when the tide is falling.

Caution.—See Caution note, paragraph 2.1, regarding lack of dependability upon discoloration to identify reefs.

A W extension of the bank fringing the coast of Pulau Bacan was reported about 1.75 miles NE of the NW extremity of Pulau Obit.

2.23 Teluk Labuha (0°38'S., 127°23'E.) is about 11 miles N of Tanjung Maregarango. A drying reef with a conspicuous tree on its E end is close to the N shore. The best anchorage is in the NE corner in 15m, soft mud. If there is too much swell, vessels may find shelter in Teluk Belang Belang to the W.

There is a small pier at Kampung Penambuan, a settlement about 3 miles S of Teluk Labuha.

Labuha (0°38'S., 127°28'E.) (World Port Index No. 52523) is at the NE corner of Teluk Labuha. The Customs Pier here is used by vessels up to 40m long and is marked by a light. The Government Pier, 0.3 mile NW, is also marked by a light and a flagstaff is about 91m SE of it. The coastline SE of the government pier was reported to be extending SW. The port is a port of call for vessels trading among these islands and is a center of trade in copra and damar, a resin.

A distinctive tree stands 0.8 mile W of the Customs pier at the E end of Dorapedo, a drying reef close off the N shore.

Two distinctive trees stand near the coast 1 mile S of the Customs pier, close N of the mouth of Kali Mendawong.

Winds—Weather.—During the S monsoon (July and August) the wind can blow with considerable strength and cause breakers, rendering communication with the shore difficult at times. During the W monsoon (January and February) a squall of great strength from the SE may occur occasionally but it never lasts more than 20 minutes. Otherwise conditions are more favorable.

Tides—Currents.—At Teluk Labuha there is both a diurnal and a semidiurnal tide, but the latter predominates. Because the spring highs and the spring lows do not coincide, and their rise is small, they do not affect navigation.

Anchorage.—The best berth is in a depth of about 15m, soft mud, in the NE part of the roadstead. If there is too much swell here, vessels may find shelter in Teluk Belangbelang.

2.24 Obit Islands (0°39'S., 127°21'E.), W of Teluk Labuha, includes Pulau Obit, Pulau Patjitaka, Pulau Parapotang, and some smaller islands. Although these islands

are hilly, they are comparatively low, wooded, or covered by coconut palms. The narrow channels between them and the shore of Pulau Mandioli are seldom used. The tin roof and chimney of a copra drying plant at a small village on the SW side of Pulau Parapotang, the westernmost large island of the group, are conspicuous.

Selat Ujung Masaran (0°37'S., 127°24'E.), the E passage, is between Pulau Obi and Pulau Bacan and is the principal channel through the Obi Islands. Although the fairway is deep it is somewhat restricted by the islets Nusa Deket and Nusa Ra in the S entrance and by the larger island Pulau Mambuat in the N entrance. The main channel used by shipping is N of **Nusa Ra** (0°38'S., 127°25.5'E.). Reefs extend about 0.5 mile of the shore running 2 miles W of Labuha Roads and the edge of a fringing reef on the W side of the strait S of Pulau Mambuat is marked by beacons. There is a 5.8m shoal in the fairway, about 0.25 mile offshore, lying 1.5 to 2.5 miles SE of Tanjung Paisumbaos. The usual route through this part of the strait is between **Tanjung Paisumbaos** (0°36.5'S., 127°22.4'E.) and **Pulau Mambuat** (0°36.0'S., 127°23.0'E.).

There is a stone landing and conspicuous mosque at Kampung Sangkuangkiano on the NE shore of Pulau Obi, SE of Tanjung Paisumbaos and Pulau Mambuat.

Teluk Belang Belang (0°37'S., 127°25'E.), N of Nusa Ra, offers anchorage for large vessels in 40m off the village of Kampung Belang Belang when anchorage at Labuha is untenable; this anchorage is out of the current.

2.25 Pulau Mandioli (0°43'S., 127°15'E.), on the W side of Selat Bacan, is hilly but has a rather flat appearance and is much lower than the larger islands of this group. The highest point, Buku Gaku 331m high is the summit of one of the conspicuous hills. A number of charted dangers surround the island, most of which are close inshore. The farthest off-lying dangers are off the NW part of the island. The islets Ambatin and Samo are about 2 and 3.5 miles NW, respectively, NW of Tanjung Sarawaki the NW point of Pulau Mandioli. Pasir Karo is a white sandbank lying on the S of two reefs about 3 miles W of the same point. A 7.9m shoal is about 0.5 mile SE of Ambitan, and another is the same distance SSE of Pasir Karo. Gamyaha (Gamjaha), 6 miles S of Pasir Karo, has least depth of 14.9m. Two more reefs are located 2.8 and 3 miles S and SE, respectively, of Pasir Karo.

The island is sparsely populated. During good weather anchorage is available with local knowledge almost everywhere off the E coast of Pulau Mandioli, but in considerable depths in some places. Local knowledge is necessary.

Three other passages between Pulau Obi and Pulau Mandioli lead N from Selat Bacan in addition to the principal and recommended passage, Selat Ujung Masaran, previously discussed. It should be remembered that reefs in these passages do not show clearly by discoloration.

All of these passages lead out to the broad clean basin to the N, then several channels lead to Selat Sambaki between Pulau Kasiruta and Pulau Bacan.

2.26 Selat Sambaki (Sambak Strait)(0°25'S., 127°17'E.), between Pulau Bacan and Pulau Kasiruta, is used by vessels proceeding N from Selat Bacan, or may be entered by vessels

coming from the W and passing between Pulau Mandioli and Pulau Kasiruta. The S entrance to the strait is cut up into narrow channels by the Batu Ampat Islands, which include Pulau Waring, Pulau Batu Ampat, Nusa Uwa, Pulau Tambelik, Pulau Tuada, and a number of smaller islands. All of these islands are wooded except Pulau Tuada, the N most, which is covered with coconut palms.

Selat Batu Ampat, the middle of the three channels forming the S entrance to Selat Sambaki is between Pulau Batu Ampat and Pulau Tambelik. It is marked by beacons, and is the recommended channel and is generally taken by vessels using this route. The maximum velocity of current in this strait is 3 knots. Two detached reefs, with depths of 1.5 and 2.7m, are on the W side of the fairway about 0.5 mile N of the SE extremity of Pulau Batu Ampat; the 1.5m reef is marked by a beacon with a white ball. A rock, awash, and reef, which extends SW from the W extremity of Pulau Tambelik, is marked by a beacon with a black ball.

Selat Herberg, the strait E of Selat Batu Ampat, is a less desirable passage and more narrow than Selat Batu Ampat. It should not be used by vessels exceeding 60m. Selat Nanung (Selat Nanoang), the strait W of Selat Batu Ampat, is less advisable because of strong currents.

When the three straits come together, just N of Pulau Tambelik, the conspicuous drying sandbank Pasir Nondang (close off Pulau Bachan shore, 0.75 mile NNE of the N point of Tambelik) serves as a good check for position.

A 7.8m shoal extends NE from Pulau Tuada and Pasir Masarang, with a least depth of 0.3m, is in the middle of the fairway of Selat Sambaki, about 4.5 miles farther N.

North of Selat Batu Ampat, the shore of Pulau Bacan is fairly low and has a couple of drying reefs which extend up to 0.6 mile offshore. A 6.4m shoal is 2 miles N of these reefs and 1 mile offshore.

The shore of Pulau Kasiruta is higher and can be approached more closely. The most conspicuous spot is a bare rocky place N of Tanjung Semo Semo.

The N entrance to Selat Sambaki is divided into two clear channels by **Pulau Toduku** (0°20'S., 127°17'E.). The E of these channels is restricted somewhat by a group of islets extending from the shore of Pulau Bacan. Vessels using the strait should note that a 6m shoal 1.3 miles off the coast of Pulau Bacan, 2.7 miles S of Tanjung Batumangara. Another shoal 4.1m is close off of Vuile Point, the NE point of Pulau Kasiruta.

Directions.— For passage through Selat Sambaki from S, when the sandbank Pasir Nondang bears E keep near the coast of Pulau Bacan until past **Tanjung Indari** (0°26'S., 127°18'E.), then bring **Nusa Poko Poko** (0°20.5'S., 127°18.3'E.) in range 004° with the E point of Pulau Tawali-kecil, NW of Pulau Kasiruta. This range clears Pasir Masarang.

The N end of Selat Sambaki has two channels, W and E of Pulau Toduku. The E channel is generally used and is clear of dangers in the fairway.

Bacan Islands (Continued)

2.27 Pulau Kasiruta (0°24'S., 127°12'E.), on the W side of Selat Sambaki, is about 18 miles long, irregular, and hilly. The highest peak, Buku Kabau, on the NE quarter of the island, is 824m high. The coast is also irregular and rocky, and has many

small inlets and bays. Several small islets front the coast, especially on the W side. The outermost danger is a 2.7m shoal about 1 mile offshore and 1.75 miles SW of Tanjung Sengga, the NW point of the island.

Anchorage.—The safest anchorage is in Teluk Kasiruta, on the SE side of the island and NW of Pulau Batu Ampat.

Several suitable anchorages are on the W side of the island, although monsoons cause a high sea and surf. Teluk Imbu Imbu has too steep a bottom for anchorage.

A basin with a depth of 39m is in Teluk Besori; it is reached through a narrow channel between two islets. The large village of Kampung Tyoba Dahahi is here.

Kampung Palamea, the largest village on the island, is on Teluk Loleo, 4.5 miles farther N; it is somewhat sheltered by the Lata Lata Islands.

Teluk Mamang, the next bay to the N, is easily entered between two rocky islets. It offers sheltered anchorage in all winds in a depth of 40m.

Kepulauan Obi

2.28 Kepulauan Obi (1°30'S., 127°35'E.), between Selat Obi (Obi Strait) and Ceram (Seram) Sea, consists of the large island Pulau Obi and several smaller nearby islands. The highest point in the group, near the middle of Pulau Obi, is 1,611m high. Only a few permanent settlements are on these islands. Most of the inhabitants come from neighboring islands; the principal occupations are the gathering of forest products and fishing.

The passages between these islands are deep in the fairway and clear of dangers, except the passages between Pulau Gomumu and the S side of Pulau Obi, and between Pulau Bisa and the N side of Pulau Obi.

From June to September the E and S coasts of the islands are inaccessible because of high seas; from December to February the same applies to the W and NW coast. Because of this, shipping confines itself principally to the village of Kampung Laiwui on the N coast of Pulau Obi.

Caution.—Severe tide rips are experienced to a distance of about 30 miles W of a point located about 40 miles NW of Kepulauan Obi.

Pulau Tobalai (1°38'S., 128°20'E.), 7.75 miles E of the E end of Pulau Obi, is a tableland, 240m high, which descends in a step-like formation to the SW. The thick jungle extends close to the rocky shore in many places. The island is steep-to, and Selat Tobalai, the strait separating it from Pulau Obi, is clear throughout.

2.29 South coast of Pulau Obi.—The coast rises steeply from the sea and is covered with jungle except at the small villages along the coast which may be recognized by their coconut plantations. A steep drop at the E end of the interior mountain range is conspicuous. Other conspicuous points are the 965m peak, about 20 miles W of the E end of the island, and a gap near the coast S of it. The higher peaks of the island are usually enveloped by clouds.

The best anchorage is at the village of **Wai Lower** (1°44'S., 127°36'E.) during the favorable seasons. A strong current may

be experienced near the points along this coast, except at this anchorage.

At Wai Lower there is both a diurnal and a semidiurnal tide. Neither the spring highs nor the spring lows of the two tides coincide. The HHW level occurs between June and August and between December and February; the lowest in May and November. The maximum rise and fall that can be expected are, respectively, 0.7m above and 0.8m below mean sea level.

Pulau Gomumu (1°50'S., 127°36'E.), about 5 miles S of Pulau Obi, is hilly but has no conspicuous summits; it rises to a height of 279m. The E and S sides are fronted by a drying coastal reef.

Gomumu Anchorage (1°51'S., 127°36'E.), on the S side of Pulau Gomumu, affords anchorage for a small vessel with local knowledge. The narrow channel leads over a bar with a least depth of 7m. Inside the bar the bay opens out to a basin with depths of 18.3m to about 29m. Farther in, a narrow channel, with a least depth of 7m between the reefs on either side, leads to an inner basin with depths of 9.1 to 18.3m. The reefs on either side of the narrow channel leading into the inner basin are easily distinguished.

There is a 4.1m shoal, extending 1 mile out, close E of this area.

Pasir Radja (Pasir Raja) (Sophia Reef) (1°47'S., 127°32'E.), a reef 4 miles NW of Pulau Gomumu, has a depth of 8.2m, but can seldom be recognized by discoloration. It is the only danger in the otherwise clear channel between Pulau Gomumu and Pulau Obi.

2.30 West coast of Pulau Obi.—The South half of this stretch of coast is comparatively low and the foothills are farther inland. Abreast of Pulau Malamala it becomes high and steep. The channel between Pulau Malamala and Pulau Obi is clear. Pasi Turi, reported to be conspicuous, is a rock on a drying reef 1.25 miles WSW of Pulau Malamala.

Vessels coming from S must take care to avoid the 1.2m shoal 2.5 miles S of Pulau Malamala; the shoal is only slightly marked by discoloration. A drying patch is 0.5 mile offshore from Pulau Obi, E of the shoal. A village, visible from seaward is close NE of the drying patch. **Tanjung Kawassi** (1°37'S., 127°24'E.) is conspicuous because of the coconut plantation around it. Reefs, extending 0.75 of a mile out, run from the drying patch to Tanjung Ake Lamo, 6 miles S.

Pulau Obilatu (1°24'S., 127°20'E.), separated from the NW end of Pulau Obi by a clear channel 1.25 miles wide, is mountainous and has some very conspicuous summits, the E most and highest of which is a sharply-pointed cone, 840m high. The only good anchorages are found in the bays on the N side of the island. The peninsulas between these bays, as well as Pulau Tusa, an islet N of the E end of Pulau Obilatu, are bare and have a reddish color. The reef S of this islet and the 2.5m shoal off the W bay can be located by their discoloration. Squalls off the mountains occur at times, especially in the bays.

Vessels using the passage between Pulau Obi and Pulau Obilatu and coming from the NE should avoid the S side of the passage between Pulau Bisa and Pulau Obi because of the reefs off Pulau Obi. When the S point of Pulau Belang Belang and the NW point of Pulau Obilatu come in range, course should be altered to port, then steer between Pulau Obi and Pulau Obilatu

on a SW course. There are no off-lying dangers and practically no shore reefs between these last two islands.

Pulau Belang Belang (1°20'S., 127°24'E.), NE of Pulau Obilatu, is low with a slight elevation at the middle. The N coast is steep and sandy, but the S coast and the coasts of Telor, an islet close off its SW side, are muddy and covered with mangroves. The S and W sides of Pulau Belang Belang are fronted with reefs and shoals and a 2.5m charted shoal is about 2 miles W of it.

Anchorage is available in 53m, 0.3 mile offshore, with the NE point of Pulau Belang Belang bearing 340°. Vessels approach the anchorage steering 324° with two high trees, near the NE point, ahead.

The passage between Pulau Belang Belang and Pulau Obilatu is easy and clean, except for the 2.5m shoal W of Pulau Belang Belang.

Pulau Tapat (1°10'S., 127°25'E.), 5.5 miles N of Pulau Belang Belang, is the NW island of the group. It is covered with jungle and rises to two fairly conspicuous summits, 491 and 563m high.

Pulau Bisa (1°14'S., 127°36'E.), N of Pulau Obi and E of Pulau Tapat, from which it is separated by a deep channel, is covered with jungle, except at the few villages, where coconut plantations may be seen. It is composed of a range of hills, of which the highest summit, 467m high is at the NW end. Pulau Jerum (Djerum), at the NE end of the island, consists of a group of mangrove-covered mud banks on the broad drying shore reef which extends from the E coast; a single conspicuous tree stands out above the others. Pulau Santare, at the SE end of the island, is a low islet on the same shore reef; its high trees make it fairly conspicuous.

Off-lying danger.—**Kurier Reef** (1°13'S., 127°49'E.), with a least depth of 1.8m and steep-to on all sides, is 7.5 miles E of Pulau Bisa. It consists of sand and coral, and is well marked by the discoloration of the water.

2.31 North coast of Pulau Obi.—Nearer the N coast of the island and separated from the principal range is a group of mountains rising to a height of 1,290m; very often these peaks are surrounded by clouds. The W most peak, 1,290m high, appears as a perfect cone when seen from the N.

From **Tanjung Leleo Basso** (1°24'S., 127°26'E.) to Kadera, about 4.75 miles E, the shore is sparsely wooded, hilly, and somewhat reddish in color. The two small off-lying wooded islets of **Kerka** (1°26'S., 127°27'E.) and Kadera, 30 to 40m high are quite conspicuous. Then from Kadera to Tanjung Anggai, 15 miles E, the coast is low and covered alternately with jungle and coconut plantations. The inhabited section of the coast begins at Tanjung Tabuedji, and along it are the villages of Kampung Baru, Kampung Laiwui (described in paragraph 2.32), Kampung Badjo, Kampung Ritja, and Kampung Anggai. Many reefs are in the channel between Pulau Bisa and this stretch of coast. The large drying reef N of Tanjung Tabuedji is marked by two groups of bushes. Pulau Sambiki, near the shore opposite the SE end of Pulau Bisa, is small sandy, and covered with coconut palms.

Aspect.—A 200m peak on the N side of Pulau Obi, about 1.25 mile S of the village of Ritja, is reported to be a conspicuous and useful landmark.

For 9 miles, between Tanjung Anggai and **Tanjung Woka** (1°26'S., 127°53'E.), the hills are close to the coast and limestone rocks show in places. This stretch is fronted by many reefs and shoals. The largest drying reef, with drying and shoal patches NW of it, is about 3.5 miles offshore; on these outer reefs are two small islets. Between the W side of Tanjung Woka and Pulau Woka there is good anchorage. Pulau Woka is partly covered with coconut plantations.

A light is shown 2 miles S of Tanjung Woka.

Between Tanjung Woka and **Tanjung Parigi** (1°34'S., 128°06'E.), a distance of about 15.5 miles, most of the coast is fronted by a barrier reef with islands and shoals within it. Except for the coconut plantations at some of the villages along the coast and on portions of the islands, this entire coast is covered with mangroves. Good anchorage can be found most anywhere in fairly deep water within the barrier reef, through which there are some deep passages. The reefs NW of Marosa are well marked by discoloration.

SE of Tanjung Parigi, the low coast is covered with jungle; there is hardly any beach.

2.32 Laiwui Roads (1°20'S., 127°38'E.), on the N coast of Pulau Obi, is somewhat sheltered by Pulau Bisa.

The approaches to Laiwui Roads are encumbered by reefs, some of which are only slightly marked by discoloration. Laiwui Reef, which dries, is about 3 miles WSW of Laiwui. Pulau Sambiki is a small sandy islet covered with coconut palms off the N coast of Pulau Obi about 4.5 miles E of Laiwui.

Vessels approaching the roads from E are advised to pass close along the reef at Pulau Santare and along the SE end of Pulau Bisa until a suitable bearing (between 190° and 170°) on the conspicuous tin roof at Laiwui is obtained. When coming from W keep outside about the 200m curve surrounding Pulau Obi until Laiwui lies between the above bearings. Anchor in about 20m, 0.2 mile from the coastal reef, E of the pier at Laiwui.

Laiwui (1°20'S., 127°38'E.) (World Port Index No. 52533) has a small pier.

Tides—Currents.—At Laiwui Roads there is both a diurnal and semidiurnal tide. Neither the spring highs nor the spring lows of the two tides coincide. The highest water level occurs in June and December, the lowest in April or May and October or November; the maximum rise and fall that can be expected are, respectively, about 0.6m above and 0.45m below mean sea level. There are no tidal currents in the roadstead. The water in the vicinity of the roads is very clear and the bottom can often be seen in depths of 11.9m.

2.33 Lawin Islands (1°31'S., 128°43'E.) and Pulau Kekik, 17 to 23.5 miles ENE of Pulau Tobalai, are a group of small but heavily-wooded islands. Pulau Kekik (Kekek), the W most, is 211m high and has the appearance of a truncated cone from all directions. Toppershudie (Tema), a small rocky islet 43m high and covered with shrubs, is 2 miles NE of Pulau Kekik and on the S end of a bank of soundings.

Pulau Lawin, the middle islet of the three E most of the group, is a circular hill 236m high. Nearby Watinger and Laliola are both mainly flat, except for an 86m hillock at the N point of Watinger. A light is shown on Laliola. Shoal water,

well marked by discoloration, extends SE from Laliola. These three islands are on the S part of a bank of soundings. A 14.6m shoal, not marked by discoloration, is 0.6 mile N of Pulau Lawin. The only suitable anchorages (weather permitting) are on the bank N of Toppershudie and in the N part of the channel between Pulau Lawin and Watinger.

The whole group is uninhabited.

Pulau Pisang (1°23'S., 128°55'E.), nearly 13 miles NE of Pulau Lawin, is very steep and has two summits, 430 and 464m high. The island is reported to be a good radar target up to a distance of 18 miles. It is uninhabited and hardly penetrable due to its steepness and dense growth. Two detached rocks surrounded by shoal water are 0.3 mile off the NW side of the island, and another rock with shoal water around it is 0.4 mile SE of the island. Contingent on the monsoons, good anchorage may be found on the N or SE side of the island, although a considerable current may be experienced on the SE side. Local knowledge is necessary.

Kepulauan Boo (1°10'S., 129°22'E.), a group of islands NE of Pulau Pisang, are described in paragraph 2.68.

Kepulauan Sula

2.34 Kepulauan Sula (1°50'S., 125°20'E.), a group of islands W of Kepulauan Obi and E of the central peninsula of Sulawesi (Celebes), consist of three very large islands and several smaller ones. The islands, Pulau Lifoematola, Pulau Mangole (Mangoli), and Pulau Taliabu (Taliaboe) form a chain extending in an E-W direction about 130 miles; they are high and bold and are sparsely populated. Pulau Sanana, extending in a S direction from abreast the middle of Pulau Mangoli, has extensive coconut plantations.

The islands of Kepulauan Sula give a good radar return from a distance of 24 miles.

Pulau Taliabu (Pulau Taliaboe) (1°50'S., 124°50'E.), the W most and largest island of the group, has a range of mountains rising to a height of 1,380m through its central and W part. There are, however, no conspicuous peaks. This island is described in Pub. 163, *Sailing Directions (Enroute) for Borneo, Jawa, Sulawesi and Nusa Tenggara*.

Selat Tjapalulu (Selat Tjapaloeloe) (1°50'S., 125°20'E.) is the narrow passage separating Pulau Taliabu and Pulau Mangole and is also described in Pub. 163.

Pulau Mangole (Pulau Mangoli) (1°50'S., 125°50'E.) is 62 miles long but comparatively narrow. It is mountainous and has two mountain ranges with a conspicuous depression between them. The highest peak, 1,147m high, is in the Lokoe Mountains range on the E part of the island and is about 16 miles W of the E end of the island.

Vessels navigating along the coasts of Pulau Mangole should expect either E or W currents.

The N coast of Pulau Mangole from Selat Tjapalulu to abreast of Tabulu (Taboeloe) Islands is low. **Tanjung Wajteta** (1°47'S., 125°22'E.), the NW extremity of the island, is rocky. Except in bays and inlets, sandy beaches will be found E of this point. Liku (Likoe) is a low islet covered with trees. The channel between Tabulu Islands and the main shore is not recommended, because of the dangers in it. There are also shoals to the E of these islands, and navigation within 2 miles of their E coast is dangerous.

About 9 miles E of Tabulu Islands is the low and wooded island of Koro, and between them are two off-lying dangers. Between 3 miles WSW and 2.5 miles SW of Koro lies a submerged rock and a 0.3m shoal. East of Koro, to the E end of Pulau Mangoli, the remaining dangers are close to the shore. Two conspicuous masses of rock with reddish-brown sides are on a drying reef, close to the shore at Tabobi and Fatsati, about 9 and 5 miles W of the E end of Pulau Mangoli.

Anchorage.—West of Tabulu Islands the only suitable anchorages are in the bights of the coast. There is good anchorage almost anywhere between the Tabulu Islands and Tanjung Lampaoe during the SE monsoon and during the turning periods with due regard for the off-lying dangers mentioned above. Vessels anchoring 0.2 mile off this coast in 33m, have reported the current sets E and W with a maximum velocity of 2 knots at spring tides during the S monsoon.

The village of Liku, SW of the islet of the same name, is located on the W side of the entrance to a large bight. In the inner part of this bight, SE of two small islets, is a small anchorage with depths of 6.8m.

2.35 South coast of Pulau Mangoli.—This coast can, in general, be approached to within a short distance, but the sea is quite rough during the SSE monsoon and eddies have been observed off the headlands. The points along the coast, as well as the mountains in the W part, are quite conspicuous.

Vesuvius Bay (1°52'S., 125°22'E.) is the NW part of the large bay between Tanjung Sakomata and Tanjung Batu Kapitan, a high rocky point with a very conspicuous pillar-shaped rock on a drying patch near it. In this large bay are the two islets, Pasilpah and Kena; the former is hilly on its W part, and the latter has the appearance of a white sandy beach.

Tides—Currents.—At Vesuvius Bay there is both a diurnal and a semidiurnal tide. The spring lows of the two tides may coincide. The lowest LW level occurs in June and December; the maximum rise and fall that can be expected are, respectively, 0.7m above and 1.2m below mean sea level.

From Tanjung Batu Kapitan the coast trends E for 22 miles to **Pulau Sambiki** (1°56'S., 125°47'E.), a steep and high islet. **Tanjung Fargata** (1°57'S., 125°32'E.), 5.5 miles E of Tanjung Batu Kapitan, is high, round, and rocky. A string of shoals and drying reefs extends nearly 3 miles W from Pulau Sambiki. The village of Kaporo with its coconut plantations, 3.5 miles W of Pulau Sambiki, is conspicuous.

Between Pulau Sambiki and the coast is a clear channel, through which vessels can proceed to anchorages in the two small bays NW of the islet. In the large bay E of Pulau Sambiki anchorage can be found almost anywhere, have due regard for the shoal spots previously mentioned.

2.36 Selat Mangole (Mangoli Strait) (1°57'S., 125°55'E.), separating Pulau Mangole and Pulau Sanana, is nearly 2 miles wide. A 6.8m shoal is in the middle of the strait. A shoaler spot was formerly reported, but later surveys failed to locate it. Strong currents (up to 3 and 4 knots), however, prevent very thorough surveys. Strong eddies have been reported in the strait, especially S of the 6.8m shoal. The Pulau Mangoli shore can be approached rather close-to; the Pulau Sanana shore is fringed by a drying reef. The best channel is N of the 6.8m shoal.

Numerous small houses and coconut plantations are scattered along the N shore of Selat Mangole and to the E. A shoal with a depth of 5.5m and possibly less is close offshore abreast of the village of Mangole (1°55'S., 125°57'E.).

Directions.—A vessel proceeding through Selat Mangole from W should keep Pulau Sambiki astern, bearing 270°, which leads N of a 0.4 shoal which is not marked by discoloration and is 2.5 miles ESE of that islet, and pass 0.33 mile S of **Tanjung Botu** (1°56'S., 125°55'E.), then clear the reef extending from the NE side of Pulau Sanana; when Tanjung Wakapara, the NE point of Pulau Sanana is in line with Tanjung Kabau, about 2 miles S, bearing 180°, course may be altered as required.

The coast of Pulau Mangoli E of Selat Mangoli can be followed at a short distance off except for the only danger, a 0.4m shoal about 2 miles SW of **Tanjung Gohadjodjara** (1°53'S., 126°14'E.).

Selat Lifumatola (Lifoematola Strait) (1°49'S., 126°21'E.), between Pulau Mangoli and Pulau Lifumatola, is of no importance to navigation and should not be used without local knowledge. It is only 0.3 mile wide and it is further restricted by islets and shoals, so that the widest navigable channel is only 137m at the narrowest part. Navigation is also made hazardous by the strong tidal currents. There are whirlpools and eddies over the banks and shoals and, during the S monsoon, there is a troublesome sea. The slack water period is short.

Pulau Lifumatola (1°49'S., 126°27'E.), the E island of the Kepulauan Sula group, is uninhabited. It is hilly and rises steeply from the sea; the highest point is 258m high. Limo is a conspicuous little rocky islet lying close to the SE side. The coast back of the islet, as well as Tanjung Dehekolano, the E end of the island, is composed of conspicuous white masses of limestone and is marked by a light; a racon is located at the light. NW of Tanjung Dehekolano are three narrow inlets; suitable anchorage may be found in the southernmost of these during the N monsoon and during the turning periods.

Strong E or W currents may be experienced on the N and S sides of the island. Around the S end they set either N or S and cause strong eddies. Because of these eddies, and particularly nasty seas if the wind and currents are opposite, the E point of Pulau Lifumatola should be given a berth of 5 miles.

Tide rips have also been observed about 33 miles ESE and 20 miles ENE of Tanjung Dehekolano.

Pulau Lifumatola serves as a good radar target at a distance of 28 miles, and Tanjung Dehekolano is reported to be a good radar target at a distance of 17 miles.

2.37 Pulau Sanana (2°03'S., 125°59'E.), the S most island of the Kepulauan Sula group, extends about 31 miles in a S direction from abreast the middle of Pulau Mangole. From E and W it appears as a single mountain range with a number of conspicuous summits 488 to 678m high. The highest peak is at the S end. In general the coast is low and has sandy beaches with coconut palms, interrupted in places by rocky formations. Except for the N end of the island and the N half of the W coast, vessels can approach the island rather close-to.

The N coast is marshy and covered with mangroves. Large vessels usually stay clear of this coast.

Sanana Bay (2°03'S., 125°59'E.) is a small indentation at the NE end of Pulau Sanana. The entrance is only 91m wide, but has a depth of 14.6m at midchannel. The depths range from 11.9 to 29m. There is a flagstaff 0.5 mile SW of the village.

Directions.—Vessels should enter the bay keeping a beacon (cone topmark), at the head of the bay, bearing 286°. Because the currents set across the entrance, it is necessary to enter at a fair rate of speed. Because of the space required for maneuvering once inside it is not advisable to enter when another vessel is already in the bay. When about 0.2 mile from the beacon, let go the starboard anchor in a depth of 15m. After the vessel has swung, a hawser should be laid out to a post N of the pier on the shore near the beacon.

Sanana (2°03'S., 125°59'E.) (World Port Index No. 52390) a small village in which a Government official is stationed lies at the head of the bay.

There is a large mosque in the village and a small pier with a depth of 0.6m at its head.

Water can be supplied from the stream on the S side of the village.

Tides—Currents.—At Sanana Bay there is both a diurnal and semidiurnal tide. The spring lows of the tide coincide. The lowest water occurs in April or May and October or November. The maximum rise and fall that can be expected are, respectively, about 0.5m above and 0.9m below mean sea level. The currents usually set across the entrance.

South of the village of Sanana there are no suitable anchorages, and the same is true for the S half of the W coast. On both coasts are a number of villages in the midst of coconut plantations. A coast road connects the villages. Tanjung Patahoj, at the middle of the W coast, is low and marshy. Tanjung Fatparoma, 7.5 miles further N is rocky. Between these points is a ridge of shoals and reefs, extending up to 2 miles offshore. Several other charted dangers front the coast N of the latter point.

At the village of Kabauw (Kaban), 1.5 miles N of Tanjung Patahoj, a shallow lagoon indents the coast; a bridge crosses the narrow entrance. North of here anchorage can be found almost anywhere clear of the reefs and shoals.

At the village of Kampung Molboefa, on the NW side of the island there is a deep basin within a drying reef. Vessels may find temporary anchorage in 10.9 or 11.9m about 0.5 mile offshore, SW of the entrance to the basin. Care is necessary to avoid the 5m shoal WSW of the village, the 0.5m shoal 1 mile N, and the reefs off the entrance.

2.38 Morotai (2°20'N., 128°28'E.), an island about 10.5 miles E of the N end of Halmahera, is about 40 miles long and is high over its greater part. The highest point (2°13.5'N., 128°25'E.) is 1,250m high and is one of the summits of the Sabatai (Sabalai) Mountains range, which stretches across the island in a NE-SW direction. On the river banks and on the flat SW part of the island are forests of sago trees and in the interior are dammar forests. The island is frequented by people who collect dammar gum and also fish among the islands off the W coast. A number of villages are along the coast. It was

reported that the NE coast of the island lies 4 to 5 miles farther NE than charted.

The NW coast of Morotai between **Tanjung Wayabula** (Wajabula) (2°17'N., 128°12'E.) and Tanjung Padang, about 24.5 miles to the NE, is steep and vessels can navigate rather close inshore bearing in mind that a narrow coastal reef exists in places. Along this coast are many mountain tops, but because they have no distinctive features they are not much use as landmarks.

Anchorage can be found almost anywhere along this coast, but the depths are great. Anchorage can be obtained off the village of **Kampung Tijo** (2°25'N., 128°18'E.), in 21m; off **Kampung Libano** (2°29'N., 128°21'E.), in 27m off **Kampung Hapo** (2°31'N., 128°24'E.), in about 28m; and off **Kampung Berriberri** (2°34'N., 128°26'E.), in 14m.

Teluk Sopi (2°35'N., 128°30'E.), the bay between Tanjung Padang and Tanjung Sopi, about 7.5 miles ENE, offers good anchorage during favorable winds. Stay clear of the charted 6m shoal in the outer part of the bay, 1.25 miles NE of Tanjung Padang. The village of Kampung Sopi is at the head of the bay.

Tanjung Sopi (2°38.5'N., 128°34'E.), the N end of Morotai, is a low but gradually sloping point with a broader reef than that found on either side of it. Several boulders are on the edge of the reef.

2.39 East coast of Morotai.—Between Tanjung Sopi and Tanjung Selepia, 15 miles S, the shore reef is steep-to. From there to **Tanjung Posiposi** (2°06.5'N., 128°34'E.), about 21 miles further SSW, the coast is foul. A barrier reef, which may be distinguished by the heavy surf on it, extends up to 0.5 mile offshore.

Winds—Weather.—High seas and rollers from the SE and NE have been experienced. Heavy showers from the SSE, called "Angin Lelei" by the natives, occur at the middle of the S monsoon. They come up about 10 or 11 o'clock in the morning without any warning and are accompanied by a heavy sea.

Tides—Currents.—Strong currents may be experienced off the NE end of the island. At **Tanjung Gorango** (2°30'N., 128°41'E.), a rate of 3 knots has been observed on a rising tide.

Berebere (Berri Berri) anchorage (2°23'N., 128°40'E.) is in a bight of the E coast about 16 miles S of the N point of the island. It is sheltered by a large drying reef on which is the mangrove-covered island of Tabailengo. The entrance between this reef and another drying reef to the N is not safe because of several shoals which do not show by discoloration. Shoals of 7.8m and 2.3m are located 0.6 mile NW and N respectively, of Tabailengo. Vessels can anchor in 40m, sand and coral, NW of Tabailengo, but care must be taken to avoid the reefs and shoals on the W side of the bight and off the S entrance. The village of Kampung Berebere, at the head of the anchorage, is the center of the native trade in dammar gum and copra.

Tanjung Boboro (2°19'N., 128°39'E.) and Kampung Busu, 7.5 miles S, the coast is fronted by a barrier reef. At Tanjung Lefau, where a conspicuous small rock is on the coast reef, there is a wide break in the barrier reef. A wide sandy beach extends N from this point. Dangers are found near the coast N and S of the barrier reef. The bight at Kampung Busu

affords anchorage, but it is not very safe from October to March, when heavy rollers come in.

2.40 South coast of Morotai.—Between **Tanjung Posiposi** (2°06'N., 128°34'E.) and Tanjung Gila, about 20 miles WSW, the narrow coast reef is steep-to. Two reefs, extending 0.75 mile offshore, are 4.5 and 6.5 miles SW of Tanjung Posiposi.

A small basin for small vessels only is off **Kampung Sangowo** (2°06'N., 128°33'E.) (World Port Index No. 52640) close W of Tanjung Posiposi. Anchorage can be found outside, but rollers are usually experienced. Vessels call here occasionally.

Kampung Sabati (Sabatai), 8.5 miles W of Kampung Sangowo is at the mouth of the river of the same name which can only be navigated by small craft. During favorable weather anchorage may be found off the village in 48m over sand.

2.41 West coast of Morotai.—The Coast between Tanjung Gila, and Tanjung Wayabula, 18 miles N, is fronted by numerous shoals, reefs, and islets which lie up to 5 miles offshore. The reefs are well marked by discoloration, and the passages within them are available to vessels of considerable draft. There is nothing particularly conspicuous about the mountains, with the exception of **Bandera** (2°07'N., 128°16'E.), a 201m coastal hill 8 miles N of Tanjung Gila.

Tanjung Gila (Tanjung Dehegila) (1°59'N., 128°15'E.) is a low, wooded tongue of land. A couple of palms on the W side are conspicuous. Pulau Mitita is a thickly-wooded coral island 1.75 miles WSW of Tanjung Gila. Two detached 4m shoals are 0.75 mile and 1.5 miles, respectively, WSW of Tanjung Gila, and a 4.8m shoal is between these two shoals.

The outermost danger in this vicinity is Pono Ponata, a 7.3m shoal about 1.75 miles W of Pulau Mitita. Midway between Pona Ponata and Goja Uku, a drying reef about 2 miles NNE, is Lutu Lutu, a shoal with a depth of 5.8m. Midway between Pona Ponata and Pulau Mitita is Dododahohe, a reef that dries 0.3m and is marked by a light.

2.42 Islets off the W coast of Morotai.—Kokoyo (Kokoja), Kolorai, Dodola-kecil and Dodola-besar are on a drying reef which is 2.75 to 9 miles NNE of Pulau Matita. The two N of these islets are not inhabited, but are covered with coconut plantations; they can be reached from Kolorai by foot at LW. A conspicuous tree is on the reef about 183m N of the NW end of Dodola-besar. Between these islets and the shore to the E is another group of islets, including Sumusuma, Ruke Rukete, Bobogono, Rube, and Lungulungu.

On the next large drying reef to the N are the islets Loleba-besar, Loleba-kecil, Pulau Galogalo Besar, and Pulau Galogalo-kecil, on which there are some houses and coconut plantations. Close W of Pulau Galogalo Besar is the small islet of Pelo. It is reported that shoal water extends S from Pelo. The large village of Dowongi Kokotu is on the coast abreast of this group and at the foot of Bandera hill.

Pulau Ngelengele-kecil (2°10'N., 128°13'E.) and Pulau Ngelengele-besar, about 1.5 miles NW, on the larger reefs, have large villages and coconut plantations. On the coast abreast of the latter is the village of Kampung Tilei, with the inhabited islet of Katjuwawa close off it.

The W coast of Morotai is fronted with numerous shoals and reefs and there are also many shoals and reefs laying off the off-lying islands and islets.

Anchorage.—A pontoon in ruins was reported about 2.75 miles NE of Tanjung Gila. A pier in ruins is about 4.5 miles NNE of the same point, with a green copra shed and a mosque about 0.5 mile and 1 mile NNW of the pier. Anchorage for two 122m long vessels may be obtained in 10.9m about 0.6 mile W of the green shed.

Directions.—The following directions for reaching this anchorage were given. Vessels approaching from W should steer for Tanjung Gila on a course of 100°. When the right tangents of Kokoyo and Kolorai are in range change course to 060°, steering for the ruined pontoon. When the W edge of the ruined pier is in range with the green shed and mosque, bearing 027°, they should be steered for. When about 0.6 mile from the ruined wharf, course should be altered to 000° for the anchorage, passing midway between the Morotai shore and the two small islets about 0.7 mile SW of the ruined pier.

2.43 Wayabula Roads (2°17'N., 128°12'E.) (World Port Index No. 52630), S and SW of the point of the same name, can be approached from the W by passing S of Saminjamau and then keeping the S side of that islet on a 282° bearing astern. Vessels can anchor in 20m, with a conspicuous tree on Tanjung Wayabula bearing 038° and the head of the pier at the village E of the pier bearing 073°. A more sheltered anchorage is close N of the two drying reefs S of the village. To reach this anchorage pass between the W reef and the 0.9m shoal S of it, then haul N between the two reefs. Vessels call here regularly. A mosque and a flagstaff are in the village.

Pulau Rao (Pulau Rau) (2°21'N., 128°09'E.), off the W side of Morotai, has a mountain range along its E side. Its highest summit, 475m high, is conical in appearance when seen from SW. Close S of the summit is a lower and less conspicuous top which terminates in a 281m hill near the SW side of the island. The E side of the island rises rather steeply; the W side slopes more gradually and ends in a wide plain covered with jungle and coconut plantations in places. Saminjamau, at the S end of the island, is a heavily-wooded islet with a rocky W side. Tunane, at the N end, and Tjapali, near the E side, are two small, rocky, and heavily-wooded islets. There are three caves in the steep cliff in the vicinity of Kampung Aru, on the E coast about 2.5 miles S of the N end of the island, which are visible from seaward.

Selat Rau (Rao Strait) (2°20'N., 128°12'E.), the strait between Pulau Rau and Morotai, has a least depth of 6m in the fairway. A bank with a least depth of 7.9m extends about 0.8 mile from the W side of the strait. The channels each side of the shoal are indicated by strong tide rips.

Selat Morotai (2°17'N., 128°06'E.), the deep strait between the N end of Halmahera and the islets and reefs off the W coast of Morotai, is 6.5 miles wide, clear, and easily navigated. In its S approach, however, a few charted dangers are found. Of these, the 7.3m spots 1.75 miles W of Pulau Mitita have already been mentioned. A 31m bank is in the N part of Selat Morotai, about 3.75 miles WNW of the N end of Pulau Ngelengele-besar. A 18.3m shoal is 2.5 miles SW of Pulau Mitita. The Momow Reefs are two reefs of 6.7m and 7.8m, lying 9.5 and 11.75 miles, respectively, SW of the same islet.

Halmahera (Continued)

2.44 Supu Bay (2°11'N., 127°59'E.) Between Tanjung Bisoa and Tanjung Djodefa (Tanjung Jojefa), about 7 miles E, the N end of Halmahera is a gradually sloping land forming a bay known as Supu Bay. Both points have a narrow fringing reef but may be rounded safely at a comparatively short distance. The bay is clear and affords suitable anchorage in 27m off the village at the head. The shore reef is widest near the village extending over 183m offshore; the rocks visible at high water are within the edge of the reef.

In general, the E coast of Halmahera is densely overgrown, hilly, mountainous, and inhospitable. At many points the coast is a great wall of rock rising precipitously out of the sea. The shoals and reefs off this coast are also steep-to. The islands near the E coast are nearly all low. Morotai (paragraph 2.44) and Pulau Sayafi (paragraph 2.55), being steep and high, are exceptions, as are Pulau Pakal and Pulau Gei in Teluk Buli (paragraph 2.54).

From **Tanjung Djodjefa** (Tanjung Jojefa) (2°12'N., 128°04'E.) to Tanjung Salimuli, a distance of about 14 miles, the coast may be approached close-to, however, the 1.8m shoal off Lapi and the 4.1m shoal NE of Tanjung Salimuli must be avoided. Anchorage may be found during favorable weather conditions at the villages of **Saluta** (2°04'N., 127°58'E.), Lapi, and Tufa Ma Lole, but the water is deep and the bottom is steep. Local knowledge is necessary.

Teluk Galela (1°53'N., 127°55'E.) is entered between Tanjung Salimuli and Tanjung Luwari (Tanjung Luari), about 10.75 miles S. Both of these points are low, but Tanjung Luwari may be identified by Gunung Mamuya (Mamuja), a 930m conical mountain 2 miles S of it. The N shore of the bay is close to the foothills of a mountain range. The W shore is backed by a broad plain on the S part of which are the two detached hills, Tarakan Itji and Tarakan Lamo, 280m and 380m, high, respectively. Temporary anchorage can be found almost anywhere along the shore in depths of about 50m.

There are several shallow areas along the shores of the bay. Off the coast E of Possi Possi, 0.5 mile and 1 mile ENE of Limau, are 1.8m shoals. Another reef reaching 2.6 miles N of Galela Roads extends 1 mile offshore with a depth of 4.1m. East and SE of Tanjung Bongo are shallow reefs. Another 2.8m shoal is located 0.7 miles WNW of Tanjung Luari.

2.45 Galela Roads (1°50'N., 127°51'E.), at the SW corner of the bay, affords anchorage in 29 to 50m, fine sand, between the pier and the islet W of Tanjung Bongo. It is sheltered during the SE monsoon, but it is not safe during the NW monsoon because of rollers. Landing is possible, however, even with the heaviest surf, S of the above-mentioned islet.

Kampung Galela (1°50'N., 127°51'E.) (World Port Index No. 52610) is at the SW corner of Teluk Galela. There is a boat pier S of the village. Some buildings with zinc roofs in the N part of the village can be seen for a considerable distance. Vessels call at Kampung Galela regularly, and at villages to the N to load wood.

Tides—Currents.—At Galela Roads there is both a diurnal and a semidiurnal tide, but the latter predominates. Neither the spring highs nor the spring lows of the two tides coincide. The maximum rise and fall that can be expected are about 0.6m

above and 0.6m below mean sea level. Currents in the vicinity of the roads are negligible until about 6 or 8 miles off, when the monsoon drifts become noticeable.

2.46 Kepulauan Tobelo (1°49'N., 127°56'E.) is a small group of islands located offshore between Tanjung Luwari and Pulau Miti, about 17 miles to the SE. The largest of these are Pulau Tolonuu (Tonuu), Pulau Kokara-besar (Kakara Lamo), Pulau Tagalaya (Tagaja), Pulau Kolorai, and Pulau Miti. They are low coral islands, but are excellent landmarks because they are covered with high trees. They are rocky to the E and NE. Patola, a 3.2m reef, 1 mile E of Pulau Tagalaya, is the only detached danger outside of the islands; it is usually marked by discoloration and occasionally by breakers.

A clear channel runs between the foul ground that fronts the Halmahera shore and the group of islands between Pulau Tolonuu and Pulau Kolorai. Clear passages are also found between the islands.

Currents may be encountered outside the islands and along the coast S of Pulau Miti, but among the islands and between them and the shore there is no current of any consequence.

The high mountains of Halmahera are also conspicuous. Gunung Mamuya has already been described in paragraph 2.45. Valsche Dukono, 4 miles SW of Gunung Mamuya (Mamuja), is a 930m mountain that looks very much like Gunung Dukono, the 1,275m active volcano 5.5 miles S of Gunung Mamuya. Between these two is a double peak called Mede, about 1,097m high. East of Gunung Dukono is a lower chain with a serrated appearance. Togohi, a 1,279m peak, is the most conspicuous and S most summit of the higher chain. South of it the land drops to a broad plain, on which are the fairly conspicuous mountains of Tokito, Tami, and Ah, from about 518 to 579m high.

Tami (1°31'N., 127°52'E.) has been reported to be a good radar target up to a distance of 9 miles.

Anchorage.—Along the coast are several anchorages, all of which require local knowledge. South of Tanjung Ruku, about 3 miles SE of Tanjung Luwari, there is anchorage in 29m. At Kampung Popilo, about 1 mile farther E there is anchorage between the off-lying islets of Mede and Popilo. Anchorage can also be found in 29m outside the shoal patches at Kampung Wari, about 6 miles SE of Tanjung Luwari.

2.47 Tobelo Roads (1°44'N., 128°01'E.) is formed and sheltered by Pulau Kumu and the reef which connects it to Halmahera. The most conspicuous mark is a tin roof at the S end of the village and abreast the S pier.

An oil depot at **Kapakupa** (1°37'N., 127°59'E.), on the N side of a small bay 4 miles NW of the N point of Miti, is served by a pier: a light is shown near the root of the pier.

About 0.3 mile SW of the SW extremity of Kuma is the small islet of Pulau Ubu Ubu. This islet is on a detached drying reef on the SE side of the roadstead. A detached reef, marked by a green conical beacon at its S end is close SE of Pulau Ubu Ubu; a 1.8m shoal marked by a red conical beacon is midway between Pulau Ubu Ubu and the shore; a 0.3m shoal is about 0.1 mile N of the N end of the reef on which Pulau Ubu Ubu lies.

A detached reef, which dries, marked by a red conical beacon on its N edge, is about 0.4 mile SE of Pulau Kuma. The

reef fringing the S side of Pulau Kuma is marked at its W end by a beacon. Tanjung Pilawana is about 0.6 mile NW of Kumu.

The limit of the roadstead is the arc of a circle, with a radius of 2,100m and the head of the S pier as center.

Anchorage.—Large vessels anchor S of Pulau Ubu Ubu, where there are depths of 14.6 to 18.3m. This anchorage should be approached from seaward by way of the channel between Kumu and the detached drying reef SE of it. The anchorage is suitable for one vessel up to 122m long.

Small vessels should approach the roadstead by passing between the SE side of Kumu and the detached reef, marked by a daybeacon, SE of it, then NE of Pulau Ubu Ubu, then N of the beacon marking the N edge of the reef extending from Pulau Ubu Ubu and steer for the S pier, passing S of several light brown shoal patches which can be easily seen; when clear of the S shoal patch, vessels should haul sharply N, with Pulau Tolonuu just open E of Tanjung Pilawana, and anchor before the S end of Pulau Tagalaya closes behind Kumu.

Tobelo (1°44'N., 128°01'E.) (World Port Index No. 52600) has a small pier suitable for boats at the S end of the village; another pier, with a depth of 2.4m alongside, is N of the village. Copra is exported.

Pulau Miti (1°34'N., 128°03'E.), about 9 miles S of Tobelo, has the village of Kampung Miti on its W side and the village of Kampung Mawea on the shore opposite. There is suitable anchorage between the two villages. The best approach is around the N end of Pulau Miti, between that island and the drying reefs to the N. The shoals are well-marked by discoloration. Local knowledge is necessary for these anchorages. The channels between Pulau Miti and the mainland are suitable for small vessels only.

Vessels can also anchor close to the shore in the bight at Kampung Gotana, a village SW of Pulau Miti.

Teluk Kau

2.48 Teluk Kau (1°03'N., 128°53'E.), a large bay, separates the N part of Halmahera from its NE peninsula. Nusa Bubale (Bobale), a low island covered with high trees, lies on the W side of the fairway in the entrance to the bay, about 15.5 miles S of Pulau Miti, and is easily recognized.

The bay, 4.5 miles wide at its entrance, extends 33 miles to the SW to its head which is separated from Teluk Dodinga, on the W coast of Halmahera, by a narrow isthmus. Generally speaking, the W shore of the bay is rather low, while the E shore is fairly high and steep. The inner part of the bay has a greatest depth of more than 494m. The inner bay is open to both monsoons and the sea rises quickly.

The plain on the W side of the bay S of the mountains Tokido, Tami, and Ah, continues S to Pegunungan Mata Mata, of which the most prominent peaks are Gunung Tabobo, 929m high, and Oostop, 534m high, 9.5 miles E. The most conspicuous point on the E side is the 1,159m summit 19 miles E of Nusa Bubale. Tilegan, 5.5 miles farther SW, is a 1,012m summit at the W end of a long range. Papudo, 3.5 miles farther W, is a detached 417m hill. Near the E shore of the bay is a group of mountains, of which Subaim, a sharply-pointed 1,143m peak, is the highest. SE of it is the more gently-sloping Wato Wato, 1,474m high.

Batu Kubu (1°28'N., 128°01'E.), a white patch at Tanjung Domake, 10 miles N of Nusa Bubale, is conspicuous when approaching the entrance to the bay. At Tunjang Tunowe, a small bank extends offshore and causes tide rips.

Tides—Currents.—The lowest water levels occur between January and March and between July and October. The maximum rise and fall of the tides that can be expected are, respectively, about 0.75m above and 1.2m below mean sea level.

The maximum rate of current on either side of Nusa Bubale is 1.5 knots. When the wind blows in the opposite direction toward that which the current sets, a difficult sea is experienced.

Anchorage.—Having due regard for the Caution Note for the danger area in the Teluk Kau approach which has been mentioned above, there is anchorage in 18.3m, sand, about 0.2 mile off the village of Kampung Bubale on the S side of Nusa Bubale. This anchorage is protected even during the S monsoon.

The main channel leading into Teluk Kau is close E of Nusa Bubale. It is deep in the fairway but has a 10m shoal on its W side and its E side is formed by a shoal bank with a least depth of 6.4m; this bank has not been closely examined and may be shoaler than charted. This shoal bank is separated from the reefs along the shore of the entrance by another deep but narrow channel. The channel W of Nusa Bubale cannot be recommended because of the several shoals and the currents.

Coconut plantations border the W shore of the bay and its entrance to **Tanjung Boleu** (Tanjung Bolu) (1°09'N., 127°54'E.), about 12 miles SSW.

2.49 Kampung Kau (1°10'N., 127°54'E.) (World Port Index No. 52590), about 1 mile N of Tanjung Boleu, is a low village with a small pier. Several stranded wrecks lie about 1.5 miles E of the pier.

The shore between Tanjung Boleu and Kampung Akelama, about 18 miles WSW, is low, but is backed by Pegunungan Mata Mata mountain range. At the W end of the bay spurs of the mountains approach the shore, but there are no conspicuous points. The isthmus between Teluk Kau and Teluk Dodinga on the W coast of Halmahera is composed of low hills. At the SE corner of Teluk Kau and on the E side opposite Kampung Kau, mountain spurs also approach the shore; these latter have already been mentioned with the general description of the bay. The small islet of **Roni** (0°59'N., 127°56'E.), close to the E shore, is 167m high and very conspicuous.

Loleo Lamo (1°13'N., 127°50'E.) is the bight W of Tanjung Boleu. A large bank in its E part extends 2 miles offshore. In the vicinity of this bank vessels should stay outside about the 20m curve. The bight affords sheltered anchorage during the N monsoon. A stranded wreck lies in the bight about 3.5 miles W of Tanjung Boleu.

Teluk Bobane (0°53'N., 127°40'E.) at the head of Teluk Kau affords excellent anchorage in 11.9m in its E part with the pier at Kampung Bobane Igu bearing 169°. A trail leads to Dodingo, on the opposite side of the isthmus.

Anchorage can be found almost anywhere along the S shore of Teluk Kau. The villages of Kampung Pintatu, Kampung

Ekor, Kampung Menamin, Kampung Saolat, and Kampung Wadjo are along this shore. Between the first two is a low plain. Vessels can anchor off **Kampung Ekor** (0°49'N., 127°50'E.), with the center of the village bearing 180° and a white spot bearing 105°. Landing can be effected at high water in the small river which flows out here.

2.50 Ake Selaka Roads (1°02'N., 127°57'E.), about 2 miles N of Roni, can easily be recognized by the small off-lying islet of the same name. Southwest of this islet there is anchorage in 40m over mud and sand. A reef is 1 mile N of this islet and about 0.4 mile offshore. The reef is not marked by discoloration. In steering for the anchorage the coast can be approached until Roni is shut in by the point N of it. This point may be recognized by the 214m hill on it and the small rocky islet close off it.

Kampung Ake Saleka (1°02'N., 127°57'E.) (World Port Index No. 52580) is a storage place for the jungle products gathered by the people of the coastal villages. Vessels call here regularly.

Teluk Waisile (1°12'N., 128°06'E.) is on the E side of Teluk Kau immediately inside the entrance. The bay is clear of shoals in its central part, but it is very seldom used. In it are three villages, Kampung Subaim, Kampung Dodaga, and Kampung Lolobata.

Anchorage.—Anchorage may be obtained anywhere in Teluk Waisile, in the NE part of Teluk Kau, in depths of about 30m, mud and sand.

In the bend close E of **Kampung Njaulaku** (1°17'N., 128°05'E.), at the entrance to Teluk Kau, there is anchorage in 32m. At the village of Kampung Iga, 15 miles to the NE, good anchorage can also be found.

In Teluk Bobolo, 11.5 miles W of Tanjung Lelai, anchorage can be obtained on a small ridge with a depth of 37m. This anchorage should be approached with 55m of chain veered out. By steering 169° for the 518m summit close E of Gunung Bobolo, the anchor will catch hold about 0.5 mile offshore.

Caution.—See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia, for information on the mine danger area in Teluk Kau, including Teluk Waisile and the approach channel to Lolobata.

2.51 From the entrance to Teluk Kau the coast trends NE for 43 miles to **Tanjung Lelai** (1°34'N., 128°43'E.), the low NE extremity of the peninsula separating Teluk Kau and Teluk Buli. At Tanjung Lelai the coast reef extends more than 1.5 miles offshore. Gunung Bobolo, a 538m coastal hill at the bay of the same name and Tatem, a 953m summit 6 miles farther to the SW, are quite conspicuous.

At Tanjung Lelai the coast turns to the S for about 31 miles to Tanjung Wayamli. Tanjung Petak, 11 miles S of Tanjung Lelai, may be identified by a flat hill with two summits, 148m high, which have the appearance of an islet. Watida, W of Tanjung Petak is a double-topped mountain, 908m high which appears sharply pointed from E. East of Watida is a group of sharp but smaller peaks. Near the coast 5 miles SSW of Tanjung Petak is a conspicuous 242m hill. South of this bay a chain of hills follows the coast as far as Teluk Buli. The Watam Mountains, 1,100m high, may be seen over these hills.

The monsoon drifts are the principal currents along this coast. These currents are rather strong around the most salient points.

Anchorage.—Dabo Bay, 2.5 miles S of Tanjung Lelai, affords anchorage in 26 to 29m. There are no inhabitants here. Karang Patilang, a reef lying in front of the bay, has a least depth of 3.6m and can always be recognized by discoloration or breakers. A rock with 2.2m, is in the channel W of this reef and a drying rock is 0.25 mile W of the reef. Teluk Akelamo, the next bay to the S, affords better anchorage than Dabo Bay. The anchorage at these bays offer shelter only during the NW monsoon.

At Kampung Tifonis, 2.5 miles S of Tanjung Petak, vessels can anchor NW of a small drying sandbank. Local knowledge is necessary.

Teluk Buli

2.52 Teluk Buli (0°48'N., 128°28'E.), between Tanjung Wayamli and Tanjung Inggelang, 31 miles S, is surrounded by mountains and highlands and is encumbered with numerous reefs and shoals inside the 200m curve line. Because of these dangers the bay is navigated mainly by vessels enroute to Buli Roads.

Tanjung Wayamli (Tanjung Wajamli) (1°04'N., 128°42'E.), the low N entrance point can be identified by the coast hills in its vicinity, especially by Onat, the 422m hill 2.5 miles NW of the point.

The peninsula separating Teluk Buli and Teluk Weda is hilly and mountainous. The most conspicuous summits seen from Teluk Buli are Tadjam, a 723m conical peak; Damoli, 711m high; Bial, 661m high; and the Waleh Mountains, a range farther to the W, whose highest peak is 653m high.

Winds—Weather.—The weather is better during the SSE monsoon than during the NW monsoon. During the SSE monsoon the S part of the bay is well sheltered, but troublesome rollers may be encountered along the N coast. Whirlwinds may be experienced inside the bay, but they are not dangerous. Rain may be expected throughout the year.

Tides—Currents.—The lowest water level occurs in June or July, and in December or January. The maximum rise and fall that can be expected are, respectively, about 0.6m above and 0.9 below mean sea level. In the open sea fronting Teluk Buli the currents consist of monsoon drifts. Between a line joining the entrance points and about the 200m curve of the bay, the currents are affected by tidal movements, and a current of as much as 2 knots may be encountered. In the inner part of the bay the tidal currents are noticeable, but they do not exceed 1 knot, except between the islands at the SE end, where they may attain a velocity of 1.5 knots.

Directions.—When coming from N, round Tanjung Wayamli at a short distance so as to pass between that point and Sailal, a 10.9m shoal 1 mile off it. Then follow the coast at a distance of about 2 miles which will lead midway between Semer and Metonga, two 4.5m shoals off Tanjung Mokali. A 0.9m shoal is E of Metonga. This course also leads N of the shoals S of a line joining Metonga and Pulau Gei (Gee), but farther into the bay alter course to pass S of Litin, a drying patch. Then steer for the anchorage in 22m to the W of a 8.8m shoal about 0.75 mile SSE of a large conspicuous shed near the

boat pier at Buli Roads. The channel, leading to the pier between drying reefs, is marked by beacons. A 0.9m shoal is about 1.25 miles E of Buli Roads.

When coming from E steer to pass N of Pulau Leleve and Sain, which are about 13.5 and 17 miles, respectively, NW of Tanjung Inggelang, then pass S of Ronde Reef, an atoll-shaped reef which dries and is marked by discoloration, then steer for the anchorage in Buli Roads.

When coming from the S give Tanjung Inggelang a wide berth then steer to pass between Pulau Inggelang and Pulau Woto. Pass S of Pulau Wor, taking care to clear a dangerous wreck about 0.7 miles SE and the 2.4m shoal about 0.75 mile SW, respectively, of that islet; then steer to pass E and N of Pulau Mia. Pinit and Toppo, reefs which dry, N of Pulau Mia, are marked by discoloration. There is a clear channel to Buli Roads passing W of Woi, a reef which dries and is marked by discoloration, and W of Ronde Reef.

The N shore of Teluk Buli is fronted in places by reefs and shoals, but suitable anchorage can be found almost anywhere. Two villages, Kampung Watam and Kampung Wayamli, lie 3 and 12.75 miles, respectively, SW of Tanjung Wayamli.

Buli Roads (0°52'N., 128°17'E.) (World Port Index No. 52570) is in the NW corner of the bay and N of Pulau Pakal and Pulau Gei. The shore is fronted by patches of drying reefs. The channel leading between the reefs to the boat pier is marked by private beacons. Kampung Buli is the shipping place for copra and other jungle products.

Teluk Sololo (0°47'N., 128°14'E.), SW of Buli Roads and at the head of Teluk Buli, is deep and has few dangers. It is uninhabited. In it and fronting it are several islands, of which Pulau Pakal is the outermost and largest.

2.53 South shore of Teluk Buli.—There are more villages on this side of the bay than on the N side. At Kampung Maba, on the S side of the entrance of Teluk Sololo, there is safe anchorage N of Maba Islet. Off Kampung Bicoli (Bitjoli) opposite Pulau Wor there is anchorage in 18m. During the NW monsoon better anchorage may be found in the lee of Pulau Wor in a depth of 28m. The best landing place is close E or W of Kampung Bicoli. Well-sheltered anchorage may be found off Kampung Inggelang in the narrow channel along the S side of Pulau Inggelang; however, the W end of this channel is dangerous and unmarked. The channels S of Seal and Tjef Islets, S and W of Pulau Inggelang, can only be navigated by native canoes. There is a boat pier at Kampung Inggelang. During the SSE monsoon suitable anchorage may be found W of **Tjef** (0°34'N., 128°37'E.) in 9.1m. The other villages along this shore are of little or no importance.

A 9.1m rocky shoal was reported about 4.25 miles ENE of Pulau Inggelang.

2.54 Sayafi Islands (Sajafi Islands) (0°31'N., 128°50'E.), 7.25 miles E of Tanjung Inggelang, are separated by clear and deep passages from the Halmahera coast and from the bank described below. The only dangers in addition to the reported rocky shoal mentioned above are an 11.9m shoal W of the N end of Pulau Sayafi, and a shore reef which extends farthest from the E side and S end of Pulau Luwo. Pulau Sayafi, the N and largest island, is 124m high, and Pulau Luwo, the S island is much lower.

About 8 miles NE of Pulau Sayafi and fronting Teluk Buli is an extensive bank of soundings with irregular depths. Near the edges of this bank are shoal spots of 11.9 to 24m. These shoal spots are well marked by discoloration. Close off the SW side of the bank is a smaller bank with a least depth of 8.7m.

Pulau Yiew (Pulau Jiew) (Katherine Islet) ($0^{\circ}44'N.$, $129^{\circ}07'E.$), on the E part of the larger bank, is a heavily-wooded island, 58m high. Near its E end is a small but high, wooded, and rocky islet; near its NW end is a lower barren islet.

Togoplun (Recovery Islet) ($0^{\circ}40'N.$, $129^{\circ}02'E.$), a rock 7.5 miles SW of Pulau Yiew, is 24m high and practically bare. From a distance it looks like a ship.

Canton Packet ($0^{\circ}39'N.$, $128^{\circ}50'E.$), 6.25 miles W of Togoplun, is a small drying rock near the SW edge of the bank. It is often marked by breakers.

A submerged reef about 0.7 mile in diameter and existence doubtful has been reported about 13.5 to 15 miles NE of Pulau Yiew, and a depth of 18.3m has been reported about 7.5 miles ENE of the island.

Caution.—Volcanic disturbances have been reported in an area 15 miles wide between $0^{\circ}18'N.$, $129^{\circ}54'E.$, and $1^{\circ}00'N.$, $129^{\circ}00'E.$ A great disturbance was observed in an area, with a radius of about 1 mile, centered about 12 miles E of Pulau Yiew. Vessels are warned to give these areas a wide berth.

Aurora Bank and Winchester Bank, located E of Pulau Yiew, are described in paragraph 2.63.

From Tanjung Inggelang the coast of Halmahera extends S for 12.5 miles and then ESE for 16 miles to Tanjung Ngolopopo. The latter stretch is the N side of a narrow tongue of land extending in that direction from the SE end of the peninsula between Teluk Buli and Teluk Weda. The most conspicuous points are near Tanjung Ngolopopo.

This coast can be approached rather closely as it is steep-to and the coast reef is very narrow wherever it exists. About the only anchorages are in 23m in a small bend, 3.5 miles S of Tanjung Inggelang; in the same depth off Kampung Paniti, 9.5 miles S of that point; and in 29m of the villages off Kampung Telepeu and Kampung Gemia, 6 and 6.5 miles farther SE. Anchorages off this coast require local knowledge.

Tides—Currents.—The maximum rise and fall of tide that can be expected at Kampung Telepeu are, respectively, 0.5m above and 0.5m below mean sea level.

2.55 Tanjung Ngolopopo ($0^{\circ}13'N.$, $128^{\circ}54'E.$) is steep and rocky. About 1.25 miles W of the point is a fairly conspicuous hill, 163m high. About 2 miles farther NW is Guba, a very conspicuous 297m hill. Pulau Muor, 86m high, is 2.3 miles ESE of Tanjung Ngolopopo with Witimdi, two flat rocks midway between. On the reef at the SE end of Pulau Muor is Weilon, a small rocky islet.

Guba ($0^{\circ}16'N.$, $128^{\circ}53'E.$) has the appearance of a table mountain when seen from E and W, but when seen from the S, both Guba and Pulau Muor may be mistaken for Pulau Muor from a distance, and at closer range Guba may be taken for Tanjung Ngolopopo, and the hill on the point for Pulau Muor.

In the passage between Tanjung Ngolopopo and Pulau Muor, the streams are sometimes very strong and cause heavy tides. During the transition periods of the monsoons, regular and

moderate tidal streams, setting NW and SE, have been observed to the N of Tanjung Ngolopopo.

A shoal with a depth of 12.8m has been reported about 7 miles E of the SE end of Pulau Muor.

Teluk Weda

2.56 Teluk Weda ($0^{\circ}10'N.$, $128^{\circ}20'E.$) lies between the SE and S peninsulas of Halmahera, within a line joining Tanjung Ngolopopo and Tanjung Libobo, about 72 miles SW. With the exception of Veldman Rock, N of Kepulauan Widi, no dangers are found more than 6 miles offshore, and there are few within that distance.

Winds—Weather.—During the entire NW monsoon the wind is light and the sea calm, except in the NW part, where the wind which blows through the low valley W of Liember Mountains strikes. In February and March, when the NW monsoon is strongest, sudden strong winds are experienced E of Tanjung Remdi, about 22 miles W of Tanjung Ngolopopo, where they blow across the narrow tongue of land starting at that point. At such times heavy rollers will be encountered just beyond the lee of Tanjung Ngolopopo. The turning period of the monsoons begins at the end of March, and only to the N of the latter point will gentle N winds still be experienced. In the beginning of the SSE monsoon heavy showers from the SW occur occasionally. They last from one to four hours and are accompanied by a peculiarly thick and heavy atmosphere. After the middle of June this monsoon is quite strong and blows from the S and SSE. Most of the rain on the shore of Teluk Weda falls during this monsoon, in contrast to Teluk Buli where most of the rain falls during the NW monsoon.

Tides—Currents.—In the bay tidal currents are only noticeable close to the shore, and the monsoon drifts are not encountered until outside the line joining the entrance points.

2.57 North shore of Teluk Weda.—The principal peaks of the peninsula between Teluk Buli and Teluk Weda have already been described in paragraph 2.56. The highest of the Waleh Mountains and Bial, a 661m mountain about 28 miles NW of Tanjung Ngolopopo, are rather conspicuous because of their steep W slopes. West of the former group of mountains, Sagea and Liember, 843 and 1,262m high, respectively, may be seen over the low coastal hills. Close to the shore S of Sagea is a very dark conspicuous 210m hill which stands out well against the background and has the appearance of an island from a distance. West of the Liember Mountains is the valley through which the winds of the NW monsoon find their way into the bay.

Navigation along this shore is not too difficult, because with favorable conditions the reefs are well marked by discoloration and the water is always clear. The E most dangers off this shore are **Karang Legli** ($0^{\circ}14'N.$, $128^{\circ}49'E.$), two 1.8m shoals, about 5 miles WNW of Tanjung Ngolopopo and 1.75 miles offshore.

Tides—Currents.—Tidal currents set along the coast but are not strong; the flood current sets W and the ebb E. During the SSE monsoon the sea along this shore is rather troublesome.

Patani Roads ($0^{\circ}16'N.$, $128^{\circ}45'E.$), about 9 miles NW of Tanjung Ngolopopo, affords anchorage with local knowledge in a depth of about 55m with the small landing pier bearing

about 315° and the SW end of Pulau Muor in line with the coast NW of Tanjung Ngolopopo bearing about 117°. The village is not easily identified at a distance, but closer in, a mosque with a white roof, behind a sandy beach, will be seen. A 1.8m shoal is 1.5 miles offshore SE of the mosque. About 1.75 miles farther W and 0.4 mile offshore there is a drying reef. Communication with the shore is difficult during the S monsoon, and the landing pier should not be used because of two rocks close off it.

Kampung Patani (0°17'N., 128°45'E.) (World Port Index No. 52560) is the center of the native trade for this section of the coast and the neighboring islands. Vessels call here regularly. A small pier extends out on the drying reef abreast the village.

Tides—Currents.—The maximum rise and fall of tide that can be expected are, respectively, 0.6m above and 0.3m below mean sea level.

Between Kampung Patani and Kampung Mesa, nearly 30 miles to the W, the coast is wild and sparsely populated, and has a deserted appearance. Suitable anchorage, however, can be found off the villages of Kampung Banemo, Kampung Moreala, and Kampung Dote, 11.5, 15, and 25 miles, respectively, W of Kampung Patani. Local knowledge is necessary in each case. Near the coast of Kampung Mesa are three hills, which may be found useful landmarks when navigating along this shore. The W most and highest hill is 283m high.

Caution.—A 1.8m shoal is close to the shore 0.6 mile SE of Kampung Moreala. At Kampung Sebonpopo, 1.5 miles NW of Kampung Moreala, a drying reef extends 0.5 mile W from the shore. **Karang Matalel** (0°22'N., 128°29'E.), another drying reef, is 1 mile farther off. Near the edge of the 200m curve and 2.5 miles W of Karang Matalel is Karang Samlowos, an extensive drying reef with a 0.9m shoal 0.5 mile SE of its eastern end. Karang Mie is a similar drying patch lying farther S. Karang Mela, still another drying patch with a 1.4m shoal close NE of it, is about 1 mile SE of Kampung Dote.

2.58 Mesa Roads (0°24'N., 128°17'E.) can be recognized by the small islets Mesa and Mtu, which are low with high conspicuous trees. Drying reefs are S and W of Mesa, and S and E of Mtu. East of the last mentioned reef are other detached reefs. These reefs are not always marked by discoloration when covered and not easily located. The anchorage is N of **Mtu** (0°23.8'N., 128°18.0'E.) in 26m over sand. The best approach is on a 330° bearing on the 283m hill mentioned above, until Mtu and the middle of Mesa are in range bearing 280°, when the shore can be followed. When the reefs are visible the anchorage can also be approached from the S between the reefs extending from Mtu and Mesa. Kampung Mesa is located NW of Mesa. A boat basin leads N of this islet to a basin S of the village. It was reported that Mesa is connected to the mainland N of it.

Kokka Bay (0°27'N., 128°10'E.), 8 miles W of Mesa, has two small basins in its E part formed by **Tete** (0°27'N., 128°10.0'E.), a mangrove-covered islet, and the reefs extending from it. The N basin affords anchorage in 29 to 40m, but a 4.5m shoal N of Tete constitutes a danger which should be

avoided. Another good anchorage spot is in 31 to 33m, mud, with the E side of Tete in range with Tanjung Waleh. In the N part of the bay are two drying reefs with a 0.9m shoal E of them. These are separated from the shore by a clear but narrow channel. In this vicinity anchorage can also be found in 29 to 40m. Karang Mela, another drying reef, is near the 200m curve in front of the bay. A little over 1 mile W of Karang Mela is a 2.3m shoal.

The village of Kampung Sepa, with a conspicuous house at its E end, is on the N shore of the bay. The village of Kampung Waleh is E of Tanjung Waleh, the SE extremity of the bay.

At **Kampung Sagea** (0°28'N., 128°06'E.), about 2.5 miles W of Kokka Bay, there is a slight bend in the coast where anchorage can be obtained in 33m during the N monsoon and transition periods. Local knowledge is necessary. There are five small wooden piers at the village. A dark hill near the coast S of Sagea Mountain is a useful mark for approaching vessels.

2.59 West shore of Teluk Weda.—This shore, formed by the S peninsula of Halmahera, trends in a general S and SSE direction. The mountains of this peninsula begin S of the valley W of Liember Mountains. Immediately W of the village of Kampung Weda, there is a conspicuous row of five hills, 209 to 382m high. Above these, the coastal mountains of the W side of Halmahera may be seen. The highest and most conspicuous of these latter mountains were described earlier with the W coast of Halmahera in paragraph 2.9.

Abreast of the S range of mountains and nearer the E coast of the peninsula are two conspicuous round hills, 341m high and 29 miles NW of Tanjung Libobo. The bank of soundings along this side of the bay is wider than that on the N side, but there are more shoal dangers that must be avoided; these shoal dangers are not always marked by discoloration.

Communication with the shore on this side of the bay is difficult during the SSE monsoon.

Tides—Currents.—The currents setting along the shore in the N part of the bay are weak; farther S and near Kepulauan Widi they become stronger. The currents set N with a rising tide and S with a falling tide.

Between **Tanjung Uli** (Oeli) (0°28'N., 127°58'E.) and Tanjung Foya (Foja), 22 miles to the S, the 200m curve extends further offshore than any other part of Teluk Weda. The only danger outside this curve is the reef Karang Pasir Tidore, described in paragraph 2.61, off Weda Roads. The N side of Tanjung Silota, 12 miles S of Tanjung Uli, is quite rocky. Some rocks and the small islet of Silota, close S, make the point quite conspicuous. Between Tanjung Silota and Tanjung Foya, about 10.5 miles S, there are a number of shoals and reefs with a navigable channel between them and the shore reef. The shoals have 3.2m or less of water over them and several of the reefs dry at LW. The outermost reef, Karang Elmoos, is 5.5 miles offshore.

The principal village along this part of the coast is Kampung Weda. To the N are the villages of Kampung Kobe and Kampung Lelilef, and to the S the village of Kampung Sosowomo.

Weda Roads (0°20'N., 127°53'E.) is entirely open and affords no shelter during the SSE monsoon. Kampung Weda is

a storage depot for copra and jungle products from this part of Halmahera. The shore reef here is marked by two beacons with ball topmarks. A flagstaff stands at the S end of Weda.

Kolo Islands, the most important of which are **Yef** (0°21'N., 127°54'E.) and Kulefu, close SW, are close offshore NE of Kampung Weda. The E side of Yef, which is saddled-shaped, is fringed by a drying reef. A rock is on the SE side of this reef and two islets are on the NE side. The S edge of the reef is marked by beacons.

Kulefu (0°20'N., 127°53'E.) 52m high, about 0.5 mile SW of Yef, is covered with coconut palms and is fringed with a drying reef whose edges are marked by a number of beacons. A 0.9m reef, marked by discoloration is about 0.6 mile SE of Kulefu and two reefs, marked by beacons, are 0.3 mile S of the islet. A drying reef, marked by a beacon with a square topmark, is about 0.8 mile SSW of Kulefu.

2.60 Karang Pasir Tidore (0°19'N., 127°59'E.), the outermost danger in this vicinity, is a drying reef 7 miles E of Kampung Weda. A 1.8m shoal is 1.25 miles W of the N end of this danger.

The outer anchorage off Kampung Weda has a depth of 34m over coral. From here a wooded rock on the drying reef at the head of Teluk Maidi can easily be seen just open W of Kulefu; this berth is exposed to the S monsoon. Small vessels will find well-sheltered anchorage in about 13.7m between Kulefu and the shore. This anchorage may be approached from N or S of Kulefu.

Directions.—To pass N of Karang Pasir Tidore steer 270° for the conspicuous steep slope of the 646m mountains in 0°21'N, 127°45'E, about 5 miles N of Lenggua until Tanjung Foya bears 191°, then alter course SW and steer for the S most and highest of the five hills W of Kampung Weda bearing 244°. When the warehouse on the beach N of Kampung Weda is open SW of Kulefu bearing about 313°, steer for the anchorage, passing SW of the 0.9m shoal SE of Kulefu.

To pass S of Karang Pasir Tidore steer 287° for the conspicuous steep slope of the 646m mountain in 0°21'N, 127°45'E; when abeam of Karang Pasir Tidore, steer for the anchorage.

2.61 Between **Tanjung Foya** (0°07'N., 127°55'E.) and Tanjung Libobo the coast is fronted by dangerous shoals and reefs and there are few conspicuous points. This area is sparsely populated; the few villages are Kampung Foya, Kampung Mafa, Kampung Latubi, Kampung Ake Lamo, Kampung Wosi, Kampung Besui, and Kampung Gane di Luar. Coconut plantations are N of Kampung Wosi, 17 miles S of Tanjung Foya, but S of that place are mostly jungles with the greater part of the shore lined with sandy beaches.

Of the islets that are on or near the shore bank, Pulau Sunam, the outermost, is 35 miles SE of Tanjung Foya. This is a rocky islet with high trees. Pulau Djodji, near the shore SW of Pulau Sunam, is conspicuous because of the coconut palms on it. Pulau Wamlonga, close to the shore 11 miles NW of Pulau Sunam, is almost joined to the shore and is not conspicuous. **Tanjung Libobo** (0°55'S., 128°27'E.) was discussed earlier with the W coast of Halmahera in paragraph 2.11.

Anchorage.—Anchorage can be found almost anywhere between Tanjung Foya and the village of Kampung Gane di luar.

A good anchorage is off the village of Kampung Foya in the bight S of Tanjung Foya. When approaching, it is advisable to keep Tanjung Foya bearing 278° to clear the dangers off that point. Off the village are several drying reefs and shoals, inside of which is a more or less sheltered anchorage for small vessels. Communication with the shore is frequently cut off during the SSE monsoon. A 0.9m shoal is located 2.2 miles offshore.

Kepulauan Widi (0°35'S., 128°27'E.), about 16 miles N of Tanjung Libobo, consists of several wooded islands and numerous small islets and rocks, most of which are in two compact groups on a couple of drying reefs. A detached island is S of the W end of the W group, and another detached islet is S of the E group. The channels between the two groups, and between them and the detached islands, are deep and clear. There are no permanent settlements but native fishermen come here occasionally.

Dadawe Lagoon is located within Pulau Dadawe (Druvig Island) the small detached atoll S of the W end of the W group of islands. The lagoon is navigable by launches only.

Muiliyk (Muilijk) Lagoon is located within Pulau Muiliyk, the largest W island of the group. The lagoon is navigable by launches only. The entrance is through a drying reef on the SW side of the island. It is reported that a heavy current may occur in the entrance, especially when the reefs are uncovered. When the current is going out and there is a S wind, there is much surf in the entrance.

Veldman Rock (0°27'S., 128°31'E.), about 8.5 miles N of the E group of Kepulauan Widi, is a small coral reef with a least depth of 0.5m. It is always marked by discoloration.

There are no convenient anchorages in Kepulauan Widi. The islands should be given a wide berth because of the possibility of strong currents in the area.

Halmahera Sea

2.62 Halmahera Sea (1°00'S., 129°00'E.) is the name applied to the waters off the E side of Halmahera. The N part, N of Pulau Gebe, is open to the Pacific Ocean, but the part S of that island is more of an enclosed basin with deep channels connecting it to the waters S of it. The deep and clear passage between Pulau Gebe and Pulau Muor connecting the N and S parts of Halmahera Sea is known as Selat Jailolo (Djailolo Passage).

Tides—Currents.—At Selat Jailolo the NW monsoon reaches its greatest strength in February and March. A heavy swell will be experienced at any time during the year, even during the S monsoon. The monsoon drifts are felt in the deep and open section of Selat Jailolo; they are quite strong around the NW end of Pulau Gebe. Tidal currents are encountered on the bank of soundings near Pulau Muor.

Directions.—Vessels coming from N and heading for Selat Jailolo should identify Pulau Yiew, which has a high rock on its E side and a lower small island on its W side. The bank extending from Pulau Yiew can be safely crossed and even anchored upon. Shoal patches less than 20.1m show up by

discoloration, but none of them are dangerous on this part of the bank.

When past Pulau Yiew steer straight for the middle of Selat Jailolo, with consideration for prevailing monsoon and currents. Pulau Muor and Weilon, off Tanjung Ngolopopo, and the summit of Pulau Gebe are good points to check position.

Leaving Selat Jailolo steer nothing W of SSW. When Pulau Vrooliyk, the E island of Kepulauan Widi, is passed, and Libobo Hill, close W of Tanjung Libobo comes in view, course may be set for **Batu Anyer** (Anjer) (1°10.5'S., 128°29.5'E.) which can be passed fairly close, then use any of the broad channels between the islands to the S.

Caution.—Shoal depths have been reported in the passages E of Halmahera. Mariners are advised to exercise caution when navigating in this area. A rock with 12.8m, was reported in **Selat Jailolo** in 0°09.0'N., 129°05.5'E. Volcanic disturbances have been reported across the N part of Halmahera Sea in an area 15 miles wide between 0°18'N, 129°54'E and 1°00'N, 129°00'E. A great disturbance was observed in an area with a radius of about 1 mile, centered about 12 miles E of Pulau Yiew. Vessels are advised to give these areas a wide berth.

Kepulauan Widi should be given a berth of at least 5 miles because of strong tidal currents around these islands.

East Side of Halmahera Sea

2.63 Aurora Bank (0°43'N., 129°32'E.) and Ormsbee Bank, with Winchester Bank between them, are the northernmost banks NW of New Guinea and on the E side of Halmahera Sea. Aurora Bank, the W most, is 24 miles E of Pulau Yiew, which has been described in paragraph 2.55. The least depth on Aurora Bank is 12.8m, on Winchester Bank 23.8m, and on Ormsbee Bank 16.5m. The bottom is sand, rocks, and coral. These banks are not marked by discoloration, but breakers may be seen at times. The water on them is very clear, so that the rocks on the bottom may be seen at the shoalest places. A 26m shoal, was reported to be located about 3 miles SE of Winchester Bank.

Pulau Sayang (0°18'N., 129°53'E.) and Ai, the N most island on this side of the Halmahera Sea, are low and flat, but they are visible for quite a distance because of the thick and high forests that cover them. Pulau Sayang has been reported to be a good radar target up to a distance of 23 miles. About 4 miles W of Pulau Sayang the depths decrease from 18.3m to less than 10.9m shoreward. The shoal places are marked by discoloration because of the white sandy bottom. Hunter Bank, 5 miles E of Pulau Sayang, has a depth of 14.6m and is not marked by discoloration. Pulau Wajag, SE of Pulau Sayang is described in paragraph 5.3.

Caution.—Two 18.3m shoals are about 7.75 and 10 miles NNE, respectively, from the NW end of Pulau Sayang. A 20m shoal, and a 21.9m shoal lie about 11 miles NE of the same point.

The channel between Pulau Sayang and Pulau Wajag is wide and deep. A vessel approaching from the W should steer on an E course and pass about 1 mile N of Pulau Wajag which is steep-to. In this area the water is very clear and the bottom can be seen for a depth of 20.1m. Large schools of porpoises are sometimes seen in this passage and may be mistaken for dry rocks when motionless.

2.64 Pulau Gebe (0°05'S., 129°28'E.), about 19.5 miles ESE of Pulau Muor, is a narrow and hilly island, 23 miles long in NW-SE direction. The highest summit is 396m high at the SE end. It is lower at the middle, then rises to **El Fanum** (0°03'S., 129°24'E.), a double-peaked hill 285m high, then lowers again to the NW. There is safe passage both E and W of this island.

A light is shown from Tanjung Sofa, the NW extremity of Pulau Gebe.

The NE coast of Pulau Gebe is subject to rollers and surf during the N monsoon and to surf during the turning periods and the S monsoon. This makes landing on this coast practically impossible. Provided there is not much surf a landing place may be found at the adjoining villages of Kampung Sanafi and **Kampung Katjepi** (Kampung Kacepi) (0°07'S., 129°31'E.), which are mostly hidden by coconut plantations. There are openings in the coastal reef E and W of the villages. Anchorage may be found in 40m about 91m off the villages.

The SW coast of Pulau Gebe is covered with mangroves and is almost uninhabited. Between **Tanjung Oebulie** (0°04'S., 129°22'E.) and Tanjung Tuli Kalio, about 6.5 miles SE, is Pulau Fau. A reddish conical hill 128m high is on this island.

There is an open pit nickel mine on the W face of El Fanum, about 2 miles NE of Tanjung Oebulie. A small ore loading jetty is close NE of the same point. Ships load ore from lighters of 120 to 900 dwt at a rate of about 2,000 tons per day, using ship's gear. Tugs are available. Fuel and fresh water are reported not available. Ore vessels anchor about 0.4 mile NW of the jetty in a depth of about 66m.

Pilotage.—Pilotage is compulsory; the pilot boards about 1 mile NW of the jetty. The vessel's ETA must be given 8 working days in advance and confirmed 48 and 24 hours prior to arrival. Informations to be transmitted includes last port of call, draft on arrival, estimated draft on departure and quantity of ore to be embarked.

Anchorage.—An anchorage N of Tanjung Tuli Kalio has a depth of 29m. The best-sheltered anchorage is in the channel N of Pulau Fau. The entrance is about 0.25 mile wide and there are depths of 12.8 to 21.9m in the channel. Reefs are near both entrances to the channel, but the W entrance is the best. The E entrance can only be navigated when conditions are favorable for identifying the reefs.

Fairly strong currents may be experienced at spring tides in the vicinity of Pulau Fau, especially in the channel between it and Pulau Gebe.

Anchorage may be found in the two bights at the SE end of the island, but the depths are over 61m and a sea sets in during SE winds.

2.65 Pulau Ju (Pulau Joe) (Pulau Yu) (0°03'S., 129°37'E.) and Pulau Oeta (Pulau Uta), about 1.75 miles NNE, are islands on separate banks E of Pulau Gebe. Pulau Ju is 55m high and Pulau Oeta is comparatively low; both are covered with fairly high trees. A wide and deep passage separates these islands from Pulau Gebe. The village of Kampung Omnia is on the rocky SW coast of Pulau Ju. Vessels anchoring here should select a place W of the village because the bottom is too steep in front of it. Local knowledge is necessary. Boats can enter the lagoon at the SE end of the island. Pulau Oeta is not inhabited;

the coconut plantations on this island are maintained by inhabitants of other islands. Vessels can anchor in favorable weather off the SW end of Pulau Oeta in 64m, about 183m from shore, with the W point of the island bearing 005° and the S point bearing 083°. An extensive shoal, having a depth of 7.9m on its outer edge, is usually marked by discoloration and extends from the SE side of Pulau Oeta. This shoal narrows the channel width to about 0.5 mile. Both islands are infested with swarms of mosquitoes.

The passage between Pulau Ju and Pulau Oeta is deep and clear, as is the passage between Pulau Ju and Pulau Gebe. The shores of Pulau Gebe and Pulau Ju are steep-to. South of Pulau Oeta the shoal water extending from that island can be avoided by favoring the Pulau Ju shore when using that passage. In both passages the current may be strong, especially near the SE point of Pulau Gebe.

2.66 Pulau Gag (0°30'S., 129°52'E.), about 21.5 miles SE of Pulau Gebe, is about 6 miles long and is very hilly; the highest hills are 340m and 349m high. The island has been reported to be a good radar target up to a distance of 30 miles. The rocky W coast can be passed at a safe distance, but the N and E coasts should be given a wider berth. An 11.9m shoal is off the N coast, 10m and 7.8m shoals are off the NE part of the island, and a number of shoals from 1.8 to 11.9m, known as Fishing Bank, are SE of the S end of the island.

The island is most heavily wooded at the N part. It is practically uninhabitable because of swarms of stinging gnats.

Anchorage.—Anchorage, open to the SE, may be obtained on a muddy bottom with depths of about 30m to within 183m of the shore.

Madjet, a small islet on the coast reef at the N entrance point of the inlet on the E side, is conspicuous because of tall trees. A shoal of about 3.6m is about 0.5 mile W of Madjet in the entrance of the inlet.

Jef Doif Islands (Yef Doif Islands) (Pulau Bambu) (0°46'N., 129°47'E.) are on and near the middle of the S side of an extensive bank of soundings S of Pulau Gag. This bank has very irregular depths; shoals of 6.9 to 20.1m are found near its S and NW edges. Two 11m shoals have been reported 11 miles E and ENE of Pulau Klarbeek.

Pulau Klarbeek, the N most island, is rocky and 112m high, and its coast is exceptionally steep. A 5.2m shoal is close S of Pulau Klarbeek. Pulau Kommerrust, the E most, is a low wooded coral island outside of the bank of soundings.

Pulau Schoteroog and Pulau Vlaming are two small heavily-wooded coral islets close within the S edge of the bank; they are surrounded by sandy beaches. The water on the bank is very clear and the bottom can often be seen at a depth of 29m. The islands are uninhabited.

2.67 Pulau Kofiau (1°11'S., 129°50'E.), 39 miles S of Pulau Gag, is about 15 miles long in a E-W direction. The greater part of it is low, but at the W end it rises in a group of hills which attain an elevation of 255m. There are no conspicuous summits among these, however. Near the middle of the N coast is a conspicuous 288m hill named Mata, with a 201m hill close E of it. These two are dome-shaped when seen from the N and S, but they appear conical when seen from the E. This island as well as the smaller islands of this group, is

heavily wooded. With the exception of the inner bays on the S side, the water around these islands is clear enough to see the bottom at a depth of 18.3m. The sides of the group can be followed at a distance of 0.5 mile, except for the NW side which should be given a berth of at least 1 mile.

The tidal currents in the passages attain maximum velocities of 2.5 to 3 knots. When the wind and current are in opposite directions a choppy sea arises outside the archipelago.

The E part of Pulau Kofiau is totally uninhabited. A few inhabitants live in several small scattered settlements on the smaller islands such as Pulau Jailolo and Pulau Deer. The principal occupation is fishing. Trading schooners call occasionally.

Anchorage.—Wambong-besar, on the S side of the E end of Pulau Kofiau, offers good shelter against all but SW winds. The anchorage, however, is rather narrow and suitable for only a small vessel. It should be approached on a mid-channel course through the bay. At the head of the bay is a small sandy beach, on the W side mangrove trees grow out into the water, and on the E side is a narrow coral strip with mangroves behind it.

Tanjung Soos forms the E extremity of Kofiau; a light is exhibited on Tanjung Soos.

Pulau Deer (1°09'S., 129°50'E.), with the village of Kampung Deer, is separated from the N coast of Kofiau by a clear channel. Vessels will find a sheltered anchorage off the village in 10.9 to 18.9m. A vessel may lie quietly here in all conditions of weather. Local knowledge is necessary. The W entrance to the channel is narrowed by the shore reefs; the E entrance is wider.

Anchorage.—Anchorage can be for almost anywhere along the N coast of Pulau Kofiau during the S monsoon.

During the N monsoon the clear channel between Pulau Kofiau and Pulau Torobi offers excellent anchorage in 14.6 to 26m. A 10m shoal is in the N entrance of this channel. A bank with a depth of 31m is about 1.25 miles N of the N end of Toribi. A deeper approach to this anchorage is through a channel along the N side of Pulau Kofiau and S of Pulau Jailolo and the three islands E of it.

Many good anchorages are found among the smaller islands SW of Pulau Kofiau. The islands facilitate navigation because of the ease of taking bearings. The following are considered safe entrances to the waters within the archipelago:

1. Between Pulau Toribi and Pulau Gebe-Besar, by favoring the Pulau Toribi shore. Steer with the W point of Pulau Tabek bearing 150°. There is a 7.3m shoal, 0.7 mile offshore N of Gebe Besar, restricting this entrance.
2. Between the Walo Group and Keeim by favoring the Walo Group.
3. Between the Walo Group and Pulau Tabek.
4. Between Ayuan (Ajoean) and Ayuan (Ajoean) Mangi mangi. Keep to the Ayuan side.

Smaller vessels may also find anchorage in the inner bays of Pulau Kofiau.

It is not advisable to anchor close to low mangrove shores, because these areas, especially in the S parts of the island, abound in small flies whose bites can cause severe irritation usually lasting about three days.

2.68 Kepulauan Boo (1°10'S., 129°22'E.), a group of islands on a bank of soundings W of the Kofiau Group, is separated from that group by a deep and wide channel. Pulau Boo-besar, at the W end of the group, consists of two islands separated by a very narrow opening filled with reefs. These islands are about 100m high and are flat on top. On the N coast there are some rocky spots, but otherwise, only sandy beaches and woods are seen. The S coast is mostly covered with mangrove trees. The shoals off the W end are marked by discoloration. A deep channel leads between Pulau Boo-besar and the next island to the E. Strong currents may be encountered in this channel.

A rocky 12.8m shoal was reported about 4.5 miles WNW of Pulau Boo-besar in 1°09'S., 129°14'E.

Pulan Boo-kecil (Ketjill), the E island, and the smaller islands between it and Pulau Boo-besar are low. The smaller islands have more of an atoll shape and are thickly wooded. The lagoons are shallow and suitable only for native canoes. Off the W side of Pulau Boo-kecil is a clear basin with good entrances leading in from N. Vessels can anchor in this basin, sheltered in the N and partially-sheltered in the S monsoon, in 29 to 73m.

Along the S edge of the bank is a long string of sand and coral reefs with depths of 0.3 to 5m over them. They are marked by discoloration. Passing vessels are advised to give the S side of the islands a berth of 3 miles.

Strong currents with velocities up to 2.5 knots have been observed near and among Kepulauan Boo. A difficult sea may be experienced near the shallower places when the wind and currents oppose each other.

There are no permanent settlements on these islands, but they are sometimes visited by people from other islands. Water is not available.

Dona Carmalita (1°18'S., 129°27'E.), about 5.5 miles S of Pulau Boo-kecil, is an atoll-shaped bank with a least depth of 6.1m. Its edges are well marked by discoloration, and sometimes by breakers. Breakers occur with even a slight breeze blowing in the opposite direction to the tidal currents, which may attain a velocity of 2 knots in a N or S direction. It has been reported that large schools of porpoises lying on the surface sometimes appear as rocks above water in this area.

Takat Sapa (1°10'S., 129°06'E.), with a least depth of 8.8m, lies about 16 miles W of Kepulauan Boo, and is usually well marked by discoloration, current rips, or breakers.

Pulau Pisang, S of Takat Sapa was described earlier in paragraph 2.33.

Batanme

2.69 Batanme (Misool) (1°50'S., 130°10'E.), a large island, is about 32 miles SSE of Pulau Kofiau. It is on the outer end of an extensive bank of soundings extending W from New Guinea. The part of the island and its off-lying islands are low, but the S part of the island and the off-lying islands to the S and SE are high. Because the water over the bank on which these islands lie is discolored by river water, discoloration is not a sign of reefs and shoals.

In the open sea and in the channel between Batanme and New Guinea, the monsoon drifts prevail, but near Batanme and its surrounding islands tidal currents are encountered.

The N coast of Batanme is fronted by many dangers and by wooded islands. The outermost danger, 13 miles N of the W end of Batanme, is Mas Mas Oelit (Fitz Maurice Shoal), a 5.2m shoal; it is seldom marked by discoloration. A 29m bank was reported to be about 6 miles WNW of Mas Mas Oelit; a 14.1m depth has been reported to lie about 6.5 miles N of Mas Mas Oelit. Except at the W part of the island, the summits of the range near the S side of Batanme are not of much use to navigation, but the small islands are good marks for bearings. It is reported that the long range of hills near the S coast are obscured by haze during the SE monsoon.

Caution.—Dangers in addition to those charted may exist off the N side of Batanme. Vessels are warned to keep to the recommended tracks through this area. False discoloration is often seen.

2.70 Waigama (1°50'S., 129°49'E.), the most important village on the N coast of Batanme, is the station of a government official. A mosque and a flagstaff are at the village. The village is about 7 miles ENE of the W end of the island.

The best anchorage is in a depth of 18m N of Wagajel, the small peninsula E of Waigama. The N points of Pial and Kaptjan Kecil should be in line bearing 252°. Pial lies on the coastal reef 0.5 mile WNW of Waigama and Kaptjan Kecil, an islet, lies 3.25 miles WSW of Pial.

Tides—Currents.—At Waigama the maximum rise and fall of tide that can be expected are, respectively, 0.5m above and 0.5m below mean sea level. The flood current sets in a W direction. The maximum velocity recorded was 2 knots in the more open parts and 3 knots in the narrow passages.

Directions.—Approaching from W, pass between Tanjung Fet Dom, the W extremity of Batanme, and Pulau Kanari, an island about 4.5 miles to the NW; then pass about 0.3 mile N of Pial, or pass more than 1 mile N of Pial, and approach the anchorage with the W tangent of Pian, an islet about 5 miles N of Waigama, in line bearing 002°, astern, with the W tangent of the islet of Moeslat, about 2 miles further N. There is a 6.9m shoal 0.8 mile N of Wagajel peninsula with a 11m shoal close W of it. Another shoal of 4.2m is located 0.8 mile NE of this peninsula.

Approaching from N steer to pass about 1.75 miles W of **Jef Lie** (1°36'S., 129°59'E.), then keep the E peak of Adola (Adoea), 427m high, in line with the W side of Jef Kanjin, about 8 miles SW of Jef Lie, bearing 198°; then pass W of Jef Kanjin and proceed as given below.

Approaching from E proceed through the channel between Kepulauan Kalies and Batanme to a position 1 mile N of the detached reef, with a low white sand dune, 1.5 miles N of Tanjung Haokep; then set course to pass S of Laitot and Haowat, after which take passage between Pulau Bellis Darat and Pulau Mut Mafela. The alignment of the N side of Pulau Mut Mefela and the E side of Haitlal bearing 068° astern can be followed until the rocky point W of Sungai Bano is in range with the mountain Liem, bearing 192°. Steer for Liem on a 192° bearing until the N sides of Pial and Kaptjan-kecil are in range, which will then lead to the anchorage. This course passes S of a 4.2m shoal about 1.2 miles NE of Waigama in 1°49.0'S, 129°49.8'E.

2.71 Off-lying islands and dangers NE of Batanme.—Kepulauan Penyau (Schilpad Islands), 16 miles NNE of the NE

point of Batanme, are a group of eight low islands covered with high trees. They are in the N part of the channel between Batanme and New Guinea and they divide the channel into two parts.

Pentako Ef (1°25'S., 130°29'E.), the easternmost of Kepulauan Penyu, has a reef with depths of 1.8 to 2.7m extending about 0.8 mile SE from it. A 1.8m shoal is about 0.75 mile ENE and an 11.9m shoal is about 1.5 miles E of Pentako Ef. A 10m shoal was reported about 5.25 miles SW of Pentako Ef.

Hesketh Shoal (1°27'S., 130°22'E.), between Kepulauan Penyu and Kepulauan Nusela (Noesela), is a midchannel danger with a depth of 4.9m, rock.

Zeemeeuw Reefs (Karang Elang) (1°20'S., 130°31'E.), between Kepulauan Penyu and New Guinea, are two patches that dry at LW and are at that time marked by heavy breakers. Tidal currents in this vicinity are irregular.

Kepulauan Dua (Kepulauan Doea) (1°32'S., 130°31'E.), a group of small islands 5 miles SSE of Kepulauan Penyu, are two low islands thickly covered by high trees. Madgal Reefs are two dangerous reefs with 1.8 and 2.8m over them; they are 4 miles NE of Kepulauan Dua and SE of Kepulauan Penyu. A depth of 16.1m, the position of which is approximate, was reported about 0.75 mile WNW of the 1.8m shoal spot of Madgal Reef.

A wreck with a depth of 13.7m is about 7.3 miles ESE of Kepulauan Dua.

A 7.3m shoal is about 2 miles W of the NW extremity of Mesloe Besar, the N island of Kepulauan Dua. Depths of 5.2m, position approximate, were reported about 2.25 miles N and 2.25 miles W respectively, from the same point.

A 0.3m shoal is about 9 miles SW of Kepulauan Dua.

2.72 The E coast of Batanme between **Tanjung Yamtu** (Jamtoe) (1°40'S., 130°20'E.) and Tanjung Openta, about 12 miles to the SE, is low and flat, but S of the latter point it rises sharply. A depth of 4.5m is about 8 miles ESE of Tanjung Yamtu.

Teluk Tamulol (Teluk Tamoelol) (1°55'S., 130°25'E.), on the S part of this coast, is virtually unnavigable because of the numerous reefs in it. Vessels can, however, reach an anchorage SW of Pulau Mustika (Moestika) in 31m. From E pass 1 mile S of Ef Kasya (Kasja), then steer for the conspicuous Bayampop hill on Mesemta Island bearing 272° until the E side of Pulau Wagmab is abeam to port. Then steer for the S point of Pulau Mustika. When Bayampop hill bears 235° steer W until the conspicuous rocky islet of the N shore of the bay about 1.25 miles NW of Pulau Mustika bears 331°, then alter course for the anchorage SW of Pulau Mustika.

There are many shoals in this area. When heading for the anchorage these dangers, as marked on the chart, should be noted. Off the SE side of Mustika are rocks awash and reefs with depths ranging from 0.5 to 4.1m located as far as 1.6 miles offshore. Two shoals, N of the center of the island of Lenkafal, with depths of 5.9m and 11.9m are 2.4 and 3.0 miles away, respectively.

West of Tanjung Openta are two conspicuous hills, **Gunung Pelana** (Zadel Berg) (1°49'S., 130°22'E.) and Gunung Pencut (Koepel Berg), 327m and 294m high, respectively. Bayampop, a very conspicuous hill, 244m high is on Mesemta, an island separated from the SE end of the main island by Panapana

Strait. This hill is sharp when seen from seaward, but appears flatter when seen from N or S.

2.73 Off-lying islands and dangers off the E coast of Batanme.—Among the islands which extend ESE from Mesemta, there are many deep channels, but they are not recommended because of the strong and irregular currents and the very slight discoloration of the reefs. There is safe passage, however, between **Ef Pian** (2°02'S., 130°45'E.) and the Sagof group of islands about 2 miles W.

Ef Kasya (Seven Islands) (1°58'S., 130°47'E.), about 4 miles NNE of Ef Pian are steep-to with a highest elevation of 53m.

Kepulauan Daram (Valsche Pisang Islands) (2°07'S., 130°53'E.) are the E most of the chain of islands and scattered rock extending from the SE end of Batanme. The principal and easternmost island of this group is **Pulau Daram** (2°09'S., 130°55'E.), 132m high and covered with forest. An islet, 88m high, connected to the S side of the E end of Pulau Daram, is also wooded, and when seen from S is striking because of some steep yellow rocks. Bijenkorf Rots, a detached rock in the shape of a bee-hive, is on the coastal reef off the E end of Pulau Daram. The passage immediately N of Pulau Daram is clear of dangers. The remaining islets of the group are high masses of rock; the NW most, Batu Karang Hitam (Zwarte Rocks), are black rocks 4.2m high and 6.25 miles NW of the W end of Pulau Daram. The rocks about 0.75 mile ESE of Batu Karang Hitam and between them and a 25m high islet are only just above-water.

Anchorage may be obtained during the SE monsoon off the N side of Pulau Daram.

A 2.7m shoal is about 3.25 miles SE of Batu Karang Hitam. A 3m shoal and another with a depth of 2.7m are about 2.75 miles W and 1.25 miles SE, respectively, of the W end of Pulau Daram. There is a 6m shoal 2 miles W of the W end of Daram. A depth of 15.8m was reported 4 miles ESE of Pulau Daram.

Pulau Len Kafal (2°00'S., 130°35'E.), the largest of the islands of the string extending from Mesemta Island, is 336m high, and can be seen from a distance of 35 miles.

2.74 Tanjung Forongketo (2°01'S., 130°28'E.), the SE extremity of Batanme, is fringed by a reef which extends about 0.5 mile to the E and upon which there are several small islets. An 8.2m shoal is about 1 mile SE and a 6.8m shoal is 0.8 mile E of Tanjung Forongketo.

The archipelago extending S from Tanjung Forongketo is mainly small but high rocky islands, all uninhabited. Kepulauan Jal (Djal), about 9 miles SW of Tanjung Forongketo, are low; the rock WNW of these islands are always above water. Kepulauan Jam, 2 miles SW of Kepulauan Jal (Djal) are also low; 1 mile NW of them is a drying reef. A 4.9m shoal and a 6.7m shoal are about 1.25 and 1.75 miles SSE, respectively.

A very useful channel is between Ef Mo and Olobie Pale, a conspicuous conical island about 9 miles S of Tanjung Forongketo, but a 4.9m shoal well marked by discoloration is between Olobie Pale and Wajaban Lenalos.

Boo (2°13'S., 130°35'E.), a narrow island 142m high, is about 7.5 miles SE of Olobie Pale. This island rises vertically from the sea. Several above-water rocks are close off the E end of the island. A 6.7m shoal is 1.5 miles E of Pulau

Warakaket, the next island S of Boo and a 4.9m shoal is almost 2 miles NE of Boo.

Teluk Lelintah (Lilinta Bay) (2°02'S., 130°18'E.), at the SE end of Batanme, is encumbered with dangers. It is sheltered during the NW monsoon, but it is difficult to approach during the SE monsoon because of high seas. Kampung Lelintah, the principal village, is in the SW part of the bay close NW of **Tanjung Wafani** (2°03'S., 130°15'E.). Anchorage can be found abreast of the village during the NW monsoon. The highest point on the islet **Tapalo** (2°01.5'S., 130°19.2'E.), in line with **Ketjitot** (2°03.0'S., 130°17.1'E.) on a 052° bearing, serves to indicate the close proximity of the shoals and reefs extending from the shore near the anchorage. Only a few houses are visible from seaward; the zinc roof of a storehouse is the most conspicuous object.

Directions.—Vessels will encounter little difficulty approaching Teluk Lelintah from W. Discoloration should not be depended upon to distinguish reefs with the exception of the reef surrounding Fagom Genan. If **Pulau Yaan** (Pulau Jaan) (2°08'S., 130°07'E.) is recognized and passed to the N, Lelintah Road may be reached on a straight course of 067° with Pulau Yaan bearing 247° astern. The short reef near Kampung Lelintah is hardly visible.

A 10.1m shoal was reported about 15 miles WSW of Pulau Yaan.

From S the best channel is E of **Yef Pelee** (2°12'S., 130°15'E.), an island about 7.5 miles S of Tanjung Wafani, then E of **Kaenoet Sollon** (2°10'S., 130°20'E.), a rock 62m high and about 2.5 miles NE of the E end of Yef Pelee, then between Batu and Mate, about 2.75 miles farther NNE. A 6.7m shoal, slightly marked by discoloration is on the W side of the part of the passage, and a rock is close off the W end of Mate. Pass about 0.2 mile W of this latter rock, leading through a least depth of 10.9m, then steer for the entrance of Lelintah Bay, avoiding a shoal with a depth of 7.6m about 3 miles SE of Tanjung Wafani.

The easiest approach from E is N of Boo, an island 142m high which rises vertically from the sea and is 17 miles E of Yef Pelee, then N of the chain of islands of which Boo is the E most. Then the route for the S approach, given above, should be followed.

The channels between **Jaganan** (2°03'S., 130°24'E.) and Japale, NW of it, between Japale and the coast of Batanme, and between Gag and Ginjamato, SE of it, should not be used because of their bends and the strong tidal currents which run in them.

2.75 The S coast of Batanme has some conspicuous summits in the range of hills close to the S coast. Those most easily distinguished are Wieng, Liem, Adola (Adoea) and Foel, which are 408, 486, 427, and 531m high, respectively, and lie near the W end of the island. Elban, and Jadata 407m high, are near the middle of the S coast. Liem has the appearance of a cone when seen from W. Although these are the first objects sighted by vessels coming from W, the high islands of the archipelago S and SE of Batanme are soon picked up. Native fishermen report that during the SE monsoon this coast is almost unapproachable because of the heavy seas.

Tides—Currents.—The tidal currents off the S coast of Batanme sets E and W at a maximum velocity of 2 knots, which is generally less than that off the N coast. In the narrow channels, however, the currents are sometimes stronger and very irregular.

This stretch of coast is almost deserted. Four large houses used as temporary residences are at the village of **Kampung Adola** (Adoea) (1°59'S., 129°54'E.). Telok Wagom lies about 9 miles further E. Water can be obtained from a stream near its head.

Pulau Tiga (2°02'S., 130°00'E.), lying W of Teluk Wagom, is separated from the coast by a safe channel; the coast reef here is not very well marked by discoloration, however.

Suitable anchorage may be found behind Joe, a small islet SE of Teluk Wagom. The reef with a drying rock which extends from the E end of the islet is conspicuous because of the breakers on it. The islet was reported to be a good radar target up to a distance of 20 miles.

In the bay behind **Jef Bie** (2°04'S., 130°09'E.), the shallow places are not marked by discoloration, but the E entrances are easily navigated because in that area the reefs are indicated by discoloration.

Caution.—Several charted reported depths of less than 183m are located S of Batanme. A depth of 10.1m was reported at 2°12'S, 129°59'E. A depth of 11m is located at 2°06'S, 129°41'E.