

A sand cay is situated on the reef at 1 mile westward of Lago.

Caution.—In addition to the countless reefs which lie between these islets and Tanah Masa there are a number of reefs eastward of the Treba Islets, as charted. The reefs farther south, to the east of Tanjung Anjing, are always marked by breakers.

11-82 Directions.—Vessels desiring to pass eastward of Tanah Masa should make a landfall at Tanjung Seiro and steer north when Karang Anjing is abeam, distant $1\frac{1}{2}$ miles. This leads midway between the detached outlying reefs, which always break, and the reefs near the shore. Hereabouts Pulo Treba Kechil is sighted dead ahead. This course is steered safely until Chipanana Besar is in range with Trega, when the course should be changed to 310° with Batu Wawa in range with the south side of Masa.

Steer this course until the north side of Mahang is in range with the south side of Katadok, when the course should be changed to 292° for Bunijuga. This leads southward of the sand cay southward of Masa. When Bai village disappears behind Masa, shape a course for Adam. When the north point of Masa bears 054° steer 311° for Tanjung Batu Wawa until the north point of Masa disappears behind the south point of Adam; then change the course to 333° , with Pulo Bunijuga about in range with the east side of Fatilasa, astern. When the north side of Biang is in range with the south side of Memong, one is clear on the north side of the 3-fathom reef situated northward of Tanjung Batu Wawa.

If desiring to pass between Pulo Masa and Bai, bring Tanjung Batu Wawa in range with the south point of Masa, and when the west side of Penang is about in range with the east side of Lalibo astern, follow this lead, steering 002° . This leads clear of the $1\frac{1}{2}$ -foot reef in the strait. When the mosque at

Bai bears east, change course to 346° . When Lajohene is open of Masa and Treba Besar open of Bai, steer north.

Most of the drying reefs are marked by discolored water.

The north coast slopes gradually toward the interior; it is densely overgrown and nearly completely fringed by a reef. A few huts are found on this coast stretch. Westward of Batu Wawa, a low point overgrown with coconut trees, the northeast point of Tanah Masa, is a small bay in which there is a well-sheltered anchorage in 7 to 8 fathoms.

An extensive reef with 3 fathoms is situated northward of Tanjung Batu Wawa, from which it is separated by a narrow channel.

11-83 ISLANDS OFF THE NORTH COAST.—Memong, Biang, and Tagaga are the northernmost islets off the north coast; all are wooded. Biang and Baligi, east and south, respectively, of Tagaga, are each marked by a conspicuous thick tree; both can be closely approached; their northwestern sides are hilly; the fringing reef around Biang is only 200 yards wide, with very deep water beyond it.

Tagaga, the westernmost, has a reef with boulders on its northern side extending to a distance of 600 yards.

Memong, the easternmost islet, may be identified by a large rock above water near its northwestern side, which is visible for many miles.

Reefs.—About $\frac{3}{4}$ mile east-northeastward of Memong is a patch with a least depth of 29 feet and about $4\frac{1}{2}$ miles east is another patch with a least depth of 15 feet. A $6\frac{1}{2}$ -fathom patch lies about $3\frac{3}{4}$ miles northeast of Memong. A patch of 3 fathoms lies between Memong and Biang. Between these islands and the shore are many reefs. Between the two northern extremities of Tanah Masa there are eight (Continued on next page)

small reefs between the bearings of 153° and 235°, from Ujung Seropi, some with less than 6 feet of water.

11-84 BATU, MARIT, AND LORANG.—Marit lies southeastward of Blang and is hilly and covered with coconut trees; its southeastern side is clear.

Batu consists of some overgrown masses of pointed rocks southward of Marit.

Lorang, the southwesternmost island, is low and overgrown with coconut trees; the channel between it and Marit, with more than 5-fathoms of water, is 200 yards wide.

REEFS.—Lorang is fringed by a reef and has depths of 23 and 26 feet extending 1 1/2 miles southwest from it.

A reef, with a least depth of 3 1/4 fathoms, lies about 3 1/2 miles southwest of Lorang. The sea breaks heavily at times on the reef.

A 6 1/2-fathom patch lies about 2 1/2 miles south-southwestward of Lorang.

11-85 THE WEST COAST of Tanah Masa forms the east side of Tanah Bala Strait, one of the south approaches to Tello Roadstead.

PULO TELLO, located westward of the north end of Tanah Masa, is the chief and most populated island of the Batu group and is hilly; the blunt hill, 295 feet high, near the settlement has some conspicuous trees on it. Farther southward is a hill covered with bush.

The eastern coast of the island can be approached closely southward of the settlement. The southern point of the island is called Tanjung Si Rapa Rapa, with a village of the same name 1 mile northward of it.

11-86 PULO TELLO VILLAGE is the headquarters of an Administrator and a mission station. The population consists of Niassers, Malays and a few Chinese traders. In 1945 the total numbered about 3,000.

PIERS.—There are two stone piers. The main pier which is about 200 feet long has a reported depth of about 21 feet alongside. There is a flagstaff at this pier.

SUPPLIES.—Small quantities of provisions can be obtained.

COMMUNICATION.—There is regular communication by steamer with ports in Sumatra.

11-87 SIBOLO AND LULUA lie near the northwestern extremity of Pulo Tello, on the southern side of the entrance to the roadstead. Sibolo is conspicuous on account of the 250-foot hill on its northern end. Lulua is lower and fringed by a reef. The approach to the roadstead northward of Lulua has depth over 5 fathoms over a breadth of 400 yards, but the bottom is very irregular. The 4 1/2-fathom patch 1,400 yards westward of Sibolo is separated from it by a deep navigable channel.

11-88 TELLO ROADSTEAD (0°03'S., 98°17'E.) lies between the northwestern extremity of Tanah Masa and Pulo Tello. It is nearly 1 1/2 miles wide in the entrance and 1,500 yards wide between the reefs extending from either side. Within it is about 2 miles in extent, with depths sufficient for all vessels.

DANGERS.—A detached reef, with a least charted depth of 2 1/4 fathoms, lies beyond the coast reef on the western side of the entrance, just within the 10-fathom curve and 1,200 yards from the shore. A patch of 2 fathoms lies 1 1/5 miles northwestward of the detached reef, in a position about 1 mile northward of the east end of Pulo Lulua.

On the east side, the coast reef, which dries, extends about 600 yards off Tanjung Seropi northwest and southwest of it.

A detached reef lies about 800 yards southward of the northern extremity of Pulo Antinang.

A steep-to 3 1/4-fathom patch lies about 1/2 mile northeastward of the aforementioned flagstaff. A rock which dries, marked by a white beacon surmounted by a ball, lies about 600 yards southeastward of the flagstaff.

11-89 ANCHORAGE.—There is a sheltered anchorage off the settlement, in 12 to 15 fathoms, good holding ground, with the flagstaff bearing between 250° and 286°; or in the same depths southward of the drying reef off the village.

TIDES AND TIDAL CURRENTS.—The rise of tide is similar to that at Ayer Bangies. On the whole, the current in Tello Roadstead sets northward on a rising tide, and more weakly to the southward on a falling tide. The flood current runs northward through the channel between Sibranun and Pono, and to the Eastward of Batu Makele, and farther north joins the current from the southwestward, which runs between Tello and the island northwestward of it; thence it trends eastward along the northern coast of Tanah Masa. To the south of Pulo Simondong the flood runs toward Tanah Bala, but to the west of this strait the current is very slight.

11-90 DIRECTIONS.—Vessels bound for Tello Roadstead from the southward, after passing Tanjung Hatik, should bring this point to bear south, astern, and steer north to the channel between Sibranun and Pono. When near this channel, bring the west side of Memong to bear 001°, in range with the east side of Tello, or if the first-mentioned island is not visible, bring Tanjung Si Rapa Rapa to bear north and steer for it; this leads eastward of an overgrown rock eastward of Sibranun. When this rock is abeam, change the course to 012°, steering for a conspicuous tree on a small hill near the west coast of Batu Makele. This leads midway between Sibranun and the drying reef westward of Pono, which reef is steep-to. Steer this course

until the east side of Marit is in range with the east side of Tello, bearing 342°, and follow this range until the east side of Sibranun is in range with Tanjung Si Rapa Rapa, bearing 185°, and then keep this range astern or steer for Tanjung Seropi. When the flagstaff bears 286°, one is well clear of the drying rock marked by a white beacon, and may swing to port, hauling in for the road.

CAUTION.—A 7 1/2-fathom shoal, position approximate, was reported (1948) to lie about 600 yards northwest of the north point of Batu Makele. This position is about on the 185° range mentioned above.

Vessels coming out from Tanah Bala Strait may also pass eastward of Sipika and Batu Makele by steering a northerly course for Pulo Buhluhgia. When Tanjung Fatelesa bears northeast, change the course to 022°, and when the west side of that point bears south, change the course to north. As soon as the south side of Buhluhgia bears west, steer 323°, which leads clear of the sand cays near Pulo Gabaya.

When the west side of Tanjung Fatelesa is in range with the east side of Buhluhgia, one may either pick up this range astern or steer a more northerly course in order to clear the coast reef of Batu Makele, which reef extends for a considerable distance.

When Lulua is well clear of the north side of Tello or the highest peak of Tello is clear of Antinang, steer about 290° until the flagstaff of Pulo Tello bears about 250°; then steer on this bearing to the road.

Going westward of Tello, the passage between Hajau, Bintuang, and Sigata offers a good channel. By holding the west side of Marit just outside the west side of Batu, one runs clear westward of the 4 1/2-fathom reef westward of Sibolo. The west side of Marit in range with the east side of Batu leads safely between this reef and Sibolo. Thence steer either between Batu and Lulua

or (vessels of heavy draft) pass close northward of the first-mentioned island.

Vessels coming from the northward, going east of Biang, and when the north end of Batu Makele bears 161°, steer for it on this bearing until the east side of Sibrannun is clear of Tanjung Si Rapa Rapa, then haul in for the road.

Coming from the eastward and passing northward of Tanah Masa, the north side of Biang in range with the south point of Memong leads well clear of the reef northward of Tanjung Batu Wawa, and the south side of Sibolo just in range with or obscured behind Tello leads clear of the reefs northward of Tanah Masa.

11-91 PONO, SIPIKA, AND PERTAMUAN form in appearance one island; all are hilly. On the southwest side of Sipika are a few green, sparsely overgrown hills. This island, as well as Pono, is fringed by a wide reef which always breaks. The southeast point is low and overgrown with coconut trees. Two reefs with 2 1/2 fathoms of water are located on the east side.

On the northeast point, on a hill, is a very conspicuous umbrella-shaped tree, which from the southward is visible from a great distance. The channel separating the island from Pono is navigable for boats only, the depth at the southern entrance being only 6 feet.

The west point of the reef of Pono is very steep-to. The detached 2 1/2-fathom reef on the southwest side is separated from a large reef by a deep and narrow channel. The large reef always breaks.

The channel between Pono and Pertamuan dries at low water.

11-92 BATU MAKELE is hilly and is separated from Sipika and Pertamuan by a channel which narrows toward the east. This channel is navigable for small vessels, but great caution is necessary on account of the coast reef which extends at the western entrance.

A rock with a depth of 2 1/2 fathoms lies in the middle of the narrowest part, but by keeping along the northern shore this rock is easily avoided. There is no current of importance. At the eastern entrance, on the south side of Batu Makele, is the Nias village of Buhluhia. There is also a drying reef. On the east side of the island are two small islets, the northern of which lies on a long and narrow coast reef.

The hilly Antinang is separated from Batu Makele by a drying channel. On the northeast and northwest sides it is fringed by an extensive coast reef.

11-93 PULO SIBRANUN, south of Pulo Tello, is low, with coconut trees on it, and is fringed with rocks above water on the south and east sides; off its southern side is a noticeable overgrown rock named Nanta, visible from some distance.

The two islands, Hayau and Bintuang, between Sibrannun and Sigata, are low, covered with coconut trees, and fringed by a coral reef. The channel between them is clear.

11-94 PULO SIGATA (0° 08' S., 98° 11' E.) lies about 5 miles southwestward of Pulo Tello. It is about 2.3 miles in length with a hill 382 feet high on its southeast side, forming a conspicuous mark from the southward. The island is flat elsewhere; sago palms are found in the interior, and belts of coconut trees line its coasts. It is fringed by reef which extends farthest on its southern side, and on which the sea always breaks; the depths decrease rapidly within the 10-fathom curve. There are several villages on the island, Bawah Setra, located at the north end, is the principal one.

LIGHT.—A light is normally shown from a hill on the eastern side of Pulo Sigata. The light is obscured by the land between certain bearings.

ANCHORAGE.—The least unfavorable anchorage is off Bawah Setra, in depths of 9 to 10 fathoms, and the best landing place is also

there. Farther south there are boulders along the shore; the west coast is nearly always unapproachable during the whole year, on account of the heavy breakers.

11-95 POPULATION.—The population of Sigata dispersed over the several villages, last totaled 3,000. The people are mostly Niassers.

11-96 THE WEST COAST northward of Tanah Bala Strait slopes up toward the ridge of hills in the interior. Tanjung Seropi is low and overgrown, and has a drying sandbank on the south side. The coast reef extends 500 yards at this place and should not be approached too closely. The coast to the southward as far as 1 mile northward of Pulo Gabaya is clear.

PULO GABAYA is overgrown with coconut trees. On the north side are few huts. The west side is steep. Two reefs with patches of sand, always above water, steep-to on the west side, are situated in the vicinity, and about 1,500 yards northward of the west point of the island, just within the 10-fathom curve, is a rock which dries at low water.

TANJUNG FATELESA is low. A small stream discharges into the sea a little to the eastward of it. A 2 1/4-fathom reef is located about 650 yards northward of Tanjung Fatelesa, just within the 10-fathom curve. To clear this reef do not let Tanjung Fatelesa bear westward of south.

PULO BUHLUHGA, overgrown with coconut trees, is separated from the shore by a deep channel; it is also separated from Batu Makele on the west side by a navigable channel about 200 yards wide.

11-97 PULO SIMONDONG (0°10'S., 98°24'E.) lies close off Tanjung Sepremong at the northern entrance to Tanah Bala Strait, and separated from the point by a shoal channel. It is overgrown with coconut trees and fringed by a reef.

Tello Tello Gedang and Tello Tello Kechil are two islets northwestward of the northern extremity of Tanah Bala, the first of which may be recognized by a pointed hill thickly covered with coconut trees on its southern side; the second is entirely flat, but is also overgrown with coconut trees. The channel between them has irregular depths of 2 1/2 to 5-fathoms and should not be used.

SAMALEKO, between Tello Tello Gedang and Tanah Bala, is separated from Tanah Bala by a channel with a depth of 6-fathoms, but it should not be used without local knowledge, as the reef fronts Tanjung Pasalahang to a distance of 800 yards. The island is low with the exception of a small hill on the northwest side. The northeast coast is clear of dangers.

TANAH BALA is the southernmost large island of the Batu group. It is about 22 miles in length north and south and with an average breadth of 7 miles, tapering to its northern extremity. On its northern part is a hill 886 feet in height, which appears pyramidal in shape from the east and northwestward.

The hill, 230 feet high, within Tanjung Hatik, its western extremity, is visible from a considerable distance from the northward, appearing as a separate island. The whole island is thickly wooded and but for an occasional spot on the eastern coast is uninhabited. It forms with Pulo Bojo, off its southern end, on which is a lighthouse, the northern shore of Siberut Strait.

11-98 PULO MAKOLE (0°16'S., 98°23'E.) has a cone-shaped hill 226 feet high on its northern end, a conspicuous tree on its southern end, and is visible from a distance of 15 miles. It is surrounded by a reef on which two large boulders off the north side may be seen. It should not be approached within a depth of 10 fathoms. Two sunken reefs, with 3 3/4 fathoms and 1-fathom, lie outside the 10- (continued on page 407)

fathom curve northeast and southeast of the island, respectively. There are a few inhabitants on the eastern side.

Rocks.—At about 3 miles northwestward of the hill on Makole are two islets always visible on the northern end of a reef with $2\frac{3}{4}$ fathoms of water. Between it and Makole there is a reef with 5 fathoms of water.

Shoals.—A small coral shoal, with a depth of $5\frac{1}{2}$ fathoms lies 8.5 miles 247° from the northern extremity of Pulo Makole; it sometimes breaks.

A shoal, with 5 fathoms, lies about 3 miles northward of Tanjung Hatik. It is 800 yards in extent, with deep water around; it is sometimes marked by breakers.

11-99 Tanjung Pasalahang is the northern extremity of Tanah Bala; the islands in the offing have been described. The coast between it and Pulo Barogang, joined to the coast of a rocky ledge at 4 miles to the southward, forms a deep bay with a drying reef near the shore.

Southward of the island the coast is clear with the exception of a $2\frac{3}{4}$ -fathom patch just within the 10-fathom curve off Tanjung Chekeh, low, with high trees. The whole coast is low but for the rocky Tanjung Boh, within which there is a conspicuous hill.

Tanjung Halinawiro Gedang is low and inconspicuous; the depths within the 10-fathom curve shoal rapidly. To the northward the coast may be approached closely.

Tanjung Fopanua should not be approached within 1,000 yards as the coast reef extends about 500 yards. The point is covered with high trees. Northward of the bay eastward of Tanjung Fopanua the west coast of Tanah Bala presents few landmarks.

A shoal, with 5 fathoms, lies about 2.5 miles northwestward of Tanjung Fopanua. It has depths of about 20 fathoms around, and is marked by rollers.

Anchorage.—The bay within Tanjung Fopanua, 2.5 miles within Tanjung Hatik, affords sheltered anchorage from westerly and southwesterly swell, in $5\frac{1}{2}$ to 6 fathoms; a hill, 413 feet high, with a densely wooded summit and located about $3\frac{1}{4}$ miles eastward of Tanjung Hatik, is a useful mark for approaching the anchorage.

11-100 Tanjung Hatik, the western point of Tanah Bala, is rocky, thickly wooded, and has a hillock on it which renders it conspicuous. From northward, Tanjung Hatik can be mistaken for an island.

Tanjung Itano Makinu is the southern extremity of the island; between it and Tanjung Hatik there is a bay with an overgrown rock, 7 feet high, connected to the shore by a drying ledge; this coast is not accessible on account of the breakers. There are two bays eastward of Itano Makinu; the eastern between Tanjung Duru and Nanaeh is of no use as an anchorage; the one close eastward of Itano Makinu has an overgrown rock about 10 feet high on a drying reef in its center; elsewhere it is clear. Vessels can lie sheltered here in the northwestern corner in depths of 6 to 7 fathoms. Patches of 4 and 5 fathoms lie off Itano Makinu; the 10-fathom curve is about 1 mile offshore.

A patch of 8 fathoms lies 1.5 miles eastward of Tanjung Nanaeh, the southeastern extremity of the island.

Pulo Bojo, off this coast, see Siberut Strait.

11-101 East coast of Tanah Bala.—The eastern coast of Tanah Bala trends northward for a distance of 22 miles to its northern extremity. The northern part for a distance of 10 miles forms the west side of Tanah Bala Strait, which lies between Tanah Bala and Tanah Masa and leads to Tello Roadstead in smooth water.

11-102 Coast.—From Tanjung Nanaeh, the coast forms a slight bay between it and Pulo Orasa, 4 miles to the northward, in which lies Pulo Sigogolo, a small hilly islet,

difficult to identify, separated from the coast by a narrow channel with a depth of 14 fathoms; a reef extends northwestward of the islet. A house with a zinc roof is situated on the west side of the islet.

Two streams flow into this bay, the Luaha and Sibuha, but their mouths dry. There are a few inhabitants south of the streams.

11-103 Pulo Orasa, 3 miles farther northward, and about $\frac{3}{4}$ mile off the coast, may be recognized by its odd shaped trees; there are coconut trees on its northern and western sides. The eastern side of the island is rocky but free from danger; two 3-fathom reefs lie near its southern side.

Nujagia and Hibau lie northward of Orasa, and are covered with coconut trees; here are reefs extending from Tanah Bala, obstructing the channel inshore of them. The easternmost reef, with $4\frac{1}{2}$ fathoms, lies 1.3 miles from Orasa; the eastern point of that island bearing westward of 187° , leads eastward of it.

Simakonde, a small islet, lies in the small bay southward of the entrance of Tanah Bala Strait, separated from the shore by a channel with depths over 10 fathoms. Small craft find good anchorage westward of the islet. A reef with 1 fathom of water lies northward of the islet. A small stream discharges here, but is barely navigable by proas for a short distance.

11-104 TANAH BALA STRAIT $0^\circ 24'S.$, $98^\circ 31'E.$.—The southern entrance of Tanah Bala Strait has an average width of 1 mile. It divides Tanah Bala from Tanah Masa, and is a very convenient channel by day for vessels with local knowledge from Padang to Tello Roadstead, and vice versa. It is always calm. The coast on both sides is low, and the western or Tanah Bala side is almost completely overgrown with mangroves. The Tanah Masa side is higher, with coconut trees in places. The least depth in the navigable channel is 7 fathoms.

Pulo Nujambolo lies in the southern entrance; it is low and covered with coconut

trees. The channel is clear to close inshore on the Tanah Mesa side, but on the southwestern side of it a reef extends 400 yards.

About 1.5 miles northwestward of Nujambolo, on the coast reef of Tanah Bala, on the north side of a deep cove, are two small islands which are overgrown with mangroves.

Tegawa Gedang is visible from a great distance on account of a couple of large trees which at some distance give the appearance of but one tree. It is partly overgrown with mangroves, and there are some huts on the southeast side where it is also partly covered with coconut trees. In navigating the strait, this side should not be approached too closely on account of the coast reef. The island is separated by a 4-fathom narrow channel from Tegawa Kechil, which is completely overgrown with mangroves. Both islands are separated from Tanah Bala by a deep channel, which, however, is not recommended on account of the reef extending northwest from Tegawa Kechil and the reef which extends from the coast.

11-105 Nujalalei is mostly covered with coconut trees; there is a stone pier, accessible to small craft at high water only. There is a flagstaff on the pier.

The northwest side of the island is low and submerged at high water. It is separated from Tanah Masa by a narrow channel with depths of 3 to 9 fathoms. Farther northward, on the west side of the strait, are the islands of Somoloko and Tono, both of which are overgrown with mangroves. The latter is inconspicuous. On the east side is Sorobuna, likewise low and overgrown with mangroves. There are a few huts on the west side which may be approached close-to.

Reefs.—Beside the reefs located near the coast and which need not be feared, the following dangers should be mentioned:

A reef with 2 fathoms lies about 1,000 yards northward of Nujambolo. This reef is distinguishable by discolored water only under very favorable conditions.

A drying reef, always visible, with a sand patch, about 500 yards northwestward of the above-mentioned 2-fathom reef, the two being separated by a deep channel. By keeping the west side of Nujambolo just east of south, this channel is easily navigated.

About 1.3 miles northward of Nujambolo, detached from the coast reef of Tanah Masa, is a small reef with 3 feet of water; it is rarely visible. The west side of Tanah Masa is in range with the east side of Tegawa Gedang on this reef. Westward of this line, the depths increase rapidly to 10 fathoms and more.

The Buni Kechil and Buni Gedang are reefs with sand patches, northwestward of Pulo Sorobuna. On both there are signs of vegetation.

11-106 Directions.—Entering the strait from the south it is preferable to go eastward of Nujambolo.

The east point of Tegawa Gedang, bearing 330° , leads clear of the 2-fathom and 3-foot reefs northward of Nujambolo. Keep this range until the northern of the two mangrove islands on the coast reef bears 247° . One has then passed the 3-foot reef and can steer for the northwest point of Nujalalei. When the south point of Tegawa Gedang bears west, one may steer midway between this island and Nujalalei, after which the navigation of the strait presents no difficulty.

Vice versa, leaving the strait, when the south side of Tegawa Gedang bears west, one may shape course for the middle of the passage between Nujambolo and Tanjung Seiro, taking care after passing the $3\frac{1}{2}$ -fathom reef to pick up the bearing given above astern.

11-107 Pulo Pini, situated between Tanah Masa and the coast of Sumatra, has no distinguishing features. It is about 20 miles in length east and west by about 6 miles in breadth, densely overgrown, sparsely populated, and has no navigable streams; its points are inconspicuous and are quickly lost to view. The southeastern extremity, Tanjung Pasingarang, is low and joined to the actual island by a narrow strip of land, so that at a distance it appears as an island.

Tanjung Labuan Bajau, westward of it, on the southern coast is easier made out from its tall trees.

Tanjung Besar, situated 7.3 miles westward of Tanjung Pasingarang, is marked by a reddish-brown patch, while the western point, Tanjung Batu Belobang, is conspicuous, as its name implies, owing to a number of holes in its rocky face.

Tanjung Antimonang, the central point of the northern coast, is most noticeable from the northward; to the westward of it are some small trees visible for a long distance from the west and northwestward.

The island is surrounded by a coral reef, excepting that portion on the northern side between Tanjungs Antimonang and Batu Batu, where the coast can be closely approached. It may also be approached at its southwestern point, and on its south coast westward of Tanjung Rima and Tanjung Besar. Landing, however, is difficult because of the mangroves.

11-108 Dangers northward of Pulo Pini.—Laut Reef ($0^{\circ}17'N.$, $98^{\circ}42'E.$), with $1\frac{1}{4}$ fathoms least water, lies about 6 miles off the north coast of Pini. Depths of less than 6 fathoms extend about $\frac{1}{2}$ mile southeastward from the reef. Laut Reef is difficult to distinguish.

Liat Batu Reef, of coral and rock with $2\frac{1}{4}$ fathoms least water, lies 5 miles southeastward of Laut Reef, and $4\frac{1}{2}$ miles from the island. A small reef, with a depth of 4 fathoms, lies 1.5 miles southward of Liat Batu.

A reef, about 500 yards in extent, with a depth of $4\frac{1}{2}$ fathoms, is situated 11.5 miles, 310° from Laut Reef.

Pylades Reefs have been mentioned in connection with the Sumatra coast.

There are numerous other detached shoals lying up to 6 miles off the north coast, for which the chart should be consulted.

11-109 Dangers east and southeast of Pini.—Ular, a small high islet, covered with coconut trees, lies about 3 miles eastward of the eastern point of Pulo Pini, with reefs between.

Reefs extend 6 miles northward and about 4 miles eastward of Pulo Ular, as charted, and should be given a wide berth.

Karang Ular is usually hard to make out. It lies about $3\frac{3}{4}$ miles east-northeastward of Pulo Ular and has a depth of about 1 foot.

From it the southern side of Pasingarang is in range with the north side of Pulo Ular.

Gosong Ular, a reef about 1 mile long north and south, which dries and on which there is a tree, is situated about 1 mile south-southeastward of Karang Ular, with depths of 7 and 8 fathoms around. There is a drying sand patch on it.

A 1-foot patch lies about 1,600 yards south-southeastward of Gosong Ular.

Pulo Sambulaling, low and narrow, is situated about 3 miles southeastward of Pulo Ular; Pulo Anso is situated about 1 mile southward of it; both islets lie on a reef surrounded by detached patches. The former is covered with coconut trees, while Anso is wooded and has one conspicuous tree. They are visible from a distance of about 13 miles.

Karang Sambulaling, on which there is a rock that dries at low water is surrounded by depths of 14 fathoms, and lies 065° distant 1.5 miles from Pulo Sambulaling; it often breaks.

Karang Anso, the northern side of which dries, lies 180° , distant 1.5 miles from Pulo Anso; it always breaks. A reef lies north-northeastward of Karang Anso, and 1.5 miles eastward of Pulo Anso there is a large reef.

A reef, with several $2\frac{1}{2}$ - to 5-fathom patches, lies at a greatest distance of 3 miles southwestward of Karang Anso. Beside the shoals mentioned, there are numerous shoal patches off the east coast, for which the chart should be consulted.

Pulo Bakau, low and inconspicuous, is situated on the coast reef near Tanjung Feibu, the eastern extremity of Pini.

11-110 Islands and reefs on the southern coast.—Ujung Bakau Reef, which has a depth of $1\frac{1}{4}$ fathoms and breaks, lies $2\frac{3}{4}$ miles east-southeastward of Tanjung Besar; it lies 1.5 miles from the coast. A $1\frac{3}{4}$ -fathom patch, marked by a white beacon surmounted by a red cylinder, lies close northward of Ujung Bakau Reef.

A $1\frac{3}{4}$ -fathom patch lies about 1 mile south-eastward of Ujung Bakau Reef.

Tonga Reef, which dries at low water, lies about 2 miles southwestward of Ujung Bakau Reef.

Southward of these reefs and off the eastern point of Pini, as well as in the vicinity of the islands and reefs mentioned hereafter, are numerous detached patches, some which dry, for which the chart should be consulted.

11-111 Montrado Reef ($0^\circ 04' S.$, $98^\circ 43' E.$) (*H.O. Chart 3122*) has several boulders which dry at low water, and is generally marked by breakers; it has depths of 30 to 32 fathoms around it. Pulo Treba Besar lies $7\frac{1}{2}$ miles west of it. Westward of this reef there are various drying and other reefs obstructing the whole channel.

Pulo Masin, $5\frac{1}{2}$ miles westward of Tanjung Besar, is a low, flat island, densely overgrown and surrounded by a reef, which extends about 1 mile south-southwestward from it. A beacon marks the extremity of the reef. Between the island and Pulo Pini there is a deep, narrow passage. On the island is a very conspicuous tree visible from a considerable distance to the east and west.

Three islands, named Kasi, Pasakek Besar, and Pasakek Kechil, lie to the southward of Pulo Masin; Kasi is an overgrown sandbank, on an extensive reef, and the other two islands are small, low, wooded, and each surrounded by a reef.

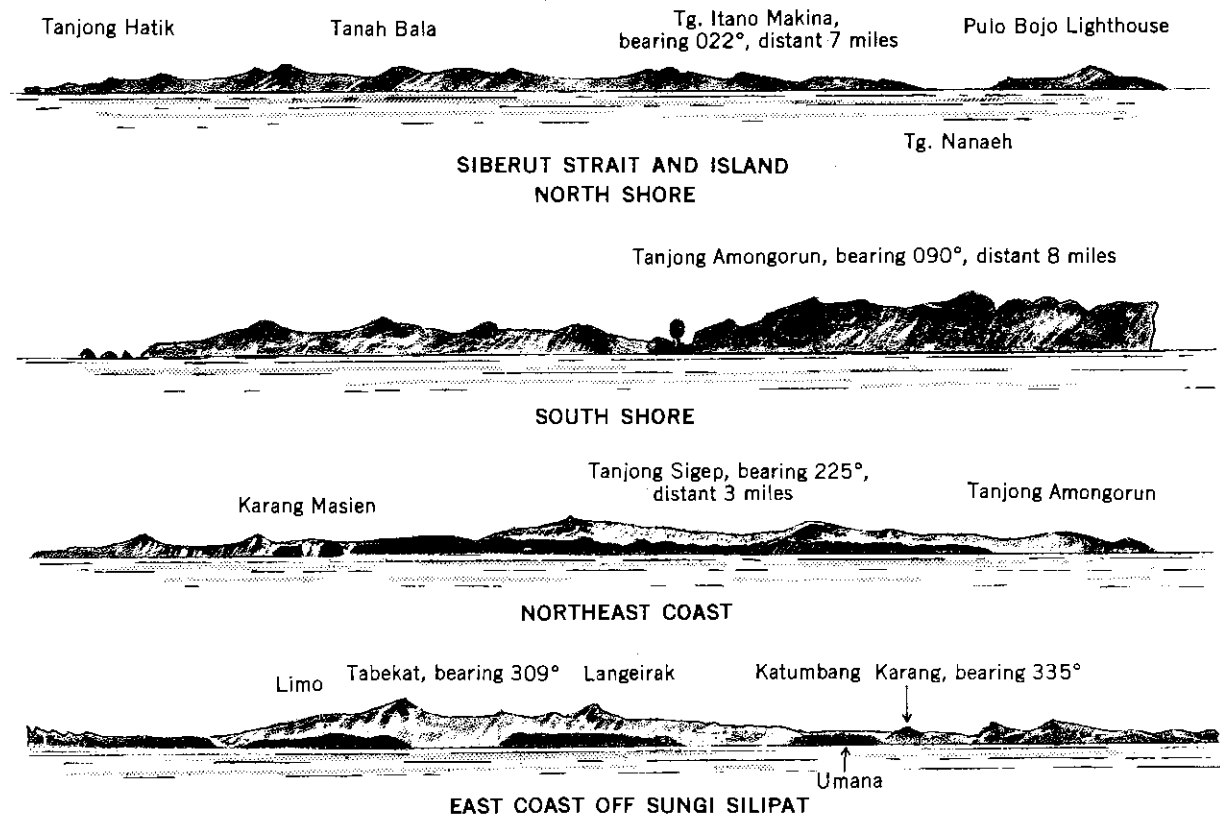
Southward and between these three islands there is no suitable channel on account of extensive reefs, some with drying sand patches. These reefs practically block the passage between the islands and Bai.

Kayu Arau is a partly drying reef, detached from shore, about 3.5 miles westward of Pulo Masin. It is frequently marked by breakers.

Reefs off the west coast.—Off Batu Belombang, within the 10-fathom curve, which, northwestward of the above point, is 2 miles removed from the coast; the depths are very irregular and numerous patches from $2\frac{1}{2}$ to 5 fathoms surrounded by deeper water are found.

It is not advisable to approach the coast within the 10-fathom curve.

11-112 Siberut Strait, between Pulo Bojo and Siberut, is 21 miles wide, and the passage usually taken by steamers running between Aceh and Batavia via Padang. Since the survey of Siberut Strait in 1877, and the establishment of a light on Pulo Bojo, as



well as the safe anchorage afforded in the southern portion of the strait, most vessels will find it to their advantage to use it in preference to any other.

Tides and tidal currents.—It is high water, full and change, in Siberut Strait during the northwest monsoon at 7 hours 30 minutes; springs rise $2\frac{1}{2}$ feet.

The vertical movement of the water in Siberut Strait belongs mainly to the double-daily system and corresponds with that of Pulo Tello. The currents are irregular and depends on the prevailing wind. The strongest currents are found close to the shores, where, to the northward of Tanjung Sigep and between Pulo Bojo and Tanah Bala, they sometimes attain a rate of 2 to 3 knots in an east-northeast and opposite direction. During the westerly monsoon the flood or easterly current is sometimes overcome and even reversed by the westerly current which then runs. The ebb is increased by this current and, running in a west-southwest direction, has a rate of about 3 knots. For several successive days during the survey by the Netherlands Governments surveying vessel, westerly and easterly currents were observed, the former usually being the stronger. After a few days without much wind the current turned at about high and low water. The flood current, which runs in an east-northeast direction inshore between Pulo Bojo and Tanah Bala, spreads itself out like a fan eastward of the strait, a part of it trending northward along the coast of the latter and the remainder in an east-southeast direction. At the entrance to Tanah Bala Strait the northerly portion meets the currents from that strait. In this locality the ebb current divides and runs northward through Tanah Bala Strait and to the southward to Pulo Bojo in Siberut Strait. There are northeast and southwest currents on the northeast and southwest ends of Van Bylandt Reefs, while

the current across these reefs was found to attain a maximum rate of $1\frac{1}{2}$ knots in both directions.

On the eastern coast of Siberut the flood runs to the southward and the ebb to the northward.

11-113 Winds.—From November to May, when the northwest monsoon prevails south of the Equator, the weather is fine in Siberut Strait, with light southerly and southwesterly winds. The wind is rarely stronger than force two; in March and April strong westerly squalls lasting about 10 minutes may be experienced; in the other months of the monsoon rain squalls with little wind may be expected. A hurricane has been known to occur during the above period. Over the Sumatra coast lightning was observed every evening, accompanied by clouds, which, when the land wind set in, passed out to sea toward Siberut, where they dispersed. At this time of the year there is always rain at night between Siberut and Padang. The wind during the day was mainly a light breeze from northwest in Siberut Strait and at night southwest and southerly. Thunder clouds massed over the islands during the afternoon, but they generally dispersed as they passed out to seaward.

If the wind shifted to south during the southeast monsoon period, which usually occurs between June and September, hard northwesterly and westerly winds prevail in Siberut Strait, accompanied by heavy squalls.

Surf.—There is generally a long line of surf on the shores of the strait, particularly on its northern and western portions. In the eastern portion and under the Siberut shore there is shelter from the sea which causes heavy surf on the northern shore, where all the dangers are stated to lie within the 3-fathom curve.

11-114 North shore.—The south coast of Tanah Bala forms the north shore of Siberut Strait, and has been described with that island in the preceding pages. Tanjung Hatik, its west extremity, is rocky, and has a conspicuous clump of trees resembling a hillock.

Pulo Bojo, lying about $1\frac{3}{4}$ miles southward of the southeastern extremity of Tanah Bala, is $2\frac{1}{2}$ miles in length in a north and south direction, $1\frac{3}{4}$ miles in breadth, and 462 feet in height. It is hilly and densely overgrown; the lighthouse and a conspicuous tree are visible from a considerable distance from the east and west, but there are no other conspicuous points. Bojo is nearly surrounded by a reef, which is 600 yards wide in places; the 10-fathom curve is nowhere more than 1,200 yards offshore, when it drops into deep water. The channel between it and Tanah Bala is clear of danger. The island is uninhabited except for the lighthouse staff.

Light ($0^{\circ}39'$ S., $98^{\circ}31'$ E.)—A light is shown on the south side of Pulo Bojo.

Anchorage.—Near the northeast point of Bojo is a landing place for boats and a boat shed, from which a path leads to the lighthouse. The shore can be approached quite closely by holding the above-mentioned shed just to the right of a small white beacon located near the water, but under no conditions should one anchor in less than 30 fathoms of water.

11-115 Dangers.—North shore.—Van Bylandt Reefs (*H. O. Chart 3122*) consist of several patches with a least depth of 2½ fathoms, and are located about 7 miles east-northeastward and eastward of Pulo Bojo. The bottom consists of coral, sand, and stones. The west side is very steep, but on the east side the depths increase more regularly. Vessels will pass southward of them by keeping the lighthouse bearing

270° , or northward of that bearing. The shallow spots often break.

11-116 South shore (*H. O. Chart No. 3123*).—The north end of Pulo Siberut, 15 miles in length in an east and west direction, forms the southern side of Siberut Strait. It is low, but covered with tall trees. Tanjung Siopa, the northwestern extremity, is a rocky point, from which a sandy beach, fronted by a reef to a distance of 600 yards, trends northeastward to Boompjes Hoek, a distance of 3 miles. Boompjes Hoek is a double point with a conspicuous white rock on the western head, visible from some distance northward; there is also a remarkable tree on it, which is only seen from the eastward. With the exception of Boompjes Hoek the whole shore is sandy. Tanjung Sigep, the eastern extremity, is low and thickly wooded.

The hills within have no conspicuous summits; the highest reaches a height of 1,332 feet, and is cone-shaped.

A bank, with general depths of under 20 fathoms, extends for a distance of 14 miles from the north end of Siberut, or more than halfway across the strait, and has a breadth of about 12 miles. The 100-fathom curve is joined to that of the Batu Islands.

11-117 Macasser Reef ($0^{\circ}48'$ S., $98^{\circ}37'$ E.), with less depth than $2\frac{1}{2}$ fathoms, supposed to be $\frac{1}{4}$ to 1 fathom, lies near the western extremity of this bank; it is easily recognized in the daytime by the high breakers on its shallow portion. The reef extends 1 mile beyond the breakers, and the 100-fathom curve lies $1\frac{1}{2}$ miles beyond except to the east and southeastward of the reef.

Reefs.—There are five patches of reef, with depths of $3\frac{1}{4}$ to 5 fathoms on the bank, all marked by discoloration. The patch located $6\frac{1}{3}$ miles 322° from Tanjung Sigep is only visible during a westerly swell. In addi-

tion to these patches, there are several others with less than 10 fathoms in the neighborhood of the two northernmost dangers. Under ordinary circumstances these ridges are marked by tide rips. Eastward of Tanjung Sigep the depths runs sharply down into 100 fathoms or more.

Shoal water extends from the southern shore of the strait in places.

Anchorage.—The best anchorage on the northern coast of Siberut is between Boompjes Hoek and the point next westward of Tanjung Sigep, where the depth is about 11 fathoms, about $1\frac{1}{2}$ miles from the shore, deepening quickly to 12 and 14 fathoms farther out; or a berth may be taken up 1,000 yards off the shore, in 5 or 6 fathoms, sand, avoiding charted dangers. There is also anchorage, over sand, in 10 to 15 fathoms, with the northeast extremity of Tanjung Sigep bearing about 120° .

The coast between Tanjung Sigep and the next point westward of it is steep.

11-118 Directions.—Vessels approaching Siberut Strait from the westward should steer to pass about 2 miles southward of the western point of Tanah Bala, and will sight Pulo Bojo with its lighthouse. The best course is to pass between Pulo Bojo and Macasser Reef, which is clear of all danger, and the reef is nearly always to be seen by the breakers. The island should be passed at a distance of 2 or 3 miles, steering about 090° , until Tanjung Sigep bears 155° , when a course may be shaped for the desired port.

A course may also be shaped by day along the northern coast of Pulo Siberut, passing Boompjes Hoek at a distance of 2 miles, and Tanjung Sigep, the eastern point, at about 1 mile; by this means the patches are avoided. In this track anchorage may be taken anywhere in moderate depths over sand, while northward of Macasser Reef there is no anchorage.

Vessels from Padang or elsewhere passing westward through the strait in thick weather may be affected by a cross current whose directions can not be given, but they usually follow that of the wind, with the consequence that a vessel may be swept onto the shoals on the ridge. The lead should be kept in constant use until the position of the vessel is assured.

By night.—From the westward steer for Pulo Bojo Light bearing 090° , pass southward of it at a distance of about 2 miles, thence bring it to bear 276° , and steer 096° , using it as a stern mark, which will lead 3 miles northward of the reefs on the eastern side of the bank.

From the eastward steer for the light bearing 276° .

11-119 MENTAWI ISLANDS—General Remarks.—The Mentawi Islands consist of four large inhabited islands, namely, Siberut, Sipora, North and South Pagai, and of several smaller, which are not inhabited. They are of volcanic formation, and earthquakes occur from time to time. They are hilly.

The temperature and climatic phenomena vary considerably on the eastern and western coasts. When the wind is blowing hard from the west or northwestward on the western coasts there are sometimes fresh easterly winds on the eastern coasts.

There are no definite wet and dry seasons.

Westerly and northwest winds usually bring rain, but the rainfall is also heavy in the Southeast Monsoon period. At these times the weather is very variable, and days of rain are succeeded by bright and clear weather.

The eastern coasts are particularly unhealthy.

Discolored water is often met with off the east coasts of Mentawi Islands. Every time the Dutch vessel, employed on the survey of

this locality, passed such patches, soundings were taken, but no bottom was found with 100 fathoms of wire out.

11-120 Pulo Siberut is about 60 miles in length and from 15 to 24 miles in breadth. It is the northernmost large island of the Mentawi Island group.

It is a fairly high island, wooded, without any conspicuous points, and with low stretches of foreshore which the constant accumulation of stone deposits have formed. These flat stretches along the coast are covered by the rising tide and farther inland become extended marshes which dry sufficiently to be walked over after persistent droughts, but which are submerged in the rainy season. The east coast is almost entirely overgrown with mangroves and has a few sandy beaches. The west and south coasts are nearly all sandy beaches, on which there is a constantly breaking surf, making landing difficult. There are several sheltered anchorages on the east coast. The north coast has been described in section 11-116.

All the rivers of any importance discharge on the east coast and have bars at their mouths. They are passable only to boats.

Several small islands lie close to the coast on the eastern side; others interspersed with shoals lie off the southwest and southern sides.

11-121 Villages.—The villages of the Mentawi Islands are small and rarely exceed 100 inhabitants. Siberut, located on Pulo Siberut, at its southeast end, is the only village of any importance. A Government official resides here. The inhabitants of the islands live mostly in the interior as the coastal areas are generally swampy. In language, customs and appearance, the people are unlike those of Sumatra and their origin is uncertain. They are very primitive and wear but little clothing. Both sexes are generously tattooed. The people are peaceful and honest, but very shy.

11-122 East coast.—There are a number of islets and reefs at from 1 to 1½ miles offshore between Tanjung Sigep and Tabekat Bay.

Labuan Bajau Bay, close southward of Tanjung Sigep, is deep but the entrance to the inner part is very difficult on account of

reefs, difficult to distinguish, and nearly drying at low water. A deep basin is formed to the southward of these reefs, which basin is clear to the westward within a short distance of the shore. On the east side of the basin a drying coast reef and rocks with little water extend 500 yards offshore.

In the southwest corner is a conspicuous grove of casuarina trees, southward of which is a shoal channel 200 yards wide, which communicates with the inner bay. This is 1 mile long in a north and south direction and has a width of 1,000 yards. The banks are lined with mangroves. The depth in the middle is 13 fathoms over mud, but the entrance is difficult even for vessels of light draft.

Anchorage.—Southward of Tanjung Sigep, about 100 yards offshore, is anchorage in 16 fathoms, sand, sheltered against westerly winds, with Masien just clear of the south point of the bay. On the shore, which here is sandy, is a hut which serves as shelter for the traders who frequently enter the bay in order to obtain rotan and other wood products. These vessels anchor close to shore in 4 fathoms of water.

11-123 Pulo Masien, located 4 miles southeastward of Tanjung Sigep, is a small wooded island surrounded by a sandy beach and encircled by a coral reef which, southeastward of the island, dries at low water.

The coast in this vicinity is also fringed by a drying reef, is overgrown with mangroves, has many indentations, and is practically uninhabited. Only on the point westward of Masien is a large house and a coconut plantation.

Near the shore are a couple of islands, of which the larger is more conspicuous by a conical peak with a slowly rising side.

Within the outer belt of reefs are various drying and other reefs, frequently separated by deep channels, which, however, do not form suitable channels.

Anchorage.—Southward of the reef extending from Masien and the partly-drying coast

reef westward of it is an area about 1 mile wide which furnishes a good anchorage in 6 fathoms with Tanjung Sigep and the south point of Labuan Bajau Bay in range, bearing 321°.

11-124 Directions.—To reach this anchorage, coming from the northward, steer 182° for Pulo Karang, 3¾ miles southward of Masien, and run in this way between the reef of Masien (always visible) and the coral patches with 2¾ to 4 fathoms southeastward thereof until Masien is in range with Tanjung Sigep, then haul in for the anchorage. Coming from the southward or eastward, one may steer for Tanjung Sigep in range with the south point of Labuan Bajau Bay, bearing 321°, and safely follow this range between the reefs up to the anchorage. For small vessels there is a sheltered channel from this anchorage, leading southward close inside the outer belt of reefs. On a line joining Masien and Karang one runs between the reefs, which ordinarily are marked by discolored water. One is further aided by a drying sand patch which lies on the steep west side of the long, partly drying reef northward of Karang, which island may be approached closely on the northwest side.

A small reef, south-southwest, distant 500 yards from this island, is easily avoided as it usually breaks.

Eastward of Pulo Karang is a shoal cove, about 1 mile wide and 2 miles long, formed by a tongue of land on the east side.

11-125 Tabekat Bay which affords a good anchorage is formed by an indentation in the coast 9 miles southward of Tanjung Sigep and is sheltered by a few islands and reefs. By the projecting mouth of the Tabekat River, off which a mud bank extends for a considerable distance, a southern basin is formed which affords shelter against all winds. Northward of

the mouth the coast is steep and the 10-fathom curve is only about 100 yards offshore.

Pulo Umajorong, which does not stand out sharply against the background, is located just northward of the mouth, close to shore. A reef extends from the north side of this island.

The southern basin is sheltered by the islands of Limo and Langeirak.

Limo is connected to the shore by a narrow ridge of sand overgrown with casuarina trees. The island is low and overgrown with mangroves and is steep-to on the west side. On the east side is a narrow drying reef.

Langeirak is a long and narrow island and is also steep-to on the west side, where there are a couple of huts. Elsewhere it is fringed by a drying coast reef from which a ridge with depths from 1 to 4 fathoms extends up to 800 yards offshore on the south side.

Pulo Umana and Katumbang, located farther northward, are separated by a narrow channel, which, however, is unsafe on account of the presence of three reefs, two of which dry at low-water springs.

A drying reef, steep-to, is separated from the south side of Pulo Umana by a narrow channel with depths from 7 to 8 fathoms. The reef is marked by breakers.

Tabekat, 935 feet high, is the highest hill on this part of the coast; seen from the eastward and southeastward it has a rather sharp summit.

Anchorage may be obtained in the south basin of Tabekat Bay in 8 to 10 fathoms, perfectly sheltered.

11-126 Directions—North entrance.—From the offing, steer for Tabekat Hill in range with the southern extremity of Pulo Umana, bearing 283°, until Pulo Karang comes in range with the sand cay, about 1 mile southward of it, bearing 339°, when a course of 260° should be steered between the drying reef southward of Umana and the

drying spot on the northern end of Pulo Langeirak Reef. This passage is about 600 yards wide, and the reefs on either side are steep-to. When the whole of Pulo Limo is open westward of Langeirak, a vessel may anchor or proceed into Tabekat Bay, keeping along the coast of Langeirak to avoid the spit off the mouth of the river and take a berth as desirable.

South entrance.—Steer for the northern extremity of Pulo Limo, bearing 282° until the eastern side of Pulo Umana is in range with the eastern side of Pulo Langeirak, then steer 304° for Pulo Umajorong, anchoring as required. The northern entrance is the wider, and therefore preferable for a steamer.

Tabekat River has a drying mud bank about 600 yards in extent fronting its mouth; it can only be entered by boats at high water. In the river there are depths of from 2 to 3 fathoms and boats can ascend about two hours' journey to a village whose inhabitants are friendly, and where the stream is about 10 yards wide. The banks of the river are thickly overgrown with mangroves and nipa palms.

11-127 Ujung Sikabalu (*H. O. Chart No. 3123*), $4\frac{1}{2}$ miles southeastward of Tabekat Bay, is very conspicuous from the north as well as from the south as the long row of high casuarina trees suddenly ends northward of it and the rhizophoras begin. It is less steep northward of this point and there is good anchorage under the shore in about 15 fathoms of water.

Silipat River flows into the sea at this point and the bank extends a considerable distance into the sea. A large house among several smaller ones is very conspicuous.

Between this point and Ujung Uwai, $4\frac{1}{2}$ miles farther southward, are several reefs of which one dries.

11-128 Telok Silogui (Silogoei) lies about 11 miles southward of Tabekat Bay. It is about 1 mile in length, east and west, and the entrance is 1,600 yards in width; it has general depths of 18 to 28 fathoms.

A reef, with a depth of $1\frac{1}{4}$ fathoms, steep-to, is situated in the entrance in a position about $\frac{1}{2}$ mile southward of the northern entrance point. A reef which dries lies near the northern shore, and a similar reef lies near the southern shore, as charted. Silogui River discharges into Telok Silogui.

Anchorage.—There is anchorage off the mouth of the river, in a depth of about 20 fathoms.

Telok Sipompong, about 5 miles southward of Telok Silogui, is about 1 mile in length. There are two smaller coves to the northward, Telok Bakeh and Telok Sibelong, which are of no importance. Off the entrance is the low, overgrown island Tabanan, which, if entering the bay, is best left to the northward.

Sipompong River discharges at the southwestern end of the bay. The water deepens very suddenly off the mouth of this river. There is a settlement of traders near the mouth.

About 4 miles westward of this bay is a conspicuous hill of which the northern summit is blunt and the southern sharp. Midway between the two is a conspicuous tree.

11-129 Saibi Road.—Westward of Pulo Panjang Saibi, which has a peculiarly shaped shallow cove with a narrow entrance, is a very well-sheltered anchorage.

Off the Muara Saibi, where there is a settlement of traders, is a mud and sand bank, wide and steep-to. Small vessels may anchor on the east point of the bank in 5 fathoms of water. The Gosong Saibi di Tengah, during the survey, was always visible. The

Kasih Gosong Saibi is a drying reef with a sand patch. It was formerly an overgrown island.

The former Saibi village was situated on a few hills northward of Muara Saibi near the very conspicuous, light green hill Segunei. The remains of a pier, houses, and sheds are still visible.

Directions.—Coming from the southward and intending to anchor behind Pulo Panjang Saibi, steer 277° for a few conspicuous trees on the east side of Ujung Ayer Memboseh. This lead between the reefs. The above-mentioned trees are easily recognized from the offing as they stand among the rhizophoras and are somewhat fan-shaped.

The passage between Ujung Melakopah and the islet southwest of Panjang Saibi is clear and easily navigated without special aids, and one is not hampered by the current.

Telok Ayer Memboseh is of no importance on account of the 1-fathom reef in it.

Telok Mototoin and Telok Labuan Korong are clear bays which penetrate into the land for some distance. The latter may be safely entered on a southwesterly course.

Coast.—Laki Laki Hill, 650 feet in height and lying near the coast, is conspicuous from both northward and southward.

Labuan Bulu Bulu is of importance only to native craft as there are numerous reefs off it. The chart should be consulted for the reefs and islands off this part of the coast. Most of these reefs are frequently marked by breakers, tide rips, and discolored water.

11-130 Telok Saribua (Sariboea) affords a very well sheltered and safe anchorage. It penetrates about 6 miles into the land in a northwesterly direction, the depths and width decreasing regularly.

Near the northern entrance, which is of no importance to navigation, is a large, very peculiarly shaped rhizophora island, eastward of which a large coast reef, the Gosong

Ridai, extends. There are several islands on this coast reef, of which the northern, the Ridai, is gradually disappearing.

On the west side of the large island is a sharp, dark hill, 190 feet high, which is easily recognized from the offing. The reefs in the bay, except in the most narrow part, may be distinguished easily.

Reefs.—Between Ujung Saribua and Onai, up to 1 mile offshore, are numerous reefs and dangers. On two of the drying reefs lie (1916) the overgrown sand patches Kasih di Tapi and Kasih di Tengah, which are good landmarks. The 100-fathom curve extends close along the outer reefs, which may always be distinguished.

Directions.—Entering, steer about 265° with Ujung Bulaumongai a little to starboard, passing within a short distance of the point. The north as well as the south point of this entrance is easily recognized from the offing. After passing between the above-mentioned hill and the eastern of some small mangrove islands, keep close along the north side of these islands and continue farther by sight and by bearings.

11-131 Telok Simalepat affords a well-sheltered anchorage behind Simalepet Island in bad weather. The northern entrance is clear and safe. The southern entrance is narrow. On the south side of the bay are two small mangrove islands, each surrounded by a reef.

Siberut Bay affords a well-sheltered anchorage behind Ujung Sikabai, the southern entrance point, except from winds between north and east.

Siberut Bay may be recognized from a considerable distance by a gap between two ridges of hills situated behind the bay. When near the bay, the overgrown sand patches Kasih di Tapi and Kasih di Tengah are sighted. Laki Laki Hill is also a good landmark.

Light.—A light is normally exhibited from two wooden posts on the root of the pier at Siberut when a vessel is expected. The light was extinguished in 1950.

Two beacons stand on the coastal bank about 1/4 mile south-southeast of the head of the pier.

Directions.—Steer somewhat northward of the gap until the conspicuous, isolated tree with large crown and light-green foliage, eastward of the flagstaff, is in range with the head of the pier bearing 211°, then follow this range until 20 fathoms is sounded. One will then lie about 450 yards from the pier and about 200 yards from the 3-fathom curve. Farther southward anchorage is less satisfactory on account of the steeply sloping bottom.

At night bring the fixed white light (extinguished 1950) on the root of the pier to bear 211°.

11-132 TOWN.—Siberut is the headquarters of the government official of the Mentawi Islands subdivision.

11-133 Coast (H. O. Chart No. 3123).—From Ujung Sikabai (1°36' S., 99°15' E.) the coast trends southeastward for about 3 miles to Ujung Rugurugun, 1 mile southward of which is the entrance to Telok Pinang Pinang. The latter is clear, affords well-sheltered anchorage, and can be entered without difficulty.

At about 1,500 yards southeastward of the southern entrance point of Telok Pinang Pinang is Lappi, a low, overgrown islet, with a tolerably broad, fringing reef on its seaward side, on which the sea always breaks.

Southward of Telok Pinang Pinang is a bay, about 4 miles between its entrance points, which is almost entirely taken up by two islands, named Tudangin and Babui.

On the south side of the approach to this bay is Sibajau, an islet, low on its east side and covered with mangroves on its west side. From 800 to 1,400 yards southeastward of the islet is Gusong Sibajau, a sunken coral reef, but always apparent.

About 1¾ miles southwestward of Sibajau Islet is Ujung Sibajau (Katorei), which has

high trees on it and is the northern entrance point of Telok Katurei.

11-134 Telok Katurei (Katoerei), near the southeast point of Siberut, is limited to the south by the islands Siloina (Selenna) and Libut (Lebu) of which the former is similar in shape to Sibajau Islet. These two islands must not be mistaken for each other in the approach of the bay. Off the entrance are a few reefs which make entry more difficult, but they are, however, usually marked by rollers or breakers.

The bay penetrates deeply into the land in a northerly direction and at Ujung Masipehe is divided into two arms, of which the western Telok Melaggai, is of little importance. The Jai Jai, a 308-foot steep hill, is situated within Ujung Masipehe.

The eastern branch is very narrow and terminates in Telok Bagatiup, Telok Lokkoni, and Telok Matoktuk, the latter two being of no importance.

The islands in the bay and a few hills are good landmarks. The coast is completely overgrown with rhizophoras except on a stretch southward of Ujung Tululago. A few densely overgrown ridges of hills rise farther inland. There are no villages or roads. In the inner reach of the bay are a few temporary houses for fishermen and rice growers. These can be reached only by boats. Katurei village is located close to Maumun Mountain. The Katurei River flows into the Telok Bagatiup and communicates with the Siberut River.

11-135 Directions.—It is easiest and safest to enter by steering 270° for Ujung Sibajau, which point may be rounded, and then shape a course to pass just southward of the reef about 1,500 yards west-southwest from this point. This reef may always be distinguished and nearly dries. When farther inside, keep along the east side of the channel; that is, close along the islands. Vessels of light draft may go into the inner reach of

the bay. Westward and just northward of Masehee Island the channel is difficult on account of the shoal depth and the drying reef southward of Ujung Masipehe. There is always a little current setting out from the bay. Coming from the southward, the channel westward of Siloina Island is not advisable on account of the reef located south-southeast from it, which reef can be distinguished only on rare occasions. The $1\frac{3}{4}$ -fathom reef southward of the above is never seen.

11-136 Islands near the southeast point (*H. O. Chart 3123*).—Southward of the southeast point of Siberu are four large as well as several smaller islands, all of which are uninhabited.

Karamajet, the southern island, has a 134-foot hill in the center with dark high trees, one of the few landmarks visible from Seaflower Channel. On the southeast point are some dead trees. There are always heavy breakers on the south and west coasts.

Pananggalan Islands are overgrown with high timber and on the largest is a conspicuous tree. They are fringed by coast reefs and on the east side there are always breakers. Between these islands and Karamajet is no channel. Southeastward of the islands, under the shore, is a fairly well sheltered anchorage.

Botiek is likewise low and overgrown. On the shoalest patches of the reef, on the west side of the island, there are usually rollers or breakers.

The channel between Botiek and Karamajet is clear with a least depth of 8 fathoms, but there may be a strong current and during westerly winds there is a high and choppy sea. Off the eastern entrance is a small shoal with 3 fathoms, with 10 fathoms around it.

Mainu is low with high trees. There are dead trees on the east point at which the sea always breaks. Northward of this island are

numerous reefs, which as a rule are marked by breakers or rollers.

There is no passage between Botiek and Mainu on account of the numerous dangers northward of Botiek and the shoal patches southward of Mainu.

The strait between Mainu and Njang Njang, in which there is a small overgrown island fringed by a large reef, the depths are very irregular. By steering north-northeast or south-southwest and keeping rather closer to the east side, one will have a fairly good channel.

Njang Njang (Po Pangalang) has two unimportant bays on the east side. In the shoal bay on the south coast, in which the Muara Masausuh empties, one will find a somewhat sheltered anchorage in 10 fathoms southeastward of the above river.

Telok Masokut, on the west coast, is completely open to wind and swell, the latter at times being quite high.

Ujung Pulanggajet, the southwest point of the island, is overgrown with dark, high trees. The sea always breaks on this point. An inclined casuarina tree, very conspicuous from the north, stands on the northwest point.

Just eastward of this point is a small, overgrown island, and about 1 mile east-northeast is a drying reef with a white sand patch.

Between this part of the north coast and the low mangrove point Pepeh are many dangers, of which the two drying reefs are always marked by breakers or overfalls. The passage between Libut Island (overgrown and fairly high) and the shore of Siberut, as well as the passage along the northwest point of Njang Njang, should not be used. The navigable space is very small, and the strong current which sets through this passage makes it practically impossible to control a vessel that does not have high speed.

11-137 SOUTH AND WEST COASTS OF SIBERUT (H.O. Charts 3123).—The coast everywhere is densely overgrown, but it has an accessible sandy beach everywhere except at the steep part between the gap of the Simatalu River and the Puseratat Bay. Numerous streams and rivers which flow into the sea, the mouths of which are frequently largely or completely silted up, make a trip along the coast difficult. In the morning a thick mist from the breakers hangs over the shore. Landing, even in very good weather, is impossible except under very favorable opportunities and with considerable local knowledge, at the mouth of the Simaleki River and northward of the Simatalu River, behind the extending coast reef, in Puseratat Bay, and on the west side of the Telok Tailleleo.

Telok Tailleleo, on the south coast, is clear and shoals regularly, but one is not sheltered against the swell which trends around Koraniki Island into the bay. Landing is nearly always possible on the west shore of the bay between the rocks of the coast reef. There is a small settlement at the west end of the bay and Tailleleo village is located about 2 miles northward of it.

At the Chinese settlement of Simansih, southward of Puseratat Bay, Malay craft occasionally land under very favorable conditions behind the coast reef.

Landing.—Puseratat Bay is really the only landing place on the west coast. Landing is practically always possible, as the coast reef forms a natural breakwater.

11-138 This section has been deleted.

11-139 Landmarks.—Behind the beach of the south and west coasts the land is marshy (rawahs), especially along the rivers, but a short distance from the coast the hills rise; they are overgrown with heavy, impenetrable woods. There are few landmarks.

Tobow Hill, westward of Telok Tailleleo, is conspicuous from Seaflower Channel. Between Tanjung Simansih and Telok Tailleleo the ridges slope from the interior toward the coast, forming gaps in places. Tetekuku Hill, 1,230 feet high and situated northward of Puseratat Bay, and the 978-foot and 807-foot hills southward of Tanjung Sakaladat are fairly conspicuous. Chinambeleo Hill, 476 feet high, detached and situated between Tanjungs Sakaladat and Siopa, is conspicuous, as is also the 610-foot hill farther northward, particularly when viewed from the north.

Koraniki, Si Njau Njau (Lipa), and Jujuat (Beti) are low islands, densely overgrown and uninhabited. They are visited, however, by people from Tailleleo for the purpose of gathering coconuts or fishing.

On account of the mud carried into the sea by the rivers, the sea along the west and south coasts of Siberut is not clear and the reefs are not marked by discolored water, although they are marked by rollers or breakers, this being dependent upon the direction and height of the swell. The rock 1 mile southward of Koraniki is always marked by heavy breakers.

At the larger rivers, and also at the Simalubek and Simatalu Rivers, but especially from the Simaleki River to near the north coast of Siberut, there are frequently strong discolorations caused by the river water.

When passing along the south and west coasts of Siberut, beyond the 10-fathom curve, there are no dangers to be feared.

Near the southern point of the island, and within the 10-fathom curve, are seven shoal patches. From 3 miles northwestward of Jujuat Island to Tanjung Mongaburu the coast is clear of dangers. From Tanjung Mongaburu to about 2 miles beyond Simatalu River there are some shoals with depths of $3\frac{1}{2}$ to 5 fathoms within the 10-fathom curve, so it is advisable to keep outside of that line. From Simatalu River to Tanjung Siopa there are no dangers and the coast may be approached close to.

The bottom slopes regularly and the holding ground is good (fine sand and a little mud).

A patch with 13 fathoms lies within the 100-fathom curve about 8 miles westward from Tanjung Sakaladat.

Landmarks.—Besides the hills already mentioned, other landmarks are the rocky headland at the mouth of the Simaleki River with a rock off it against which the breakers dash high; the gap of the Simbatalu River, which is plainly visible when it is abeam, and a few white and yellow spots on the steep coast northward of Puseratat Bay, a result of slides of rock and trees which have carried with them the vegetation, completely or in parts. During the time of the survey it was noted that new white patches sprang up and others became less prominent.

Tanjungs Simansih and Mongaburu are low and projecting. They are located westward of Telok Taileleo, are overgrown with casuarina trees, and always stand out sharply from a distance.

11-140 Seaflower Channel formed between the islands off the southern side of Siberut and Sipura, is named after the British naval brig Seaflower, Capt. W. Owen, who passed through the channel in 1806. The channel is deep and about $14\frac{1}{2}$ miles wide. It is clear of dangers except for a 6-fathom patch, which is not marked by discoloration, and located about $1\frac{1}{2}$ miles northwestward of Pototogat Island. There is no suitable anchorage in the channel.

Tidal currents.—A current setting to the eastward at the rate of 2 knots has been reported in Seaflower Channel at $1\frac{1}{2}$ hours after high-water spring tides. On the east side of Pulo Sipura the current was setting to the south-southeastward between the northern end of the island and Sipura Strait from 1 hour before low water to 3 hours before high water; the current was setting westward between the southern extremity of Sipura and the northern extremity of West Pagai Island from 3 hours to 1 hour before high water.

When passing down the east coasts of North and South Pagai Island at an average distance of 3 miles from the shore no current was found on ebb tide. After low water at Sipura Strait a northerly current was experienced for 4 hours running at a rate of $3\frac{1}{2}$ knots.

11-141 Sipura (Sipora) is a densely overgrown island. The west coast is low, with numerous bays. Behind the beach, along which the sea has piled up a dam of crushed coral, is a densely overgrown marsh. The villages are reached from the sea by a boat through the rivers, the mouths of which are much silted up. The Government, for military reasons, has constructed footpaths between the villages. Such a path runs from Tikarusut village on the west coast to Siloinan on the east coast and from Siberulan on the west coast to Sikiji on the east coast. The distance in each case can be covered by walking in about six hours.

The natives, who are few, are peaceable, but quite uncivilized. If communication with them is desired, an interpreter can be obtained at Siberut village (sect. 11-121).

The ridges of hills are not high and present no conspicuous landmarks. Only Simangkocho Hill, 768 feet high, is a plain, solitary cone. When viewed from the northwest and southeast this hill appears as a

sharp cone; from the northeast and southwest it is not so sharp, but well defined on account of the surrounding low land. It is also visible from the west coast.

The 1,027-foot hill from the north and southeast appears as a level ridge extending in an east and west direction. There is a conspicuous tree on the west side. Along the east coast, close behind the beach, are many small hills, of which may be mentioned the saddle-shaped hill northward of Sikiji village and stream.

The south point of the island, southward of Simangkocho Hill, is low.

11-142 Siburu Bay ($2^{\circ}01' S.$, $99^{\circ}35' E.$), formed by the north coast of Sipura and the islands Siburu, Simakakak, and Pototogat, affords good anchorage sheltered from swell and all winds.

There are a few low hills on the islands. Pulo Setan, northwestward of Siburu, consists of several small, steep rocks. About $1\frac{1}{2}$ miles northwestward of Pototogat is a coral shoal with a least depth of 6 fathoms.

Depths.—The depths in the bay range from 20 to 40 fathoms over a sandy bottom. Malays and Mentawai people, fishing for shells, fish, and soala (a kind of white tripang), are usually met with. Otherwise this part is uninhabited.

Caution.—In navigating the eastern entrance, southward of Siburu, one must bear in mind the reefs extending from Sipura. The reefs are not very well defined by discolored water. Northwestward of a line joining the southeast point of Pototogat and Siburu are various reefs.

11-143 Coast.—Southeastward of Siburu Bay, for a distance of about 7 miles, the coast forms deep narrow inlets, which are uninhabited and not even visited by fishermen. About 1,500 yards off the coast and

eastward of the north point of Sipura is a reef with $2\frac{1}{2}$ fathoms over it; otherwise there are no off-lying dangers at a greater distance than 500 yards.

At the end of this stretch and eastward of the 1,027-foot hill the streams flowing into the sea form a delta on which are the villages of Siloinan, Sereinou, and Simatobe.

Siuban Bay is the only bay of importance on the east coast. A detachment of armed police is encamped here, and this bay is the greatest shipping point for coconuts. The bay is clear and is easily navigated without aids. The south side may be recognized from a considerable distance on account of the cleared tongue of land on which the police camp buildings are located. In the inner part of the bay is a landing pier for small vessels. At night a lantern is shown from a high stake. The villages of Siuban and Sibarau may be reached from Siuban Bay by a good foot patch.

11-144 Coast (*H. O. Chart No. 3123*).—About 3 miles southward of Siuban Bay is Sibarau River, off the mouth of which is a mud bank. At this place the 10-fathom curve lies about 1,000 yards offshore.

Telok Semebai, about $6\frac{1}{2}$ miles southeastward of Siuban Bay, is easily navigated. Near the middle of the bay is a small drying sandbank which may be passed on either side. Southward of this bank the bottom is mud and the depths from 10 to 20 fathoms.

Three drying patches, the middle of which is a sand cay which is visible at high water, are situated eastward of Simangkocho Hill, about 800 yards offshore. There is a clear channel between these patches and the shore.

Tanjung Batu Kinapat (*H. O. Chart No. 3123*) is the southern point of Sipura and is fringed by a narrow reef. From 2 to 4 miles northward of the point the coast forms a bight, which, however, is mostly taken up by

the Pusiripangan Islands. At certain seasons of the year the entire population of some villages come to this bight to catch crabs.

11-145 West coast of Sipura.—Telok Siberimanua has good anchorage ground, sand and mud, and is well sheltered against westerly swell by Pitoyat, a low and densely overgrown island.

Coming from the north and passing along the west coast, the first villages are found here. They are situated a short distance up the stream, at the head of the bay.

About 2 miles northward of Pitoyat and about 1 mile offshore is a shoal with a least depth of $3\frac{1}{2}$ fathoms; there is a clear channel into Telok Siberimanua on either side of Pitoyat Island.

11-146 Noko Island ($2^{\circ}13' S.$, $99^{\circ}32' E.$), low and densely overgrown lies about 5 miles southward of Pitoyat Island. It is separated from shore by a clear passage with a least depth of 7 fathoms in the middle. A ridge with depths under 10 fathoms extends to the northwest from the island up to a distance of $1\frac{1}{2}$ miles. A detached patch with a depth of 9 fathoms is located about $1\frac{1}{2}$ miles southward of the island.

Simalipit and Trait are two deep bays southeastward of Noko Island, with villages on the streams which flow into them. The depths decrease regularly and the coast reef in each bay always breaks so that they may be entered without difficulty. The vessel, however, is apt to roll considerably, as there is no shelter against the prevailing southwesterly swell.

Siduamata, about 7 miles westward of Tanjung Batu Kinapat, is low and densely overgrown. Off the southwestern and southeastern sides is a fairly broad fringing reef. There is a bay on the north coast where the Malay traders load produce.

A depth of 7 fathoms can be carried through the channel between Siduamata and

Sipura. Under the shore of Sipura, northwestward of Siduamata, is Tobo Island, behind which is the entrance to the river and village of Siberulau.

The bays of Simasogut and Sibesua, eastward of Siduamata Island, are clear, but exposed to the swell.

11-147 Sipura (Sipora) Strait is about $9\frac{1}{2}$ miles wide between the southern extremity of Sipura and the northern extremity of North Pagai. The ridge on which the Mentawi Islands lie is here about 8 miles broad between the 100-fathom curves, and is steeper on the northeast side than on the southwest. Generally speaking, the highest part of the ridge has depths of from 20 to 30 fathoms over it.

A shoal, with a least depth of 6 fathoms and about 1 mile in extent, lies about 4 miles westward of the northern end of North Pagai, otherwise the strait is clear of any known danger. Along the north coast of North Pagai, in the vicinity of this shoal, a current with a velocity of $1\frac{1}{2}$ miles is occasionally encountered, probably caused by the irregular depths.

11-148 Pagai (Pagi) Islands—General remarks.—These two islands are separated by the deep and narrow Sikakap Strait.

North Pagai is hilly, but the peaks are difficult to distinguish. The hilly land lies in the middle of the island and extends in a northwest and southeast direction. The coast is flat practically throughout. Only the northern part of the west coast is hilly and rocky in places; the southwest, south, and east coasts are low and marshy. The island is fringed by a very narrow coast reef and the 10-fathom curve runs close along the shore.

South Pagai is also hilly, especially in the northern part, and presents the appearance of a high dune landscape. The ridge, about 1,207 feet high, which practically extends across the island and slopes toward the sea

eastward of Bitojat Islands, is conspicuous from the northwest as well as from the southeast. The ridge is nearly as flat as a table. The hill, 1,033 feet high, with a conspicuous tree, is conspicuous from the west, north, and east. The hills situated on the southern promontory are detached and visible from the west as well as from the east coast.

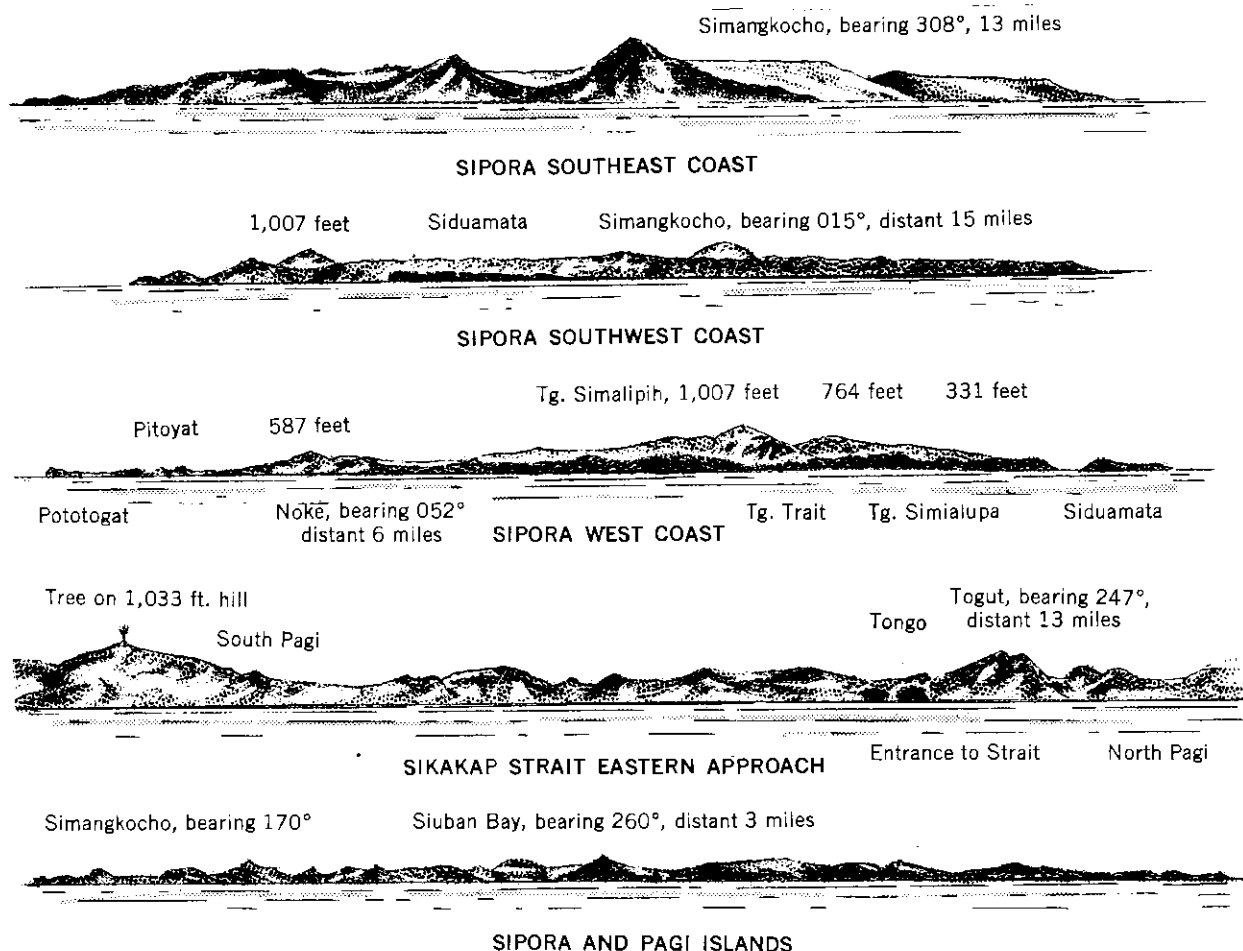
11-149 East coast of North Pagai.—A river discharges on the north side of North Pagai, about $\frac{1}{2}$ mile westward of Tanjung Pinang Pinang. The hills at the north end of the island are not easy to distinguish.

Tanjung Pinang Pinang, the northeast point, is overgrown with casuarina trees and stands out sharply. A 3-fathom patch lies about 600 yards offshore and a little less than $\frac{3}{4}$ mile eastward of Tanjung Pinang Pinang. The entire east coast is low and

marshy with few coves and bights. A fairly good footpath joins the villages. Si Jau Jau and Kiki are the largest of some low sandbanks lying about 1 mile offshore and 3 to 5 miles southeastward of Tanjung Pinang Pinang. Good anchorage can be obtained between Si Jau Jau and Kiki. Vessels should keep outside of them as there are several shoals between them and the shore. The villages of Pasapat, Si Ngau Ngau, and Simanganjo are on this part of the coast.

Saumanganya Road is off the Christian village of Saumanganya, about 10 miles southeastward of Tanjung Pinang Pinang. A 3-fathom patch lies 1,000 yards 010° from the northern extremity of Saumanganya Islet. A reef with a depth of $\frac{3}{4}$ fathom lies 560 yards 016° from the same point.

Tanjung Simatobe is 4 miles southeast-



ward of Saumanganya, and the village of Simatobe is on the rivulet that discharges about 2 miles farther southward. The rivulet may be identified by the coconut trees growing near the mouth.

From Tanjung Simatobe to Sikakap Strait is about 8 miles. At 1 mile northward of the strait a small sandbank which nearly covers at high water lies near the coast, and patches of 2 and 3 fathoms lie northward and eastward of it at a distance of nearly 1,000 yards.

Except for the dangers already mentioned, the whole east coast can be closely approached.

11-150 West coast of North Pagai.—Tanjung Takarimau ($2^{\circ}34' S.$, $99^{\circ}58' E.$) is rocky. Tanjung Sigogoa stands out sharply as a steep, solitary rock which is connected to shore by a narrow tongue of land. Batu Malai lies between the two above-mentioned points near the shore. A few detached, drying rocks lie under the shore southward of Tanjung Sigogoa. The coast is uninhabited and landings can not be effected.

Silabulabu Bay affords a calm anchorage. The bay is most easily entered by passing northward of Silabulabu Gedang and then continue to the anchorage northeastward or eastward of Silabulabu Kechil by aid of the lead there is a narrow channel between the two islands which has depths of $5\frac{3}{4}$ to $9\frac{3}{4}$ fathoms.

Silabulabu village lies a short distance from the mouth of the river. Both the river and the village are located in the north bight of the roadstead. Coming from the northward, it is the first village reached on the west coast.

Coast.—Betumonga Bay, southward of Silabulabu Bay, and Sabeo Guguk, on the south coast, are both clear, but open to the southwesterly swell. In each of these bays there is a rivulet and village, the villages being connected by a fairly good footpath to Silabulabu and to villages in Sikakap Strait.

11-151 Sikakap Strait separates North Pagai from South Pagai. In the middle of the eastern entrance is the island of Tonggo, which, although hilly, with a conspicuous tree in the middle, is difficult to distin-

guish from the offing against the shore behind it. The passage southward of this island could not be used.

The eastern part of Sikakap Strait, about 500 yards wide, is deep and clear, with hilly and densely overgrown shores. On the north side of this part at the foot of the flat hill Togut, 713 feet high, (an excellent landmark from any place on the east coast) is the camp of the armed police. It is known as Sikakap Village, and there is a landing pier. Westward of it is the Malay village of Berre.

In the cove westward of this village is the island of Krawe. A stream, the Si Bai Bai, on which there is a village of the same name, empties into the above cove. Westward of the cove, under the spur of the chain of hills of North Pagai, is the missionary station Nennemleleo, with a simple church and the residence of two missionaries and Batak assistants and servants.

Beyond Nennemleleo is the village of Kaote. The stream Taikako discharges in the strait northward of Bakat Peigu Island, which is located in the middle of the strait. The bar off the mouth of this stream can be passed only at high water by small steam craft. The depth inside the bar increases to 2 and 3 fathoms, and farther up the river are the large villages of Silaoinan and Taikako (about one-half hour's journey).

On the south side of the eastern part of the strait are only the village of Seai and the island of Sangko. Bakat Peigu is hilly with a few tall trees overgrown with epiphytes. One can carry more than 10 fathoms on either side of this island. The eastern passage is recommended to large vessels as the bend is less sharp; keep close along the island. About 160 yards from the shore of South Pagai is a rock which dries.

Southward of Bakat Peigu the strait runs in a southerly direction with average depths of 7 to 10 fathoms. There is most water on the eastern side of the strait where the low thickly wooded islands Masusu, Lumui, and Ragi lie, but on the west side it is shoal in the bight and detached patches of 3 fathoms lie off the west shore. A shoal of 2 fathoms lies about 600 yards southwestward of Ragi.

Bukukmonga River, on which is a village of the same name, discharges about 1,000 yards southward of Ragi.

The islands Nusa, Siopa Besar, and Siopa Kechil lie in the western entrance to the strait. The large ship channel is between the two first-mentioned islands. This channel is clear with a least depth of 8 fathoms. The coast reefs fringing the islands are narrow. The channel between Nusa and North Pagai is shoal and unnavigable. The passage between Siopa Besar and Siopa Kechil has a 2-fathom shoal and should therefore not be attempted. The passage between Siopa Kechil and South Pagai is clear, and has a least depth of 6 fathoms in the fairway. The area westward of Nusa and Siopa Islands is clear everywhere with deep water.

A small hill with a conspicuous tree on Siopa Besar and the 1,033-foot hill with a conspicuous tree on South Pagai are good landmarks when approaching from the westward.

Tidal currents.—In the strait there is seldom more than a 2-knot current, even at springs; the current changes at the times of high and low water.

11-152 West coast of South Pagai.—The islands situated near the west coast are all low, densely overgrown, and uninhabited. They have coconut plantations on them and are frequently visited by Mentaweiers.

The two northern islands, Bitojat Besar and Bitojat Kechil, are separated by a narrow channel with a depth of 5 fathoms in midchannel. There is a very conspicuous tree on Sibigau which is connected to South Pagai by a ridge with less than 10 fathoms of water. On the above-mentioned ridge is the island of Ragi which is fringed by a wide coast reef. Elsewhere the depths are not less than 6 fathoms.

Between Libuat and Silau Islands is a reef on which the sea always breaks. The reef between Silau and Si Baru Baru is also near-

ly always marked by breakers. The last-mentioned island is joined to the shore and to this reef by a bank with less than 10 fathoms, with irregular depths and frequently a heavy sea and swell.

Between the above-mentioned islands and South Pagai the depths are everywhere less than 20 fathoms. The passage is safe and sheltered against swell, except at Si Baru Baru, during heavy swell, where it is preferable to pass on the outside.

The coast of South Pagai, close under which are also the islands of Kasi and Siu-mang, has a number of coves of which Tio Bay, eastward of Silau, affords good anchorage, sheltered against ocean swell, for vessels with local knowledge. On the west side of the bay is a coast reef which extends for some distance. The depths shoal gradually toward the inner part, and in the inner reach are some mangrove islands. It is easily navigated by aid of the lead without special aids. The bay is uninhabited. Bulasat is the southern village of the west coast. One seldom comes in contact with the inhabitants.

East coast of South Pagai.—The southern point of South Pagai is a tongue of land, 2 miles wide, ending in Tanjung Bio, on which there is nearly always heavy breakers. On the east side of this tongue of land, close under the shore, are several islands which from the seaward are difficult to distinguish from the coast.

11-153 Veeckens Bay is spacious and formed between the coast of South Pagai and a group of low islands, all of which are densely overgrown and uninhabited. The bay offers a safe anchorage, but as all islands are infested with mosquitoes, it is not advisable to anchor close under the shore. The depths in the bay range from 14 to 30 fathoms, sand and mud, but one may pass deep into the northwestern part of the bay, between the islands, in depths not less than 8 fathoms. Shoals and rocks are easily distinguished so that navigation presents no difficulty.

The shores of Veeckens Bay are also uninhabited, but the bay is visited by fishermen from the villages northward of it.

Si Jau Jau Island, located eastward of the north end of Tinopo, has reefs extending about 550 yards northward and about 750 yards southward from it. A 3-fathom patch lies about 1,800 yards south-southeastward of the south extremity of the island, with a 5-fathom patch between. There are also two patches with 2 and 3 fathoms northward of Si Jau Jau.

Siumang Island, southward of Tinopo Island, should not be approached closer than 2 miles on the southwest side as there are frequently rollers which would indicate that the depth is less than 3 fathoms. The reefs north by west and south by east from Simon-ga Island have depths less than 2 fathoms and are frequently marked by rollers or breakers.

Directions.—The bay is most easily and safely entered from the southward. The channel depth ranges from 10 to 20 fathoms.

The bay is also easily reached from Tinopo Strait, but the east side of this strait should be avoided. By steering 216° through the middle of the strait, one passes between the drying reef eastward of Labajau Island and the 3-fathom shoal northward of Si Jau Jau. One may also make Tanjung Sibelua and then steer close under the shore through the strait, avoiding a drying rock eastward of Labajau. The reefs in this vicinity are not very well marked by discolored water.

When bound for Veeckens Bay, one may also pass between Sirpasabela, Siatanusa, and Tinopo Islands and eastward of Simaturugogo Island.

11-154 Tanjung Sibelua ($3^{\circ}01'S.$, $100^{\circ}28'E.$); about 8 miles northward of Veeckens Bay, stands out sharply, and from the south and north is made conspicuous by an obliquely overhanging tree. About 1 mile southward of this point is a cove about 1 mile in length, but foul with rocks and islets.

Labajau Island lies close to the coast about

4 miles southward of Tanjung Sibelua. The island is fringed by a reef on its eastern side. A rock which dries lies about 900 yards eastward of the island, and a rock, with a depth of less than 6 feet, lies about 400 yards southward of the island. Another rock which dries, lies about $1\frac{1}{2}$ miles eastward of the south extremity.

Coast.—The coast northward of Tanjung Sibelua is low with a few small hills in the interior. Farther northward the coast is hilly and in some places rocky, with plantations here and there on the slopes and some villages by the rivulets. About 4 miles southeastward of the entrance to Sikakap Strait the coast line becomes irregular, and there are many small islets, of which the outer and larger are known as Si Ngi Ngi, Siatanusa, Sibabui, and Si Jau Jau. The passage between these islands and the coast is not navigable.

11-155 Sanding Strait, between the southern extremity of South Pagai and Sanding Island, is a clear channel 12 miles wide with depths of 25 to 45 fathoms. The only obstructions are Europa Reef and some rocks extending from the north side of Sanding Island.

Sanding Island, the southernmost of the Mentawai Islands and lying 12.5 miles south-eastward of South Pagai, is low and densely overgrown. It is inhabited by a few Malays who gather coconuts. The coast reef is very narrow along the south and west coasts; it is about 2.5 miles wide on the north side of the island. The entire edge of the coast reef, except on the southwest side, is lined with small, overgrown islets. The Stupai, north-eastward of Sanding, is the largest. A channel in the coast reef, westward of this island, forms a good but narrow road for small vessels.

The island on the northwest point of the coast reef is difficult to distinguish from the shore. Sanding may be rounded everywhere on sight.

Europa Reef ($3^{\circ}31'S.$, $100^{\circ}33'E.$) is located about $4\frac{1}{4}$ miles southwestward of Sanding and con-

sists of two detached patches separated by deep water. From the highest point of Sanding the two patches bear 255° and 245° , respectively, and from the 558-foot summit on the southern end of South Gagai they bear 147° . These patches are frequently marked by rollers or breakers, and the least depth is probably not more than 4 fathoms.

11-156 Mega Trieste Island ($4^{\circ}01' S.$, $101^{\circ}02' E.$, *H. O. Chart 3124*), located 38 miles southeastward of Sanding Island, is 2 miles in length and surrounded by a reef. It is low and densely overgrown, and should be visible for a distance of about 15 miles in clear weather. The depths around the island are rather irregular, and patches with $3\frac{3}{4}$ -fathoms and 3-fathoms are found about $\frac{1}{2}$ mile northward, and 1 mile southward, respectively. There is a coral patch with 7 $\frac{1}{2}$ fathoms about $4\frac{1}{2}$ miles westward of the island, and a 2-fathom patch lies about 200 yards off its northeastern end.

Anchorage may be taken in 12 fathoms, sand and coral, about $\frac{1}{2}$ mile off the east coast, with the extremities of the island bearing 225° and 315° . The only landing place is on the northwestern side, at high water, northward of the mangroves.

11-157 Engano (Telanchang)—General remarks—Aspect.—Engano, the southernmost of the large islands fronting the western coast of Sumatra, and distant from it 60 miles, is 20 miles in length and about 10 miles in breadth. A range of hills runs through the island from northwest to southeast. The hills extend down to the sea along the southwest and southern side, but the island is lower and more level toward the northwest and northeastern sides.

It is densely wooded, unbroken by a field of grass or a trace of cultivation; it can not be said to have a beach, as the trees reach to and overhang it. A quantity of coconut trees are seen along the coasts; the sea breaks

furiously on the drying coral reefs, with which the island is surrounded. There are heavy breakers on the reefs even in the calmest weather, making landing impossible except at one or two points mentioned later.

11-158 There are no roads on the island and the marshy interior is difficult to penetrate and produces fever. Communication between the villages is effected by boats. There are several streams throughout the island and wild pigs are numerous. There are many coconut plantations and some rubber and coffee. The island forms part of Benkulen Province.

The inhabitants are scattered along the northeast coast, the remainder of the island is uninhabited. The people are friendly and peaceable and the population is composed of Enganese, who are Christian, Javanese, Malays and Bataks. There are reported to be Enganese and Batak missionaries on the island.

11-159 Engano Bay, the principal anchorage, is on the eastern side of the island, and has in its entrance three small islands surrounded by reefs, which always break heavily.

Pulo Dua (Poelau Doca), or North (Aduwe) Island, is inhabited and covered with trees; excepting a small opening on the western side it is surrounded by a coral reef of considerable extent, partly dry at low water, but having depths of 4 to 10 fathoms close-to.

Two detached reefs with $2\frac{1}{4}$ and $2\frac{1}{2}$ fathoms lie about 1,000 yards southwestward of Pulo Dua. In the channel northward and westward of Pulo Dua other shoal patches exist.

A depth of 6 fathoms was reported (1949) in a position about $\frac{2}{3}$ mile northward of the western extremity of Pulo Dua.

Pulo Marbau, or South (Kaupanu) Island, $1\frac{1}{2}$ miles southward of Pulo Dua, is also covered with trees and surrounded by a reef, which on the western side extends but a short distance. There is a deep, narrow passage

apparently between Marbau Island Reef and that which extends southeastward of Tanjung Kahoabi.

Pulo Bangkei or Middle (Kaperuru) Island, the smallest of the three, is conspicuous from the sea, having a high sandy beach, with a tuft of trees near the center. It is located on the outer detached reef which lies off Euma (Eumo) Point, the northeastern point of Telok Kiowa, a deep cove in the southern part of Engano Bay. A $1\frac{3}{4}$ -fathom patch lies about 1,000 yards northeastward of Bangkei and a 2-fathom patch lies about 500 yards northward of Bangkei.

Caution.—The coast reef has extended northwestward from the northwestern side of Pulo Dua for a distance of about 110 yards (1950).

11-160 Anchorage.—The best and quietest anchorage is 327° , distant about 650 yards from the west point of Pulo Dua, in 14 fathoms, sand. There is also anchorage between Pulos Marbau and Bangkei in 9 to 18 fathoms, sand, northwestward of Pulo Marbau; both these are fairly sheltered anchorages. In 1950, a vessel recommended anchorage, in about 11 fathoms, to the northwestward of Pulo Dua with the conspicuous 351-foot hill, located about $1\frac{3}{4}$ miles westward of Tanjung Kahoabi, bearing 219° and the north tip of Pulo Dua bearing 105° .

Directions.—To approach Engano Bay, steer 248° northward of Pulo Dua anchor as above directed.

11-161 Coast.—A 9-fathom patch lies about $3\frac{1}{2}$ miles southward of Tanjung Kahoabi.

Black Rock, 8 feet high, lies about 1,000 yards off Tanjung Labuho (Kenemei), the southern point of Engano Island. About 2 miles southeastward of the same point are

some shoal patches with a least depth of 2 fathoms.

Telok Labuho lies within Tanjung Labuho, but it affords little shelter against southerly swell. The bay is uninhabited, as is also the entire southwest and northwest coast, although there are a few huts along the beach, and also sheds for coconuts.

11-162 Satu (Kahek).—On the southwest side of Engano, in a small bay between Pulo Satu (Kahek) and the shore, there is anchorage for small craft in about 8 fathoms, sand, with the south extremity of the island bearing about 281° , distant 600 yards. The passage between the island and the north point of the bay is 800 yards wide, but the reefs extending from both shores reduce it to about 400 yards, with depths of 2 to 7 fathoms. The eastern shore of the bay is fronted by a reef to the distance of 400 yards. For other dangers, consult the chart.

At Tanjung Kiojo, 4 miles northward of Pulo Satu, the coast reef extends in a rocky spit and forms a deep cove.

Barohia Anchorage, a little westward of the northern point of Engano Island, is a narrow inlet in the fringing reef, extending east and west nearly 1,600 yards and having in midchannel a depth of 6 to 8 fathoms, except near the head, where there are shallow patches near the landing place. This anchorage is not safe in the westerly monsoon period.

Tides.—It is high water, full and change, at about 6 hours 30 minutes near Barohia; springs rise about 3 feet.

11-163 Coast.—At Tanjung Lakoaha, the northern extremity of the island, is the village of the same name. Farther eastward are the villages of Karkua, Koppo Koppo, and Kijah, besides straggling villages of a few huts. The coast reef along the northeast coast

is narrow; the sea bottom is steep-to and clear, except at Malakoni, where close under the shore there are a few detached rocks and shoals.

Malakoni is the principal settlement of Engano. It is located about $8\frac{1}{2}$ miles east-southeastward of Tanjung Lakoaha, the north extremity of the island. It is a port of call for local steamers and a Native Administrator resides here.

Anchorage.—Excellent anchorage is obtainable here. Vessels are advised to veer about 80 feet of cable and to steer 235° towards the mouth of the river, continuing on that course until the anchor holds. The mouth of the river is easily distinguished. A good landing place for boats is found at the steps of a copra shed built on the reef.

Landmarks.—For navigation around the island at greater distances the hilltops of the main chains are sufficiently good objects for bearings.

Bua Bua, 922 feet high, is the highest and most conspicuous. Nanuua, on account of its saddle shape, is also fairly conspicuous from the northeastward, westward, and southwestward. The 351-foot hill on the southeast point stands out sharply above the low, sloping promontory. The west summit of the ridge along the coast at Tanjung Kooma is also conspicuous.

NOTE.—For description and directions of the Sumatra coast from Flat Point to Batakarang Point, see H. O. Pub. 71.

APPENDIX I

List of principal ports, showing particulars of depths, etc.

Port	Depth at M. L. W. S. in channel of approach	Depth at M. L. W. S. in anchorage	Remarks
	(Fathoms)	(Fathoms)	
Keppel Harbor, Singapore.....	W. ent., deep.....	.....	27 to 33 feet alongside.
Linga Road.....	E. ent., 3¼-5.....	.....	.....
Malacca.....	Deep.....	4	.....
Olehleh.....	do.....	10-12	Lighterage port.
Penang.....	N. ent., 4¼.....	4-5	Up to 10 feet alongside.
Rhio Road:	S. ent., 3¼.....	6-12	11 to 35 feet alongside.
Outer.....	Deep.....	3½	.....
Inner.....	do.....	2	.....
Sabang.....	12-20.....	15-20	27 to 32 feet alongside.
Singapore Road.....	Deep.....	6-12	.....
Swettenham, port.....	do.....	6	18 to 35 feet alongside.
Belawan Del.....	4¼.....	4 1/3	17 to 29 feet alongside.
Telukbajur (formerly Emmahaven).....	4¼.....	4 1/3	19 to 27 feet alongside, Port for Padang.
Sambo Road.....	Deep.....	11-19	8½ to 36½ feet alongside.
Sungei Kolak.....	3.....	27½ feet alongside, Vessels up to 525 feet can be berthed
Uban.....	Deep.....	14	13 to 35 feet alongside.

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APPENDIX II

Place: Penang. Latitude 5° 24' N., longitude 100° 20' E. Height above mean sea level, 20 feet

(Meteorological table compiled from 39 years' observations, 1882-1920 from British Admiralty Sailing Directions)

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature								Relative humidity	Cloud amount, scale 0 to 10	Rain			Wind										Number of days gales	Number of days fogs		
	Mean		Mean daily				Mean monthly		Extreme	Total fall			Number of days ²	Maximum fall in 24 hours ³	Mean force, Beaufort scale	Percentage of observations from—													
	For month	Daily amplitude	For month ¹	Maximum		Minimum		Maximum								Minimum		North	Northeast	East	Southeast	South	Southwest	West	Northwest			Calm	
				° F.	° F.	° F.	° F.	° F.	° F.							° F.	° F.												
January.....	29.86	.....	80	89	73	92	70	94	66	75	3.8	3.82	8	3.70	27	20	6	7	10	6	6	22	3	26	3	.....	.....
February.....	29.86	.....	81	91	73	93	70	96	66	74	3.8	2.91	6	6.18	5	19	16	7	11	11	11	22	3	29	2	.....	.....
March.....	29.83	.....	82	92	74	94	71	97	68	75	4.3	4.59	9	4.45	4	16	18	8	11	11	13	22	3	30	1	.....	.....
April.....	29.83	.....	81	91	75	93	72	95	69	78	5.0	6.93	14	4.65	4	13	18	11	14	15	19	22	3	23	3	.....	.....
May.....	29.83	.....	81	90	75	93	72	98	69	79	5.1	10.79	15	8.80	5	9	14	9	15	19	21	22	3	21	3	.....	.....
June.....	29.83	.....	81	89	74	92	72	95	68	78	4.8	7.68	12	5.67	5	9	13	9	21	19	22	3	21	3	.....	.....	
July.....	29.83	.....	81	89	74	92	71	95	69	79	5.0	8.35	13	8.12	5	10	14	8	20	19	21	3	16	4	4	.....	.....
August.....	29.83	.....	80	88	74	91	71	94	69	81	5.8	16.15	17	10.05	6	11	16	5	16	14	14	4	4	28	2	.....	.....
September.....	29.83	.....	80	88	73	91	71	93	65	81	5.8	16.63	21	10.32	5	5	17	7	15	12	3	4	4	30	3	.....	.....
October.....	29.83	.....	79	88	73	91	71	93	65	81	5.6	11.82	19	7.05	6	21	21	6	11	6	3	4	4	35	1	.....	.....
November.....	29.83	.....	79	88	73	91	71	93	67	78	4.8	4.96	10	3.96	6	21	21	5	5	3	3	4	4	36	2	.....	.....
December.....	29.83	.....	79	88	73	91	71	93	67	78	4.8	4.96	10	3.96	6	21	21	5	5	3	3	4	4	36	2	.....	.....
Means.....	29.83	80	89	74	93	71	95	68	78	4.9	14	16	7	14	13	3	4	27	2	
Totals.....	10.28	159	
Extreme values.....	
Number of years' observations.....	35	39	39	39	39	26	26	26	34	21	

Adjusted to mean of 24 hours.

Day with 0.2 mm rain or over.

Maximum fall during the 24 hours from one morning observation to the next.

Mean of highest each year and lowest each year.

Hours of observations 0900, 1500, and 2100 standard time.

Place: Malacca. Latitude 2° 15' N., longitude 102° 14' E. Height above mean sea level, 23 feet

(Meteorological table compiled from 39 years' observations, 1882-1920 from British Admiralty Sailing Directions)

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature								Relative humidity	Cloud amount, scale 0 to 10	Rain			Mean force, Beaufort scale	Wind								Number of days gales	Number of days fogs
	Mean		Mean daily		Mean monthly		Extreme		Total fall	Number of days			Maximum fall in 24 hours	Percentage of observations from—												
	For month	Daily amplitude	For month	Maximum	Minimum	Maximum	Minimum	Maximum						Minimum	North		Northeast	East	Southeast	South	Southwest	West	Northwest	Calm		
January	29.83	80	88	71	91	69	93	65	89	3.5	2.23	9	5.59	46	34	17	3	5	8	6	11	16	0	0	0	0
February	29.83	80	89	72	92	69	95	63	88	3.5	2.50	7	6.75	31	15	1	3	5	8	11	9	6	19	0	0	0
March	29.83	80	89	73	93	70	95	65	87	3.8	4.41	9	7.52	30	14	2	7	8	11	9	14	10	6	19	0	0
April	29.83	80	89	72	92	69	95	67	89	4.3	6.85	13	14.62	29	14	2	7	9	12	11	10	6	21	0	0	0
May	29.80	81	89	72	92	70	98	67	90	4.2	6.68	12	8.34	27	9	15	8	2	15	15	12	10	21	0	0	0
June	29.80	80	88	72	91	70	96	67	90	4.3	7.78	12	6.11	19	11	8	2	12	13	10	6	24	3	2	1	0
July	29.80	80	88	72	91	69	96	64	90	4.6	8.04	12	9.26	24	8	11	2	13	13	11	9	8	23	2	1	0
August	29.80	80	88	72	91	69	96	64	91	4.7	10.89	15	15.01	19	7	2	14	9	14	10	25	1	1	0	0	0
September	29.83	80	88	72	90	69	92	64	91	4.8	8.23	13	10.05	17	8	3	8	8	8	12	10	34	0	0	0	0
October	29.83	80	88	72	91	69	93	62	90	5.0	9.65	16	7.09	25	11	5	1	4	7	3	14	31	0	0	0	0
November	29.83	80	87	72	91	69	93	62	90	5.0	8.19	17	7.52	40	19	1	1	1	1	6	3	21	0	0	0	0
December	29.83	80	87	72	91	70	93	65	90	4.5	6.18	14	10.01	40	19	1	1	1	1	6	3	21	0	0	0	0
Means	29.83	80	88	72	94	67			90	4.3				27	12	2	9	10	9	9	8	22	1			
Total											33.92	149														
Extreme values													15.01													
Number of years' observations	29-31	35	35	35	22	22	22	22	34	32-33	35	22	38	16	16	16	16	16	16	16	16	16	16	16		

Adjusted to mean of 24 hours.

Day with 0.2 mm rain or over.

Maximum fall during the 24 hours from one morning observation to the next.

Mean of highest each year and lowest each year.

Hours of observations 0900, 1500 and 2100, standard time.

APPENDIX II

Place: Singapore. Latitude 1° 17' N., longitude 103° 51' E. Height above mean sea level, 10 feet

[Meteorological table compiled from 39 years' observations, 1883-1920 from British Admiralty Sailing Directions]

Month	Pressure at mean sea level, reduced to 32° F. and latitude 45°		Air temperature								Relative humidity	Cloud amount, scale 0 to 10	Rain			Wind										Number of days gales	Number of days fogs		
	Mean		For month †	Mean daily		Mean monthly		Extreme		Total fall			Number of days †	Maximum fall in 24 hours ‡	Mean force, Beaufort scale	Percentage of observations from—													
	For month	Daily amplitude		Maximum	Minimum	Maximum	Minimum	Maximum	Minimum							North	Northeast	East	Southeast	South	Southwest	West	Northwest	Calm					
January	29.86	...	79	86	72	90	70	93	67	82	5.1	9.88	16	7.37	...	10	45	2	1	0	1	1	6	34	...	...	
February	29.83	...	81	88	73	91	70	94	66	79	4.4	6.62	11	5.55	...	8	43	4	5	1	2	1	4	32	...	...	
March	29.83	...	81	89	74	92	71	94	67	78	4.4	7.40	14	6.62	...	5	28	7	11	1	3	7	5	38	...	...	
April	29.80	...	82	89	75	92	72	95	70	80	4.7	7.38	15	6.32	...	3	10	7	15	3	7	2	7	46	...	...	
May	29.80	...	82	89	75	92	73	97	70	79	4.8	6.68	14	3.31	...	2	2	4	21	9	15	3	6	28	...	...	
June	29.80	...	81	88	75	92	73	95	71	79	5.1	6.85	14	3.66	...	1	1	3	22	11	19	4	4	35	...	...	
July	29.80	...	81	88	75	91	72	92	69	78	4.9	6.77	13	2.86	...	0	1	2	25	16	10	4	4	30	...	...	
August	29.83	...	81	88	75	91	72	93	70	78	5.1	7.96	14	3.98	...	0	0	3	33	12	21	4	3	34	...	...	
September	29.83	...	81	88	75	91	72	93	70	78	5.3	6.77	13	2.87	...	1	0	2	26	10	21	4	4	32	...	...	
October	29.83	...	81	88	74	91	72	93	69	79	5.3	8.08	16	4.41	...	1	2	3	16	5	16	5	9	42	...	...	
November	29.83	...	81	87	74	91	72	92	69	81	5.6	9.03	16	7.25	...	4	10	2	6	3	8	3	20	44	...	...	
December	29.83	...	81	86	73	91	71	93	69	83	5.3	10.56	19	4.29	...	10	27	2	3	1	3	1	12	41	...	...	
Means	29.83	...	81	88	74	93	69	79	5.0	4	14	3	16	6	11	3	7	36		
Total	95.15	177		
Extreme values		
Number of years' observations	18-19	...	22-23	22-23	22-23	20	20	20	20	15-16	16	...	32	25	...	16	16	16	16	16	16	16	16	16	16		

† ¼ (maximum and minimum).
‡ Day with 0.2 mm rain or over.

† Maximum fall during the 24 hours from one morning observation to the next.
‡ Mean of highest each year and lowest each year.

Hours of observations, 0900, 1500 and 2100, standard time.

APPENDIX III

NOTICE TO MARINERS

Great Britain—Caution when approaching ports.—The following has been received from the British Admiralty and is reproduced for the information of mariners:

CAUTION WHEN APPROACHING BRITISH PORTS

PART I. CLOSING OF PORTS

(1) My Lords Commissioners of the Admiralty, having taken into consideration the fact that it may be necessary to forbid all entrance to certain ports of the Empire, hereby give notice that on approaching the shores of the British Isles, or any of the ports or localities of the British Empire, a sharp lookout should be kept for the signals described in the following paragraph, and for the vessels mentioned in paragraph (5), Part II, of this notice, and the distinguishing and other signals made by them. In the event of such signals being displayed, the port or locality should be approached with great caution, as it may be apprehended that obstructions may exist.

(2) If entrance to a port is prohibited, three red vertical lights by night, or three red vertical balls by day, will be exhibited in some conspicuous position in or near to its approach, which signals will also be shown by the vessels indicated in paragraph (5), Part II, of this notice.

If these signals are displayed, vessels must approach the port with the greatest caution, and implicitly obey all orders or signals given them by the Examination Vessel, Traffic Control Vessel, or Signal Station.

(3) At some ports or localities, at home or abroad, searchlights are occasionally exhibited for exercise.

Instructions have been given to avoid directing movable searchlights during practice onto vessels underway, but mariners are warned that great care should be taken to keep a sharp lookout for the signals indicated in paragraph (2) above when searchlights are observed to be working.

Vessels are particularly warned not to enter a declared "Dangerous Area" or approach boom defences without permission, nor to anchor or remain stopped in a dangerous area or prohibited anchorage unless specially instructed so to do.

PART II. EXAMINATION OF SERVICE

(4) In certain circumstances it is also necessary to take special measures to examine individual vessels desiring to enter ports and localities at home and abroad and to control entry generally. This is the function of the examination service. Where traffic control vessels take the place of Examination Vessels, their authority is the same.

(5) In such case vessels carrying the distinguishing flags or lights mentioned in paragraph (7) will be charged with the duty of examining ships which desire to enter the ports and of allotting positions in which they shall anchor. If government vessels or vessels belonging to the local port authority are found patrolling in the offing, merchant vessels are advised to communicate with such vessels with a view to obtaining information as to the course on which they should ap-

proach the port. Such communication will not be necessary in cases where the pilot on board has already received this information from the local authorities.

(6) As the institution of the examination service will probably be unknown to vessels desiring to enter the port, especial care should be taken in approaching the ports, by day or night, to keep a sharp lookout for any vessel carrying the flags or lights mentioned in paragraph (7), and to be ready to "bring to" at once when hailed by her or warned by the firing of a gun or sound rocket.

In approaching by night any port in the British Empire, serious delay and risk will be avoided if four efficient all-round lanterns two red and two white, are kept available for use.

(7) By day the distinguishing flags of the examination steamer will be a special flag (white and red horizontal surrounded by a blue border); also three red vertical balls if entrance is prohibited.

Usually the examination steamers or traffic control vessels will fly the blue ensigns, but in certain circumstances they may fly the white ensign.

By night the steamer will carry three red vertical lights if the port is closed and three white vertical lights if the port is open.

The above lights will be carried in addition to the ordinary navigational lights and will show an unbroken light around the examination steamer.

(8) Merchant vessels approaching a port at which the examination

service is in force, must hoist their signal letters on arriving within visual signal distance of the port, and are not to wait for the signal "What ship is that?" to be made from the examination steamer.

(9) Masters are warned that before attempting to enter any of these ports when the examination service is in force they must, in their own interests, strictly obey all instructions given to them by the examination steamer or traffic control vessel.

Whilst at anchor in the examination anchorage masters are warned that it is forbidden, except for the purpose of avoiding accident, to do any of the following things, without permission of the examination officer: (a) To lower or hoist the ensign; (c) to move the ship; (e) to allow any other vessel to approach the ship.

(10) If an examination steamer is enjoined to examine a vessel, it shall be the duty of the examination steamer to

(1173) EAST INDIES—Borneo—East coast—Tarakan—Pilot light vessel—
Information.—Tarakan Pilot Light Vessel (3°14'27" N., 117°53'28" E.) has
been changed to show a flashing white light every 9 seconds, flash 1 second. No
(See N. M. 47 (5677) of 1954.)
(B. a. Z. 44 (543)'s-Gravenhage, 1955.)
H. O. Chart 6183.
H. O. Light List, Vol. II, 1953, No. 28770.
H. O. Pub. 162, 1952, page 438.

(N. M. 11, Mar. 12, 1955.)

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GLOSSARY

A few useful terms in the Malay, Achinese, Siamese languages and Sumatran dialects

Malay	English	Malay	English
Air.....	Stream.	Krung.....	River.
Alangalang.....	Reeds.	Kuala, kuala.....	Mouth of a river.
Api.....	Fire.	Labuan.....	Anchorage, harbor.
Arang.....	Coal.	Laem.....	Cape, point.
Arrib.....	Strait.	Lampung.....	Buoy.
Arus.....	Current.	Laut, laut besar.....	Sea.
Ayer.....	Fresh water.	Layar.....	Sail.
Ayer masin.....	Salt water.	Lem.....	Cape, point.
Ayer pasang.....	Flood or high tide.	Lho.....	Bay.
Ayer surat.....	Ebb or low tide.	Lugu.....	Inlet.
Bagan.....	Fishing village.	Lumpur.....	Mud.
Baharu.....	New.	Malang or malan.....	A rock a little above high water
Batang.....	River.	Merah.....	Red.
Batee.....	Rock, stone.	Muara.....	Mouth of a river.
Batu.....	Rock, stone.	Nangka.....	Jack fruit.
Benting.....	Fort.	Nipa.....	Small marsh palm.
Beriberi.....	A disease.	Nusa.....	Island.
Besar.....	Large, great.	Oedjaeng.....	Point, cape.
Beni.....	Iron.	Padang.....	Plain, open space.
Beting.....	Shoal, sand bank.	Padi.....	Rice in the straw.
Bukit.....	Hill.	Pak.....	Mouth.
Burung.....	Bird.	Panjang.....	Long, tall.
Dalan.....	Deep.	Pasang besar.....	High tide.
Dammar.....	Gum.	Pasang kring.....	Low tide.
Dapur.....	Cooking place.	Pasang naik.....	Flood tide.
Darat.....	Coast, land.	Pasang surut turun.....	Ebb tides.
Gadung or gadong.....	House.	Pasar.....	Village.
Gampier.....	The juice of a native plant.	Pasir.....	Sand, shoal.
Gebus.....	Shoal.	Patin.....	Betel nut.
Gedang.....	Great.	Pisang.....	Banana.
Gide.....	River.	Pisang.....	Peak of a hill.
Gle.....	Hill, mountain.	Ponchak.....	Native boat.
Goh or koh.....	Island.	Prau.....	Island.
Gono.....	Reef.	Pulo or pulau.....	White.
Gunung or gunung.....	Mountain.	Putih.....	Reach of a river.
Gunung or gunung api.....	Volcano.	Rantau.....	Rattan cane.
Gunung or gusong.....	Reef or rocks.	Rotan.....	Small boat.
Hin.....	Rock.	Sampai.....	Dry rice field.
Ikan.....	Fish.	Sawa.....	Channel, strait.
Itam or hitam.....	Black.	Selat or selat.....	Fishing stakes or inclosures.
Jalan.....	Road.	Seros.....	River, stream.
Jalur.....	Native boat.	Sungai, Sungai or Sungai.....	Land, country, earth.
Jambatan.....	Mole, jetty.	Tanah.....	Cape, point, promontory.
Jemara.....	Caquarina tree.	Tanjung or tanjong.....	Lake.
Jermal.....	Fishing inclosures.	Tauk.....	Reef.
Kampung or kampong.....	Village.	Tekong.....	Bay, cove, creek.
Kapal.....	Ship.	Telok or teluk.....	Coast, seaboard.
Karang.....	Coral reef rock.	Tepilaut.....	Copper.
Kedai.....	Town, large village.	Timbaga, tembaga.....	Store.
Kelapa.....	Coconut.	Toka.....	Beche de mer (edible sea slug).
Kecil.....	Little, small.	Tripan.....	A sunken rock.
Klong, Klong.....	Canal or creek.	Trumbu or terumbu.....	Channel, passage.
Ko.....	Island.	Trusan.....	Mountain.
Koala.....	River mouth.	Ulu.....	Cape, point, promontory.
Kota or kota.....	Town.	Ujung or ujung.....	

Principal points of the compass (Malay)

Utara.....	North.	Salatan.....	South.
Utara-samatimor.....	NNE.	Salatan-daya.....	SSW.
Timor-laut.....	NE.	Barat-daya.....	SW.
Timor-samatatara.....	ENE.	Barat-samatatara.....	WSW.
Timor.....	East.	Barat-tapat.....	West.
Timor-tenggara.....	ESE.	Barat-samatatara.....	WNW.
Tenggara.....	SE.	Barat-laut.....	NW.
Salatan-tenggara.....	SSE.	Utara-barat-laut.....	NNW.

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