which the principal export of the place is derived.

DEPTHS.—The bay is nearly filled with a bank of soft mud; the depths within the entrance being less than 3 fathoms, shelving gradually toward the head. Depths of 9½ feet were reported along the range leading to Selat Kalianget which is considerably deeper.

DANGERS.—A stranded wreck is located ⅗ mile 187° from the front light structure of the Kalianget Range. A wreck lies stranded in a position about ½ mile northward of the entrance channel of the Kali Saroku. A sunken wreck lies about 1½ miles north-northeastward of Tandjung Tandjung. An obstruction with a radius of 1 mile is located about 2 miles northeastward of Tandjung Tandjung in position 7°05′54″ S., 113°54′37″ E.

LANDMARKS.—The light structure on Tandjung Tandjung is prominent. A harbor office, with a flagstaff in front of it, stands near the entrance of the Kali Marengan. An old fort, which has been converted to a hospital, is located about ½ mile northward of the harbor office. Its red roofs are visible from the outer anchorages. A large salt plant, the lights of which are seen from the offing, is located about ¾ mile northwestward of Kalianget.

NAVIGATIONAL AIDS.—A light is shown from Tandjung Tandjung.

The front light of a range is shown from a white iron framework, 26 feet high, located westward of the town. The rear light is shown from a similar structure, 43 feet high, located 158 yards north-northeastward of the front range. These lights in range 029° lead from the middle of Teluk Sumenep to the southwest entrance of Selat Kalianget.

Selat Kalianget Range Lights can be used only at night because the light structures are difficult to distinguish. The rear light is mounted on a wooden pole on the east corner of the passenger pier. The front light is shown from a wooden pole located 85 yards 236° from the rear light. These lights in range 056° lead from the entrance range into the channel and alongside the pier.

Buoys and beacons mark the entrance channel and are in conformance with the Indonesian buoyage system.

3C–8 TIDAL CURRENTS.—The currents set through Selat Kalianget in an east-northeasterly direction during the falling tide and in a west-southwesterly direction during the first three hours of the rising tide. From half tide to slack water the current was reported to be weak and irregular. The strongest current observed was 1½ knots, although a 4 knot current has been reported in the narrows during full and new moon. The currents in Teluk Sumenep have been described in section 3C–4.

CURRENT SIGNALS.—The following current signals are displayed at Kalianget:

Northeast current—Black cylinder below black cone, point up.

Strong northeast current—Black cylinder below 2 black cones, points up.

Stand of current—Black cylinder with cone above, point up, and a cone below, point down.

Southwest current—Black cylinder above black cone, point down.

Strong southwest current—Black cylinder above 2 black cones, points down.

TIDE GAUGE.—A tide gauge, located on the inner side of the wooden pier (prolongation of the pontoon pier), shows the depth of water along the entrance range (029°) at a distance of 1⅓ miles from the front light.

ANCHORAGES.—Vessels can anchor in 4 fathoms, mud, with Tandjung Tandjung bearing 237°, distant 1½ miles. This anchorage is not safe during the east monsoon, and at such times vessels should anchor off the north coast of Gili Genteng (sec. 3C–3).

Vessels of light draft can anchor within the bay, in convenient depths, during both monsoons. Such vessels can anchor off Kalianget in 7 or 8 feet. There are mooring buoys here. Mariners are cautioned of the confined space, shelving bottom, and strong currents.

Anchorage off the pontoon pier is not recommended because of the presence of large coral rocks and two sunken caissons. As a result there is a chance that the anchor cannot be raised.

DIRECTIONS.—Vessels bound for Teluk Sumenep from westward should pass between Gili Radja and Gili Genteng and thence between Noko Rock and Tandjung Tandjung to the anchorage off that point.

Vessels coming from the Java Sea may use the channel between Gili Jang and Tandjung Lapa (sec. 3A–6) or may pass through Selat Sapudi. The southeast end of Pulau Puteran may be rounded at a distance of 2 miles and a direct course steered for the outer anchorage.

Vessels of light draft can enter the bay and approach the strait on the entrance range of 029°. Local knowledge is required for approaching the pier on the inner range of 056°. Vessels should stem the current in approaching the pier. When the wind is strong, use should be made, both in mooring and unmooring, of the mooring buoys in front of the pier.

SUMENEP (7°00′ S., 113°52′ E.)

3C–9 FACILITIES.—SUMENEP the capital of the Sumenep District, stands on the banks of the Kali Marengan, about 4 miles inland. There is a post office and hotel in the town. Kalianget is the shipping port for Sumenep. The majority of the imports are entered at the customhouse, located near the mouth of the Kali Marengan.

PIERS.—A pontoon pier, 328 feet long, used by small passenger ships, has a depth of 18 to 20 feet alongside. A stone pier for praus has a depth alongside of 8 feet. The crooked pier at the salt factory is used only by lighters. These piers are all located in the narrows.

SUPPLIES.—Fresh provisions can be obtained. Water is laid onto the pontoon pier.

REPAIRS.—Repairs to hulls can be made.

COMMUNICATIONS.—Railroad, telegraph, and road communications. Coastwise vessels make regular calls.

MEDICAL. There is a hospital at Sumenep.

COASTAL FEATURES (CONTINUED)

3C–10 BETWEEN TANDJUNG TANDJUNG (SEC. 3C–7) AND TANDJUNG PADELEGAN (SEC. 2F–13), about 22½ miles west-southwestward, the coast is indented by a shallow bay and fronted by numerous islands and dangers (sec. 3C–3). The north shore of this bay is formed by the slopes of the mountains described in section 3C–2. The land here is wooded and has a fertile appearance. The west shore of the bay is flat and marshy. TANDJUNG DATO, located 1¾ miles northeastward of Tandjung Padelegan, is a rocky wooded point.

Many small villages stand along the shores of the bay. Several small rivers intersect the coast. The only river of any importance is the Kali Bunder which flows out about 1¾ miles northward of Tandjung Dato. Kapedi, a town located about 10 miles east-northeastward of Tandjung Tandjung, can be identified by a white stone house on the beach. Pakamban, located about 4 miles westward of Kapedi, has some houses which are visible from the offing. Kaduara, located about 3¼ miles westward of Pakamban, can be identified by a tall waringin tree showing up dark against the light-colored background.

DEPTHS–DANGERS.—The 6 fathom curve fronts the north shore of the bay to a distance of 4 miles. A mud hank and shoal ground, as defined by the 6 fathom curve, fronts the west shore of the bay to a distance of 9 miles. Depths of 2 to 3 fathoms are found in the entrance of the Kali Bunder as far as the harbor office, located about 1 mile up river. However the channel through the drying bank of mud and sand leading to the river entrance

SEE SHORT CORRECTIONS

has a depth of only 1 foot. Several unofficial BEACONS mark the channel.

Pasir Putih, separated from Gili Gilingan (sec. 3C–3) by a channel with a depth of 6½ fathoms, is a low, flat coral islet, 200 yards in length. The islet is surrounded by a drying reef that extends 400 yards to southward, with 4 to 6 fathoms at its edge. The islet is only 2 feet above water, but two trees on it can be seen for a distance of 6 miles. A WRECK lies stranded on the north side of the reef surrounding the islet.

Gili Dua and Gili Pandan are low islets covered with brushwood. They stand on a reef that extends northeastward for 1¾ miles and has a width of nearly ½ mile. The islets are barely 2 feet above high water, but there is a tree 23 feet high, on the east side of Gili Dua, which can be seen for 6 miles. A native tomb with a red-tiled roof stands at the foot of this tree. A LIGHT is shown from Gili Dua. The channel between the reef surrounding these islets and Pasir Putih has depths of 5 to 6 fathoms.

Takat Wedi is a coral reef about 670 yards long lying about 3 miles west-northwestward of Gili Dua. A small white cay stands on the reef. The channel between the reef surrounding Gili Dua and Takat Wedi has a least depth of 2¾ fathoms.

Takat Blukaran, similar to the above reef, but smaller, lies about 1 mile northwestward of it. Several drying rocks lie between Tandjung Dato and Takat Blukaran.

ANCHORAGES.—Vessels can anchor, according to draft, between the islands fronting this coast and the coastal bank. The holding ground is good.

PROHIBITED AREAS.—Two prohibited areas, each 2½ miles in radius, are centered at Gunter Rock and at Takat Belukaran.

BUNDER ROAD.

3C–11 BUNDER ROAD lies off the entrance of the Kali Bunder and is limited by the parallel through the south point of Gili Dua and the meridian through the east point of Gili Pandan.

ANCHORAGES.—Bunder Road affords safe anchorage during the west monsoon, but in the east monsoon a heavy swell sometimes runs in, making the anchorage unsafe.

During the west monsoon vessels can anchor in 4 fathoms, mud, about 3 miles northeastward of the entrance of the Kali Bunder and 3 miles offshore. This anchorage lies about ¾ mile northward of the prohibited area.

During the east monsoon vessels can anchor 1 mile westward of the north point of Gili Pandan in 3 to 5 fathoms, mud, sand, and shells. This anchorage is protected from easterly and southerly seas, but is exposed to a swell which rolls in after a gale.

DIRECTIONS.—Passage to the roadstead is made difficult by the mud bank between Takat Blukaran and the coast, and by the prohibited area surrounding that danger. Vessels should approach the roadstead from eastward if they are drawing more than 16 feet.

PART D. NORTHEAST COAST OF JAVA–TANDJUNG SEDANO TO TANDJUNG BEDULAN

3D–1 TANDJUNG SEDANO (7°50′ S., 114°28′ E.) is identifiable by three steep walls of rock at the extremity of a spur from Gunung Baluran. A narrow strip of land, southward of the point, lies between the coast and the mountains.

COAST—GENERAL

3D–2 The greater part of the coast is formed by spurs from the mountains. Between Tandjung Sedano and Tandjung Djankar, there are

dense forests alternating with bare slopes. Between the latter point and the town of Besuki there are rice paddies and sugar fields. The latter is a shipping place of some importance.

Eastward of Gunung Ringgit, which lies close to the sea, there is flat land backed by a chain of hills running in an east and west direction about 7 miles southward of Tandjung Patjenan. These hills approach the coast in the bight eastward of that point and gradually rise to Gunung Baluran. Panarukan, an important lighterage port, stands on this flat land.

A large plain, enclosed by Gunung Ringgit, Gunung Ranu and Gunung Hiyang, is formed westward of the first named range.

A few miles eastward of Tandjung Bedulan spurs from Gunung Hiyang approach close to the coast, leaving only a narrow strip of beach as far as Gunung Temporah, located 10 miles to the eastward. Tandjung Bedulan is described in section 2F–13.

MOUNTAINS—Gunung Baluran, located near the northeast end of Java, forms a large crater, the north side of which is enclosed by Gunung Kelosut, located 5 miles westward of Tandjung Sedano. The summit of the crater is a prominent sharp peak, 4,091 feet high. Two reddish-brown knobs standing close together are located close westward of the crater.

A lofty range, located southwestward of the above range, extends eastward to Selat Bali. Gunung Raung (8°02′ S., 114°03′ E.), a volcano on the west side of this range, is 9,245 feet high. The center of this range is a large plateau. There is a crater on Gunung Raung and on the large plateau. Gunung Merapi, the easternmost peak of the range, has a conical summit 9,187 feet high.

Gunung Gundil, a spur of Gunung Ringgit, located about 3 miles southeastward of Tandjung Petjaron, is 541 feet high. It can be readily identified by its light gray color. A triangulation pillar stands on its summit.

Gunung Ringgitt, close to the coast, presents many fantastic peaks, the westernmost and highest is 4,101 feet high. Gunung Kukusan, located about 2 miles southward of Gunung Gundil, has a sharp summit 1,670 feet high. A sharp peak of 1,969 feet is located close southward of Gunung Kukusan.

Gunung Temporah, located about 10 miles eastward of Tandjung Bedulan, is a high round hill, 325 feet high. A prominent tomb, standing near some conspicuous trees, is located on a small hummock on the east side of the hill. The mountains southward and westward of Gunung Temporah have been described in section 2F–14.

DEPTHS—DANGERS

3D–3 This part of the north coast of Java is steep-to; the 10-fathom curve lying nowhere more than 2 miles offshore. The greater part of the coast is fringed by a narrow mud and sandbank, with a drying reef of stones and coral where the mountain spurs near the sea. Eastward of Tandjung Tjotek (7°45′ S., 114°18′ E.), the coast is fringed with coral reefs, some parts of which are always above water and being frequently overgrown, appear as islets.

PULAU KARANGMAS (7°40′ S., 114°26′ E.) and Putih Reef are the only dangers lying outside the 10-fathom curve. The former consists of a group of reefs. The northeast part of the southeast reef consists of coral and large rocks. The reef dries at low water and has an islet, covered with shrubs, on the west side of the drying part. The northwest reef is covered by 2¼ to 8 fathoms. Pulau Karangmas can usually be identified by the discoloration of the water. A LIGHT is shown from the northeast part of the southeast reef.

ANCHORAGE in 24 fathoms, can be taken 600 yards westward of the light structure. This anchorage can be reached by steering a course of 072° with the light structure ahead. With good light the edge of the reef can be avoided due to its discoloration.

PUTIH REEF, 400 yards in length and covered by 6 feet, lies close outside the 10-fathom

curve in position about 5 miles westward of Tandjung Djankar.

TIDAL CURRENTS–CURRENTS

3D–4 See section 3–3.

WINDS AND WEATHER

3D–5 See section 2F–18.

CAUTIONS

3D–6 A submarine cable is laid from Landangan, located 5½ miles south-southeastward of Tandjung Patjenan to Buleling (sec. 5A–8) on the north central coast of Bali. A conspicuous white cable house with zinc roof marks the landing at the first-named town.

Fishing stakes are reported to be located as far as 2 miles off the coast between Tandjung Djankar and Tandjung Patjenan.

The shore bank was reported (1956) to have extended seaward in the area about 1½ miles northward of Panarukan light structure.

COASTAL FEATURES

3D–7 BETWEEN TANDJUNG SEDANO AND TANDJUNG SUMBERBOTO, the coast is formed by the steep slopes of Gunung Baluran. Tandjung Lumut is wooded and steep-to. The strip of land that separates the coast from the mountains narrows to the southeastward and terminates altogether at Tandjung Sumberboto.

TANDJUNG TJOTEK is located 3¾ miles westward of Tandjung Lumut. The bare slopes of Gunung Baluran rise just to the eastward of the latter point. The village of Tjotek is located about 1 mile southward of the same point on the banks of a small stream.

TJOTEK REEFS, separated from the coast by a narrow channel, having depths of 5 to 12 fathoms, extend from a position 1 mile eastward of Tandjung Tjotek to Tandjung Lumut. Parts of these reefs are always above water, and the white coral sand over them renders the whole line of reef visible from a distance. The seaward edges of the reefs are steep, with depths of 20 fathoms close-to. The narrow channel between these reefs and the coast is entered from westward.

ANCHORAGES.—Vessels can anchor off the village in 12 fathoms, sand, about 1 mile from the shore. This is an exposed anchorage and during the east monsoon there is a great deal of sea and swell. Small vessels with local knowledge can find shelter in the narrow channel.

TANDJUNG DJANKAR is a rounded, steep-to-point, covered with high trees. The coast westward of the point is cultivated and has rice paddies and sugar plantations. Djangkar, a sugar shipping place located 2 miles southwestward of the point, can be identified by a tall chimney, 140 feet high, some 2 miles inland, and by the zinc-roofed warehouse and loading pier on the shore. Tandjung Agel, located 1¾ miles westward of the town and having a lone tree with a rounded top, is a good landmark.

DANGERS.—A 5-fathom patch lies nearly 1 mile northward of Tandjung Agel. A small coral patch of 2 fathoms lies about 2 miles westward of Tandjung Djankar. A black BEACON, with a topmark consisting of two black cones, marks the latter patch.

ANCHORAGES.—Small vessels with local knowledge can anchor ½ mile offshore in 8 fathoms, sand, with the prominent warehouse bearing 181° and Tandjung Djankar bearing 068°. Large vessels can anchor farther offshore in convenient depths with the warehouse on the same bearing.

DIRECTIONS.—Vessels should not approach the coast until about due northward of the warehouse. The tall chimney bearing 161° will clear the 2-fathom patch. (See cautions sec. 3D–6.)

TELUK KOMBANG, the open bay between Tandjung Agel and Tandjung Patjenan, is ob-

structed by several reefs and should be entered with CAUTION. Putih Reef, the outer danger, has been described in section 3D–3. Tandjung Patjenan is low, sandy and steep-to. Vessels can ANCHOR in convenient depths. The tall chimney at Djankar and the chimney of the sugar mill, located 2½ miles southward of Tandjung Patjenan, serve as useful landmarks.

DANGERS.—Shoals, with depths of 3 to 5 fathoms, lie up to 1 mile off the shores of the bay. (See cautions, section 3D–6.)

BETWEEN TANDJUNG PATJENAN AND PANARUKAN the coast is covered with a thick growth of coconut palms. The black chimney of a sugar factory, located 4½ miles south-southwestward of Tandjung Patjenan, is sometimes seen through the trees. Kalbut, a village located about 2 miles southwestward of the above point, is a sugar loading port. There are no prominent marks, the warehouses being hidden by the trees. A number of praus are usually anchored off the warehouses.

ANCHORAGE, fully exposed to the west monsoon, can be taken in 12 fathoms, about 1¼ miles off-shore of Kalbut. The bank is steep, and praus have difficulty in coming alongside, during the west monsoon.

PANARUKAN ROAD

3D–8 TANDJUNG PETJARON (7°41′ S., 113°52′ E.), the west entrance point of the road, is formed by a conical hill 204 feet high. From the offing this hill appears as an island. The road is entered between this point and Tandjung Paras. A tomb, surrounded by trees, stands on the conical hill and give it the appearance of a feathered hat. Panarukan is identifiable by the warehouses, one of which has a zinc roof. The light structures and flag staff are difficult to make out.

DANGERS.—Several shoal patches, with depths of 4 feet to 22 feet, lie within the 10-fathom curve in a position nearly 2¼ miles west-northwestward of the light structure at Panarukan.

Djamungan Reef, located ⅗ mile west-northwestward of the light structure, has a least depth of 2½ fathoms. Several shoal patches, with depths of 1¼ to 3 fathoms, lie between this danger and the coastal reef to the westward.

A foul area, reported to be an anchor and chain, lies about 1¼ miles northwestward of the light structure.

NAVIGATIONAL AIDS.—The main light is shown from the beach near the landing place.

A light is shown from a position nearly 1 mile west-southwestward of the main light structure.

A beacon with a red cylindrical topmark stands on the edge of the shore bank in position about ½ mile north-northwestward of the main light structure.

LOCAL SIGNALS.—The following signals, to be sounded on the whistle or siren, are in effect:

S	Police required
T	Doctor required
T (prolonged	Doctor required (urgent).
K	Agent representative required
N	Send fresh lighters
CH	Send tug alongside

ANCHORAGES.—The recommended anchorage in about 10 fathoms is with the main light structure bearing 128°, the light structure westward of the main light structure bearing 187°, and Tandjung Petjaron bearing 275°.

Moderate size vessels can anchor in 8¾ fathoms in a position with the main light structure bearing 146°, distant ¾ mile.

During the west monsoon, particularly in January and February, there is a short confused swell, so that lighters cannot be fully loaded and praus have difficulty in coming alongside.

DIRECTIONS.—Vessels approaching Panarukan from eastward will clear the reef fringing Tandjung Paras by keeping the main light structure bearing southward of 195°. Vessels making the immediate approach to the anchorage are cautioned that the depths decrease sharply within the 10-fathom curve. (See caution, sec. 3D–6.)

PANARUKAN (7°42′ S., 113°56′ E.)

3D–9 FACILITIES–PANARUKAN is the lighterage port for Situbondo, a town located 4 miles eastward. Sugar, coffee, rubber and tobacco are the chief exports. Extensive trade is carried on with Madura.

BERTHS.—There are no berths for deep-water ships. Two jetties project northwestward from the shore. The northeast jetty is 580 feet long and dries at low water. The southwest jetty is 1,130 feet long and has a depth of 3 feet. The wharves between the jetties dry at low water.

TUGS.—A few lighter-towing boats are available.

CARGO INFORMATION.—Cargo is worked from lighters at the anchorage. Several lighters are available. A crane of 2-ton lifting capacity is located at the northeast jetty. Covered and open storage areas are available.

PROVISIONS.—Meat and fresh provisions can be obtained in limited quantities. Other provisions are scarce. Water was reported (1963) as unobtainable.

REPAIRS of a minor nature to small craft can be accomplished.

COMMUNICATIONS.—There is telegraph, telephone, and railroad communication with other ports in Java. There is ferry service with Kalianget, Madura.

MEDICAL.—There are two small hospitals at Panarukan. There is a harbor doctor.

COASTAL FEATURES (CONTINUED)

3D–10 BETWEEN TANDJUNG PETJARON AND TANDJUNG PASIR PUTIH, about 3¼ miles west-southwestward, the coast is formed by the spurs of Gunung Ringgit (sec. 3D–2). A narrow reef fringes this coast.

Between Tandjung Pasir Putih and Tandjung Ketah, the coast is flat and wooded with high coconut palms, behind which the chimney of a sugar mill can be seen. The village of Bungatan stands on the northeast side of the bight. Tandjung Ketah is low and sandy. It is hard to identify from the offing.

Between Tandjung Ketah and Tandjung Bedulan, (sec. 2F–13) there are few noticeable landmarks, except for Gunung Loros (sec. 2F–14) and Gunung Temporah (sec. 3D–2). Besuki, a shipping place of some importance, stands along the banks of the Kali Besuki. Binor, located 4½ miles eastward of Tandjung Bedulan, can be identified by its small houses with red roofs and by its white fishing praus.

OBSTRUCTION.—An anchor with about 55 fathoms of chain is reported to lie about 2 miles westward of Tandjung Pasir Putih in position 7°42′20″ S., 113°47′20″ E.

DANGER.—Pulau (Taka) Kerandji, about 400 yards in diameter and covered by 9 feet, lies about 750 yards offshore in position about 5 miles westward of Tandjung Bedulan.

MEASURED DISTANCES.—A measured distance of 3½ miles, each end of which is marked by a pair of beacons surmounted by white triangles, is available between Tandjung Petjaron and Tandjung Pasir Putih. The east pair of beacons stands on Tandjung Petjaron.

Three pairs of beacons mark a measured distance located about 5 miles eastward of Tandjung Bedulan; each of these beacons has a white triangular topmark.

BESUKI ROAD (7°44′ S., 113°41′ E.)

3D–11 BESUKI is the capital of the residency. The limits of the roadstead are formed by the parallel through Tandjung Ketah, the meridian through Gunung Temporah, and the coastline.

LANDMARKS.—The waringin tree near the residents house and some round-topped trees

SEE SHORT CORRECTIONS

standing close by are prominent. The light structure, a white flagstaff, and two large warehouses with red roofs near the mouth of the river are very prominent. The chimney at the sugar refinery is sometimes seen through the high coconut palms along the coast. A LIGHT is shown from the entrance of the Kali Besuki.

ANCHORAGES.—Vessels should anchor outside the 10-fathom curve in a position about ⅗ mile from shore to northward or northwestward of the light structure. Vessels can anchor in convenient depths, mud bottom, with the waringin tree bearing about 138°.

DIRECTIONS.—Vessels from eastward can approach with Gunung Temporah bearing 242° ahead. Vessels from westward should pass well northward of Pulau Kerandji by keeping the conspicuous trees at Besuki well open of Gunung Temporah. The reef will be cleared when Gunung Loros bears 180°.

BESUKI is a shipping place of some importance. There are no deep-water berths. Fresh provisions are obtainable. The town is connected with the general railway system.

NOTE.—The coast westward of Tandjung Bedulan is described in section 2F–14.

PART E. KEPULAUAN SAPUDI–SELAT SAPUDI–SELAT MADURA

3E–1 PULAU PAJANGAN (6°58′ S., 114°26′ E.), the northern islet of the Kepulauan Sapudi, is very low, but has some tall trees on its south end. It is surrounded by a drying reef which extends up to ¾ mile offshore. A 6-fathom patch lies about 2½ miles north-northwestward, and a patch with a depth of 52 feet about 3½ miles north-northeastward of the island.

GENERAL REMARKS

3E–2 KEPULAUAN SAPUDI are a group of islands lying between Madura and Kepulauan Kangean. Pulau Sapudi is the largest and most important.

TIDAL CURRENTS—CURRENTS

3E–3 See section 3–3 for information on currents and tidal currents in Selat Sapudi. See section 3C–4 for such information in waters off the southeast coast of Madura.

WINDS—WEATHER

3E–4 See section 3–2.

SELAT SAPUDI, SOUTH ENTRANCE.

PULAU SAPUDI AND SELAT SAPUDI

3E–5 The center part of Pulau Sapudi consists of low hills enclosed by a ridge of hills rising in the shape of a ring. The summit, 407 feet high, is located on the southeast side of the island. Flat land is found at only a few places along the coast. The principal settlements are Gajam on the southwest coast, Tribung, on the northwest coast, and Nongunung, on the northeast coast. The island is fringed by a narrow steep-to reef.

SELAT SAPUDI, the channel between Pulau Sapudi and the islands and dangers off the east and southeast coast of Madura (sec. 3A–6 and sec. 3C–3) is wide and deep. Vessels bound for Selat Madura or Selat Bali usually navigate this strait.

LIGHTS.—A light is shown from the west point of Palau Sapudi. A light is shown from the head of the pier at Gajam.

ANCHORAGES.—Temporary anchorage can be taken off Gajam, Tribung, and Nongunung. These are open roadsteads and there

SEE SHORT CORRECTIONS

are often strong eddies when the winds oppose the tidal currents.

During the west monsoon there is anchorage off Gajam in 19 to 20 fathoms, about 800 yards from the drying coastal reef, with the conspicuous trees on a hill, 315 feet high, in range 000° with the cupola on the pier. The hill is located northward of the village.

During the east monsoon landing at Gajam is often difficult, and vessels then discharge their cargo and land their passengers at Tribung Road. Vessels can anchor about 400 yards from the edge of the drying coastal reef in 16 to 18 fathoms with the light structure bearing due east. CAUTION is required as the reef, northward and southward of the light structure, extends farther from the shore.

GAJAM, the principal village on Pulau Sapudi, is the site of a customs annex and has a number of stone houses. A stone pier, 400 yards long, is available for small craft with local knowledge. A flagstaff and a prominent red-roofed cupola stand at the end of the pier. Some fresh provisions can be obtained.

NONGUNUNG is a settlement with a few stone houses.

ISLANDS NORTHEASTWARD AND EASTWARD OF PULAU SAPUDI.

3E–6 PULAU BULUMANUK (7°00′ S., 114°29′ E.) is surrounded by a reef that extends up to 1 mile offshore. Pulau Pajangan has been described in section 3E–1.

Koset reef, with a least depth of 11 feet, is located about midway between Pulau Bulumanuk and the west point of Pulau Raas. The reef is about 1 mile in diameter and usually shows discoloration.

A growing reef is reported (1963) northeastward of Pulau Bulumanuk in approximate position 7°07′30″S., 114°37′40″E.

PULAU RAAS is 82 feet high in its west part and 160 feet high in its east part. The land between is low so that from the offing the island appears as two separate islands. Pulau Sarok, overgrown with low trees and encircled by a white beach, stands on the north part of the drying reef that extends 4½ miles northward from the north side of Pulau Raas. Some detached patches lie off the west side of the drying reef. The south patch, located 2½ miles northeastward of the west point of Pulau Raas, dries at low water.

A 3¾ fathom shoal of sand and stone lies about 2½ miles northwestward of Pulau Sarok.

PULAU ANJER, close off the northeast point of Pulau Raas, is a small, round islet lying within the edge of the drying reef surrounding the large island. The islet can be seen from a considerable distance.

PULAU TONDUK has a flat cultivated hill, 98 feet high, with some scattered trees on it. A mosque, with some coconut palms near it, stands on the north side of the island. There are a few houses on the island.

Pulau Telango Ajer, Pulau Telango Tenga, and Pulau Telango Timur are a group of islands, surrounded by reefs. Pulau Telango Ajer, the western island, and Pulau Telango Timur, the southeastern island, are covered with brushwood.

PULAU GOAGOA is fringed by reefs and shoals that extend up to 5 miles northward and northwestward. A number of stone and wood houses stand on the island and on the northeast point there are several tall trees. From the offing the island may appear as two islets. Many small boats will be seen at anchor as the island is approached. A report states that the island has the appearance of a series of detached rocks, none over 50 feet high.

PULAU KAMUDI, a small round islet encircled by a white sandy beach, is located 1 mile northeastward of Pulau Goagoa. A 7½ fathom patch lies about 2 miles southwestward of the same island.

KARANG TAKAT is a large steep-to reef, the edges of which are plainly visible during daylight hours. The outer edge of the reef consists of coral and stones. Fishing craft are usually seen on the reef. The tidal CUR-

SEE SHORT CORRECTIONS

RENTS are irregular and set strongly along the east and west points of the reef. The passage between Karang Reef and the shoal ground surrounding Pulau Goagoa and Pulau Kamudi is deep and clear, except for a 2¾ fathom patch which lies about 2 miles westward of the reef.

PULAU KEMIRIAN, densely wooded and 157 feet high, is surrounded by a steep-to reef, the edges of which are plainly visible during daylight hours. The passage between the islet and Karang Reef is deep and clear.

It was reported (1963) that Pulau Kemirian is a good radar target at a distance of 11 miles.

SELAT RAAS

3E–7 SELAT RAAS is wide and deep. There are no known dangers in the strait. The strait is seldom used by large ships as the currents run at a greater rate through it than in Selat Sapudi.

SELAT MADURA

3E–8 SELAT MADURA is the wide and deep strait between Madura and Kepulauan Sapudi, on the north, and the east part of Java, on the south. The islands forming the north side of the east approach have been described in Part 3E. The north side of the strait has been described in Part 3C and the south side in Part 3D. The west end of the strait has been described in section 2F–19 to section 2F–26.

PART F. KEPULAUAN KANGEAN

3F–1 TANDJUNG TINGGO, the northwest point of Pulau Kangean (6°50′ S., 115°13′ E.) is high, wooded, and visible for a distance of 24 to 28 miles. Teluk Ketapang, which indents the coast, just southward of this point, is the principal anchorage in the archipelago.

GENERAL REMARKS

3F–2 KEPULAUAN KANGEAN consist of one large island and several smaller ones, with numerous islets surrounding and between them. The sea area northward of the larger islands of the group, as far as the parallel of 6°15′ S., is studded with reefs and dangers. This group of islands and the Kepulauan Sapudi form a subdivision of the Sumenep District for administrative purposes. They are governed by a controller who resides at Ardjasa, on Pulau Kangean.

TIDAL CURRENTS–CURRENTS

3F–3 A CURRENT of more than 3 knots has been reported along the south coast of Pulau Kangean. The current is said to set in an east-west direction outside of the strait between Pulau Saubi and the coast of Pulau Kangean to the westward. A 4-knot current has been reported setting to the northward through the strait between the east side of Pulau Kangean and Pulau Paliat. For further information on tidal currents and currents, see section 3–3.

WINDS–WEATHER

3F–4 Heavy squalls from northward and westward occur in January and February in Teluk Ketapang. For further information on winds and weather, see section 3–2.

CAUTION

3F–5 The water surrounding these islands is very clear and the reefs can usually be recognized by discoloration, during daylight hours. As a rule, however, there is very little surf. Breakers have been reported in the passage between Pulau Paliat and Pulau Kangean. Numerous fishing craft may be met in the vicinity of these islands. For further cautions, see section 3–4.

PULAU KANGEAN

3F–6 PULAU KANGEAN is densely wooded and consists of coral lime heaved up by volcanic action. The greater part of the north coast is mountainous, attaining a height of 1,197 feet near its center. Low land separates these mountains from a ridge of hills located near the northwest end of the island. Sumur Batu, standing on this ridge, attains a height of 393 feet. It has a prominent summit, covered

with vegetation, and affords a good mark for approaching Teluk Ketapang. Two prominent hills stand close to the coast between Teluk Hekla and Teluk Gedeh.

The west part of the island is cultivated. Kalisangka and Ketapang, located in Teluk Ketapang, and Tabean, located on the north coast of Pulau Kangean, are the most important settlements. Ardjasa, the capital of the island, is the residence of a government official.

NORTH SIDE OF ISLAND.—A great part of the west half of the north coast is fronted by a sandy beach. The east half is fringed by a reef overgrown with mangroves. The village of Pabean, located 5¾ miles eastward of the northwest extremity of the island, can be identified by a dense grove of coconut trees, a couple of houses with red roofs, and a number of praus. The village lies behind a sloping stoney beach. The north coast of Pulau Kangean can only be safely navigated as far eastward as Pabean.

The WEST COAST is indented by Tekuk Ketapang and Teluk Hekla. The north part of this coast is hilly and the south part is low and covered with mangroves.

The SOUTH COAST is low, deeply indented, and has numerous islets and dangers off it.

TELUK KETAPANG AND TELUK HEKLA

3F–7 TELUK KETAPANG.—The north side of the bay is formed by a ridge of hills terminating in Tandjung Batu Guluk. Kalisangka stands at the head of the bay and is connected with Ardjasa by a broad sandy road. The village of Ketapang is located close southward of Kalisangka.

DEPTHS.—Depths of over 6 fathoms are found in the middle of the bay and in Bromo Passage. It was reported (1954) that the reef fringing the north side of Pulau Mamburit was extending in a northeasterly direction thereby narrowing the north end of the passage.

ISLANDS AND DANGERS.—Pulau Mamburit, a fairly high islet standing on the east side of an extensive drying reef, has a bright white beach. A fishing village stands among some coconut palms along the beach. A conspicuous tree stands on the southwest side of the island. Bromo Passage, about 400 yards wide and having depths of 12 to 17 fathoms, separates the northwest end of Pulau Kangean from the reef surrounding Pulau Mamburit. A mud flat, with depths of less than 6 fathoms, extends 2 miles southwestward and a little over 1 mile westward from the islet.

A reef of 2¾ fathoms is located about 4 miles northwestward of Pulau Mamburit. A 4¼ fathom patch lies about 1 mile southeastward of the reef.

The shores of the bay are fringed by a broad drying reef. Several detached drying reefs lie between the edge of the 6 fathom curve and the coastal reef. There are also some detached dangers outside this curve.

NAVIGATIONAL AIDS.—A light is shown from a white wooden pole located at the head of the pier at Kalisangka.

A beacon with a ball topmark, painted in black and white bands, marks the reef close northward of Taka Patokanon.

A beacon with a ball topmark, painted in black and white bands and surmounted by a black diamond, marks the edge of the reef northward of Tandjung Ala.

A beacon with a ball topmark, painted in black and white bands, stands on the west edge of Taka Takat.

The lower part of the above beacons are usually painted white. Several unofficial stake beacons mark the boat channels leading to the pier at Kalisangka.

A range beacon stands on a small reef south-southeastward of Taka Patokanon. This beacon in range 057° with the east summit of Sumur Batu (sec. 3F–6) leads into the bay from the southwest.

ANCHORAGES.—Large vessels can find shelter in the middle of the bay in 7½ to 11 fathoms. Small vessels can anchor in 8 fathoms, hard sand, with Tandjung Batu Guluk bearing 305°, distant 350 yards. This anchorage is not recommended, because of the swell, during the east monsoon. At such times sheltered anchorage can be taken in 3½ to 4 fathoms, soft clay, about 400 yards westward of the beacon on Taka Takat.

DIRECTIONS.—Tandjung Tinggi in range (045°) with the east point of Pulau Mamburit can be used in approaching the bay from the southwestward. The entrance range of 057°, shown on the chart, leads into the bay. It should be noted that the beacon, marking the front part of this range, is hard to identify. To avoid the dangers southwestward of Pulau Mamburit, Bromo Passage must be kept well open before the east point of Pulau Kemirian (sec. 3E–6) is in range with the west extremity of Pulau Kangean.

Small vessels bound for the north anchorage should enter the bay on the 057° range. When Tandjung Batu Guluk bears 022°, head for it on that bearing. When the beacon marking the reef close northward of Taka Patokanon bears 090°, the course can be altered for the north anchorage.

Small vessels bound for the anchorage westward of Taka Takat should follow the entrance range until the beacon on the west edge of Taka Takat bears 090°. Thence a course of 090° leads between dangers on either side to the anchorage.

Vessels leaving Teluk Ketapang through Bromo Passage can steer a due northerly course midway between Pulau Mamburit and the rocky shore of Pulau Kangean. When the low west side of the latter island comes in range with the southeast point of Pulau Mamburit, astern, follow this range until the channel is cleared.

CAUTION—The 3-fathom patch lying close northwestward of the entrance range in position 1¼ miles south-southwestward of Pulau Mamburit and other unmarked coral heads will be avoided if the ranges are closely followed.

TELUK HEKLA affords sheltered ANCHORAGE in its outer part. The inner part of the bay has not been properly examined.

TELUK GEDEH AND ANCHORAGES OFF SOUTH COAST OF PULAU KANGEAN

3F–8 TELUK GEDEH has a large reef in its entrance and should be entered only by small craft with local knowledge.

ANCHORAGES.—There are several safe anchorages of the coast of the east part of Pulau Kangean. These anchorages are sheltered from the southward by Pulau Sepapan (6°59′ S., 115°25′ E.), Pulau Saubi and Pulau Sabunting. The entire area within these islands is studded with reefs and dangers, most of which show up well under favorable conditions. The anchorage areas have general depths of 6 to 10 fathoms, mud, and in some places, mud and sand. The channels leading between the islands to the anchorage areas are narrow and unmarked. The channel leading northward of these islands is reported to be buoyed.

Small vessels having local knowledge can use these anchorages under favorable conditions of light.

SELAT PANTJUR AND ISLANDS EASTWARD OF PULAU KANGEAN

3F–9 SELAT PANTJUR, the narrow passage between Pulau Kangean and Pulau Paliat, can be used only by small vessels with local knowledge. A 6-foot patch lies in the middle of the south entrance of the strait. For currents and cautions in the strait, see section 3F–3 and 3F–5.

PULAU PALIAT is for the most part inaccessible because of the mangroves lining its shores. A hilly ridge, 469 feet high at the northwest end of the island, runs through its entire length. The island is wooded and has some cultivated areas.

PULAU SAPEKEN is small in extent, but is one of the more important islands of the group. Rows of houses, several of which have zinc roofs, stand along the west and south coasts of the island. A salt warehouse, a long building with a red roof, stands near the southwest end of the island. There is a stone PIER, suitable only for small craft, at the southwest end of the island. A LIGHT is shown from the southwest end of the island.

Pulau Bangkan and Pulau Paroppo are reef fringed and covered with mangroves. Pulau Silarangan has some scattered trees on it. Pulau Setabo is wooded. A hospital with a red roof is located on Pulau Saular.

Pulau Sidulang-besar is wooded and cultivated. Pulau Sidulang-ketjil has a small high part, and there are a number of clumps of mangrove standing in the water on the fringing reef. Pulau Pagerungan-ketjil is densely covered with coconut palms. Pulau Pagerungan-besar is cultivated in the west part and wooded in the east half.

PULAU SEPANDJANG is low and wooded. The north coast is deeply indented by creeks with mangrove-lined shores. Sandy beaches are found on the south and east coasts. A fishing village stands on the northeast end of the island. It has been reported that the coastal reef extends farther southward than charted.

Pulau Sasiel, near the northwest end of the reef fringing Pulau Sepandjang, has a village on its east side and some scattered trees.

Pulau Seridi-besar and Pulau Seridi-ketjil are fringed by reefs and wooded. The north point of the latter island is sandy.

Pulau Sapankur and Pular Saur are each high in the middle part and cultivated. Pulau Saebus has coconut plantations. There is a lying-up place for cargo praus on the north side of this island. A wreck lies stranded on the reef fringing the west side of this island.

PULAU SEKALA (6°56′ S., 116°15′ E.) has some high trees on it which are visible for 17 miles. The island is surrounded by a very steep-to coastal reef, the edge of which dries and is covered with vegetation on the northeast side, giving it the appearance of a detached island from the westward. A reef, with a depth of 6 fathoms, lies about 1 mile westward of the island.

ANCHORAGE can be taken off the southwest end of Pulau Sapeken in about 5½ fathoms. Vessels with local knowledge can approach this anchorage from the eastward or southward under favorable conditions of light. CAUTION is necessary in order to avoid the numerous shoals and mud flats. The area has not been completely examined.

ISLANDS AND REEFS NORTHWARD OF PULAU KANGEAN

3F–10 The sea area northward of the larger islands of the group, as far as the parallel of 6°15′ S., is studded with reefs and dangers. There is deep water between these dangers, but few marks are available for avoiding them. For cautions, see sections 3–4 and 3F–5. For weather conditions in this area, see section 3–2.

PULAU ARAAN (6°29′ S., 115°45′ E.), the largest of the many islets in this area, has a wood of high trees, with shrubs elsewhere. Pulau Aluan has three round-topped trees in its south part. These trees are somewhat higher than the other trees on the island. Pulau Patjar has some tall trees. There is a sandy point on the south side of the island. Pulau Segentok has a row of slender casuarina trees. It is reported that these four islets can be seen from a distance of 13 miles.

Pulau Miongan and Pulau Timunan are each covered with low vegetation. The former has a high tree in its middle part. The latter is reported to be visible from a distance of 7 miles. Pulau Bunginnjamjur, visible 6 miles, is a sandbank covered with undergrowth.

NOTE.—Fishermen are sometimes found in this vicinity. They set up temporary fishing camps on the various islands.

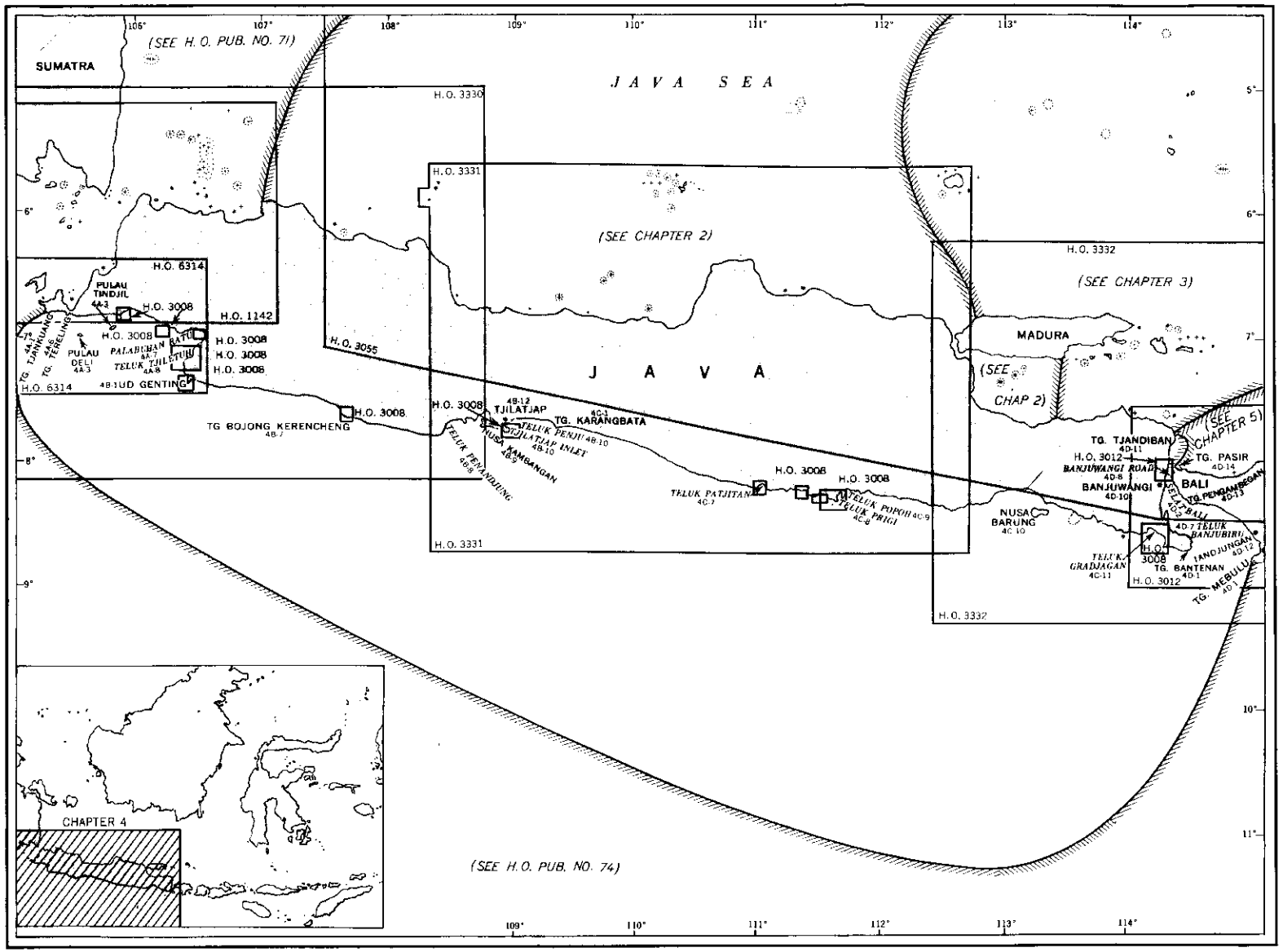


Chart limits shown are of the best scale charts issued to naval vessels by the U.S. Navy Hydrographic Office.
Numbers refer to the section in the text describing a designated locality.

CHAPTER 4—GRAPHIC INDEX

CHAPTER 4

SOUTH COAST OF JAVA—SELAT BALI

Part A. Tandjung Tjankuang to Udjung Genteng
Part B. Udjung Genteng to Tandjung Karangbata
Part C. Tandjung Karangbata to Tandjung Bantenan
Part D. Selat Bali

PLAN.—This chapter describes the south coast of Java. The arrangement is from west to east. This is followed by a description of Selat Bali. The arrangement is from south to north.

GENERAL REMARKS

4–1 The south coast of Java is for the most part high and consists of steep rocks and narrow points. Java is relatively narrow; the prominent mountains on either side of the island serve equally as good landmarks. Some of the mountains can be identified at distances up to 75 miles during the Northwest Monsoon. During the Southeast Monsoon these mountains are usually concealed by the hazy atmosphere, and cannot be identified until close by.

The coast for the most part is steep-to. Heavy swells break unceasingly on all exposed points and roll into the bays and some of the harbors. There are a few harbors which afford shelter during either monsoon. Tjilatjap is the most important port on the south coast of Java.

Selat Bali, which separates Bali from Java, is used primarily by local traffic. Banjuwangi, on the west side of the strait, is a lighterage port of some importance.

WINDS AND WEATHER

4–2 Southerly winds prevail along the south coast of Java during all months except January. The Southeast Monsoon commences in April and lasts until September; the wind occasionally blows from the south-southwest or southwest at this time. In October the mean direction of the wind is southerly, in November and December south-southwesterly and in January west-northwesterly or northwesterly. A retrograde motion begins in February, and in March winds from the southwest occur. These winds sometimes shift to northwest or southeast. This unsettled condition lasts to the latter half of April.

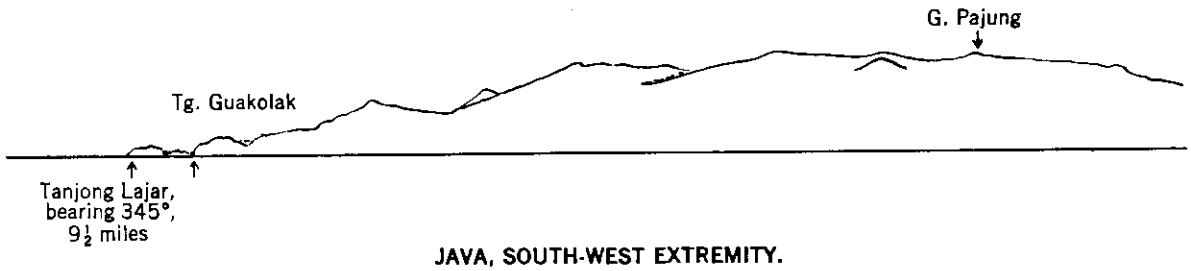
Rain can be expected, during the Southeast Monsoon, about 58 hours per month. During the Northwest Monsoon, especially during the first three months of the year, this occurrence will increase to about 110 hours. Near the coast, a considerable fall may occur where high mountain spurs extend to the shores. Little rainfall occurs where the coastal land is level.

CURRENTS AND TIDAL CURRENTS

4–3 Currents run usually to the southeast being strongest during the Northwest Monsoon and weak at other times. The vertical tide movement is mixed, with a predomiuantly semidiurnal character. In general the tidal currents set westward on the rising tide and eastward on the falling tide.

CAUTIONS

4–4 The south coast of Java, between Tandjung Guakolak (H.O. Pub. 71) and Tandjung Sodung, is said to be similar in appearance, during hazy weather, to the coast to the northwest-



JAVA, SOUTH-WEST EXTREMITY.

ward, including Pulau Panaitan. The long narrow isthmus connecting Djungkulon Peninsula with the Java mainland has been mistaken, at a distance, for the entrance of Behouden Passage. This passage and Pulau Panaitan are described in H.O. Pub. 71.

During the Southeast Monsoon, the weather is hazy and the high mountains of Java and Bali can rarely be seen.

PART A. TANDJUNG TJANKUANG TO UDJUNG GENTENG

4A–1 TANDJUNG TJANKUANG (6°51′ S., 105°16′ E.) is the southernmost point on Djungkulon Peninsula. A 1,273 foot peak rises just northward of the point. The 1,598 foot summit of Gunung Pajung is located about 2 miles northward of the point. A submerged rock lies close offshore in a position about ¾ mile eastward of the point. An above-water rock lies about 800 yards southward of the point. The coast of Java, westward of Tandjung Tjankuang, is described in H.O. Pub. 71.

COAST–GENERAL

4A–2 The coast, between Tandjung Tjankuang and Udjung Sinini, is fronted by a sandy beach upon which the sea breaks at all times. There are a few scattered villages along the coast. Here and there along the coast are dune formations which are subject to continuous change.

Palabuhan Ratu (Wijnkoops Baai), entered between the latter point and Udjung Karang Bentang, is surrounded by high hills which are covered with trees. Teluk Tjiletuh (Zand Baai), just southwestward of the larger bay, is small in extent and relatively shallow within. Spurs from nearby mountains nearly reach the northeast and southwest shores of the bay. The southeast shore of the bay is less abrupt and consists of alternate high and low land. The hills and low lands are covered with high trees. Bamboo grows along the beaches.

Between Teluk Tjiletuh and Udjung Genteng, the coast is indented by several rocky bights.

DEPTHS—DANGERS

4A–3 The 10-fathom curve lies up to 3 miles offshore between Tandjung Tjankuang and Udjung Sinini. Palabuhan Ratu is steep-to on its north side; the 10-fathom curve lies up to 2½ miles off its east side. The coast, between the south entrance point of the bay and Udjung Genteng is rocky and rather steep-to, the 10-fathom curve lying up to 1 mile off the salient points.

OFF-LYING ISLANDS.—PULAU DELI is covered with large trees. Numerous coconut palms stand along its shores. A partially drying reef fringes the shores of the island. Vessels can anchor off the north side of the island in 13 to 15 fathoms, clay.

PULAU TINDJIL is similar in appearance to Pulau Deli. Between these islands and the coast of Java there is a bank with depths of 15 to 30 fathoms, coarse sand and mud bottom.

OFF-LYING SHOAL.—A shoal bank with a least depth of 3¾ fathoms extends 2½ miles

southeastward from a position 1¼ miles southeastward of Tandjung Sodung.

TIDAL CURRENTS—CURRENTS

4A–4 Little is known of the currents in Palabuhan Ratu. After heavy rains the outset from the Kali Tjimundiri sets southwestward along the southwest coast of the bay. It is never stronger than ¾ knot. A southerly outset current of 2 knots has been reported in the northwest corner of the bay. See section 4–3 for further information.

WINDS AND WEATHER

4A–5 The sea breeze sets into Palabuhan Ratu at 0900 during the Southeast Monsoon and is moderate in force. The Southeast Monsoon does not blow strongly in the bay, probably due to the surrounding high land. The west wind blows strongly during the Northwest Monsoon. The climate, in general, is healthy. See section 4–2 for further information.

COASTAL FEATURES

4A–6 TANDJUNG KARANGPABAJANG (6°51′ S., 105°16′ E.) is a high, steep and barren point. The high rocky ground continues for 2½ miles northeastward to a small stream. A group of rocks, partly above water, lies about 1 mile northeastward of the point. Between the stream and Tandjung Tereleng, there is a low, sandy shore. The latter point is low, sandy, and surrounded by rocks.

Tandjung Panggorah is rocky and is backed by hilly land. The coast between this point and Tandjung Tereleng forms the south side of an isthmus between Djungkulon Peninsula and the mainland.

Tandjung Sodong is a rocky point backed by hilly land. Between this point and Tandjung Panto, the shore line has a gentle slope. The land within is wooded and level. A number of small streams intersect the coast. A 3¼-fathom patch lies about 2½ miles southeastward of Tandjung Mantijung. The islands and dangers lying outside the 10-fathom curve have been described in section 4A–3.

Tandjung Panto is fringed with rocks, and the sea may break 1 mile offshore. A small river discharges on the west side of the peninsula forming the point. A small village stands at the river mouth. During the Northwest Monsoon, vessels can ANCHOR in 7 to 9 fathoms, good holding ground, off the east side of the small peninsula. A swell sometimes rolls in around the point.

Eastward of Tandjung Panto, the coast continues to be low for about 9 miles and then gradually rises. Between Udjung Karangtaradje and Udjung Sinini, the coast is high, rocky, and thickly wooded.

JAVA, SOUTH COAST BETWEEN Tg. TERELENG AND Tg. SODONG.

PALABUHAN RATU

4A–7 PALABUHAN RATU is visited, during both monsoons, by coastal vessels as well as by large oceangoing ships. The bay is entered between Udjung Sinini and Udjung Karang Bentang. Rugged points are found along the shores of its bay. Rocky shoals project up to 600 yards off these points. Several small rivers flow into the bay. Some warehouses for salt and coffee stand at the head of the bay.

In the north part of Palabuhan Ratu depths on the insular shelf increase abruptly to over 10 fathoms within 1 mile of the shore. In the east part the 10 fathom curve lies up to 2½ miles from the shore. The coast, between the south entrance point of the bay and Udjung Genteng, is rocky and the insular shelf is steep-to with depths of over 10 fathoms within 1 mile of salient points. Depths of over 100 fathoms are found in the middle of the bay. All dangers lie within the 10-fathom curve.

NAVIGATIONAL AIDS.—A light, exhibited when a ship is at anchor or is expected, is shown from a white pillar located about ½ mile southward of Palabuhan.

A black can buoy, marking some rocks, is located about 350 yards southwestward of the small pier.

ANCHORAGES.—Anchorage can be taken in 8 to 12 fathoms off the east side of the bay between Palabuhan and Tandjung Kembang. Anchorage can be taken off the north side of the bay to the eastward of Tandjung Tjikembang. During the Northwest Monsoon it is better to anchor in greater depths, as the roadstead is not safe due to the heavy swells rolling in. There are several fish traps in the roadstead.

PALABUHAN, a small village with a chapel, stands at the head of the bay.

A small "T-head pier" lies close westward of the warehouses. A mooring buoy lies about 300 feet from the head of the pier. Some fresh provisions are obtainable.

TELUK TJILETUH

4A–8 TELUK TJILETUH (ZAND BAAI) provides good shelter during the Southeast Monsoon. Several small unnavigable rivers flow into the bay. A small, but noticeable waterfall, is located near the village of Balekambang. About 2 miles inland there is a large waterfall, about 790 feet high.

DEPTHS AND DANGERS.—The 10-fathom curve lies about 1¾ miles from the head of the bay. Within this curve the depths shoal gradually. Foul ground, consisting of sunken and above-water rocks, extends nearly 1 mile offshore to the eastward of Tandjung Kunti. Pulau Rametuk and Pulau Manuk lie within this foul area. The former is cliffy and has trees on it. The latter is rocky, but somewhat lower.

A reef, visible above water, projects about 600 yards southwestward from Tandjung Karangragok.

Castor Rock, the outermost danger in the bay, is 8 feet in diameter at its head and covered by 2 feet at low water. A rock with a least depth of 2½ fathoms lies 43 yards southeastward of Castor Rock. These rocks are hard to identify when there is a calm sea.

A 7- or 8-fathom patch lies northwestward of Castor Rock in a position about 1 mile north-northwestward of Tandjung Kunti. A rock awash lies about ¼ mile northward of the same point.

ANCHORAGE.—Vessels can anchor in the middle of the bay in 12 fathoms, mud, mixed with sand. Vessels can drop anchor with the north end of Pulau Rametuk bearing 150°, distant 1,600 yards and Udjung Karangtjapis bearing 242°. This anchorage lies about ½ mile northeastward of Castor Rock. It is unsafe during the Northwest Monsoon.

COASTAL FEATURES (CONTINUED)

4A–9 Between Udjung Karangtjapis and Udjung Genteng, there are several bights with white sandy beaches, separated by prominent points formed by spurs from the hilly land behind. Vessels should give the north part of this coast a berth of at least 1 mile as above and below water rocks lie up to ¾ mile offshore. Small vessels with local knowledge can find shelter in these bights during the Southeast Monsoon; the bottom is of white sand and shells, mixed with clay.

PART B. UDJUNG GENTENG TO TANDJUNG KARANGBATA

4B–1 UDJUNG GENTENG (7°23′ S., 106°24′ E.) is a low peninsula having tall trees on it. It is very conspicuous from westward. A sandbank, with a great many rocks on it, fringes the point and extends 800 yards southward from it. The south part of this sandbank is prolonged in a south-southeasterly direc-

tion for about ¾ mile by a rocky ridge with a depth of 3¾ fathoms at its outer part.

An inlet indents the coastal reef on the west side of the peninsula. The inlet is narrow and has a fairway width of less than 100 yards at the entrance. A PIER extends 250 yards in a southerly direction to the edge of the reef on the west side of the inlet. There is a depth of 20 feet alongside. Two mooring buoys are moored eastward of the pier.

BEACONS.—A white beacon stands on the neck of the peninsula at the head of the inlet. A prominent shed with a zinc roof is located close southeastward of the beacon. A beacon surmounted by a black cone marks the edge of the coastal reef on the west side of the inlet, about 300 yards within the entrance. An unofficial beacon, located 325 yards 200° from the white beacon, marks a rock on the east side of the inlet, near its head.

ANCHORAGE-DIRECTIONS.—Passing vessels should not round Udjung Genteng in depths of less than 20 fathoms. Small vessels with local knowledge can enter the inlet on a course of 029° with the white beacon ahead. During the Southeast Monsoon, large vessels can anchor in 11 fathoms with Udjung Genteng in range with a rock on the fringing reef, about 350 yards westward of the point, bearing 096°. A saddle mountain in the distant will be seen on this alignment behind the point. This anchorage is only 300 yards off the coastal reef. Vessels can anchor farther westward on the same range, but more swell may be experienced.

COAST—GENERAL

4B–2 BETWEEN UDJUNG GENTENG AND TANDJUNG BOJUNG KERENCHENG, the south entrance point of Teluk Tjilauteureun, the coast is mountainous and devoid of prominent points. Gunung Tjikuraj, located 23 miles north-northeastward of the latter point, appears as a peak having a perpendicular west side and a rounded east side. Gunung Papandajan, to the westward of this peak, is 8,602 feet high and appears as a broad summit with 5 peaks.

Between Tandjung Bojong Kerencheng and Udjung Madasari, there is only one noticeable point, namely Tandjung Gede. In this stretch, the coast is low near the sea, well wooded, and cultivated.

Between Udjung Madasari and Tandjung Karangbata, the coast is somewhat indented. Nusa Kambangan, a long and relatively narrow peninsula, rises to a height of 660 feet and is covered with tall trees. Teluk Penandjung, which is divided into two bays by Tandjung Tjimanggu, is located westward of the peninsula. Teluk Penju is located eastward of the peninsula. The important port of Tjilatjap is located along the west side of the latter bay, northward of the east end of the peninsula.

DEPTHS–DANGERS

4B–3 The coast is high and steep-to between Udjung Genteng and Tandjung Bojong Kerencheng. Between the latter point and Udjung Madasari, the coast is steep-to. The rocky points are fringed with reefs on which the seas break violently. A heavy surf breaks on the white sandy beaches in the small coves indenting this stretch of coast. The bays indenting the coast between Udjung Madasari and Tandjung Karangbata are clear of dangers in their outer parts.

TIDAL CURRENTS—CURRENTS

4B–4 See section 4–3.

WINDS AND WEATHER

4B–5 See section 4–2.

CAUTIONS

4B–6 A shoal area, in which a depth of 4¾ fathoms was reported, is charted southeastward of the east end of Nusa Kambangan. For further cautions, see section 4–4.

COASTAL FEATURES

4B–7 TANDJUNG BOJONG KERENCHENG (7°40′ S., 107°41′ E.), the south entrance point of Teluk Tjilauteureun, is covered with tall trees. A white multistory house, the huts at the landing place and a bridge over a stream, all located on the southeast shore of the bay, serve as landmarks.

DEPTHS–DANGERS.—Depths of 5½ to 8 fathoms are found in the middle of the bay. Karang Kaputihan, a drying reef, extends about 400 yards northwestward from Tandjung Bojong Kerencheng. A shoal spit, with depths of 3 to 5 fathoms, extends 1,800 yards northwestward from the outer end of the drying reef. A large prominent rock stands on the drying reef.

ANCHORAGES.—Teluk Tjilauteureun is open, but, under favorable conditions, anchorage can be taken in 6 or 7 fathoms with Tandjung Bojong Kerencheng bearing 170°, distant 800 yards. This anchorage is approached from the northwestward.

TELUK PENANDJUNG

4B–8 TANDJUNG TJIMANGGU (7°44′ S., 108°40′ E.) is the south extremity of Penandjung, a small peninsula 479 feet high. The peninsula separates Teluk Parigi from Teluk Maurits. These bays collectively form Teluk Penandjung. Some provisions can be obtained here.

TELUK PARIGI offers good shelter during the west monsoon. Vessels can anchor in 10-fathoms with Udjung Masari bearing 199° and Tandjung Tjimanggu bearing 091°. During the east monsoon, vessels can anchor in the east part of the bay, off the small peninsula.

TELUK MAURITS offers good shelter during the west monsoon. Vessels can anchor in 8 or 10 fathoms with the southeast side of Penandjung bearing 186° and Tandjung Besek bearing 105°. The latter point is the southwest extremity of Nusa Kambangan.

NUSA KAMBANGAN–MUARA TJITANDU

4B–9 TANDJUNG BESEK (7°44′ S., 108°47′ E.) is the southwest extremity of Nusa Kambangan, a long and narrow island. A very narrow channel, only navigable by small craft of light draft, separates the northeast side of the island from the mainland. This channel connects Teluk Penju with Segara Anakan, a shallow lagoon. Teluk Maurits is connected with the lagoon by Muara Tjitandu.

ISLAND AND DANGERS.—Nusa Wre, a high, densely wooded, rocky island lies on the northwest side of the entrance of Muara Tjitandu. Muara Tjiseel is the passage westward of this island.

Ambur Badak, the outermost of a group of drying rocks, is located about ⅗ mile north-northwestward of Tandjung Besek.

TELUK BATUR (SOLOK BATUR), entered about 1 mile northward of the point, affords good shelter during easterly winds in 5 to 7 fathoms.

MUARA TJITANDU is the west channel leading to Segara Anakan. The sides of the inlet are high and steep. The opening into the inlet is hard to identify from southward, but on closer approach, Nusa Wre is distinguishable.

The reef projecting from Tandjung Sarang is covered by heavy breakers. A 1½ fathom patch is located 400 yards west-northwestward of Tandjung Sarang. Nusa Manuk, about ¼ mile northward of this point, is a rock standing near the edge of the 3-fathom curve. A few drying rocks are located on the west side of the channel, opposite the rock.

DEPTHS.—Depths of 5 to 27 fathoms are found in the fairway of Muara Tjitandu which is only 200 yards wide in places. Muara Tjiseel, westward of Nusa Wre, has depths in places of only 6 feet. Foul ground, with depths of less than 6 feet, extends ¼ mile northward from the north end of the island.

TIDES AND TIDAL CURRENTS.—The range of the tides depends to a great extent upon the winds, and on a greater or less discharge of the rivers which flow into Segara Anakan. Spring tides usually rise 5 feet, and neap tides 3½ feet.

The tidal currents are variable in force and duration except when the rivers are low, the flood and ebb then changing every six hours. During periods of high river, the flood runs 3 hours and the ebb runs 9 hours.

ANCHORAGES.—Vessels can anchor in 7 or 8 fathoms, sandy bottom, off the mouth of Muara Tjitandu. The bottom within the inlet is uneven and consists of hard sand, gravel, and broken rocks. Small vessels with local knowledge can anchor, as convenient, within the inlet, but better anchoring ground will not be found until the entrance of Segara Anakan is reached. Due to the narrowness of the channel, the irregularity of the tidal currents, and the presence of strong eddies, it is advisable for such vessels to moor. Vessels load and discharge their cargo by means of praus.

DIRECTIONS.—The passages on either side of Nusa Wre are unmarked and difficult to navigate by vessels not having local knowledge. With southerly winds, in either monsoon, the channel entrance is difficult to navigate and sometimes impassable. The steep sides of Muara Tjitandu intercept all winds which do not blow straight through. The little room the channel affords for navigation, along with its winding form, makes for difficult navigation.

TELUK PENJU AND TJILATJAP INLET

4B–10 TELUK PENJU is the open bight between Nusa Kambangan and Tandjung Karangbata. The 10-fathom curve lies from 1½ to 4 miles off the shores of the bay. Rivers discharge into the bay, carrying out trees and debris which cause discoloration of the water and dangers to navigation. The important port of Tjilatjap stands on the west shore of the bay. Tjilatjap Inlet, a narrow channel, leads along the northeast shore of Nusa Kambangan to the port. Ajar, a small village, stands along the northeast corner of the bay.

TJILATJAP INLET, the narrow channel to Tjilatjap, leads along the northeast side of Nusa Kambangan. The east end of this island is prominent from southward and may be recognized by the bluff head of Tandjung Karangbolong and by Tjimiring Light structure. During clear weather the conical peak of Gunung Slamet (sec. 2B–2) is a good landmark. Tandjung Karangbata (sec. 4C–1) serves as a good land mark for Tjilatjap Inlet. The ruins of a fort stand on Tandjung Karangbolong, the southeast entrance point of the inlet.

WINDS AND WEATHER.—A gentle land breeze from the west or northwest blows in during the morning hours. From the middle of July, however, until the beginning of October there are continuous easterly winds, and in August and September they are accompanied by heavy rains and frequent storms, with no westerly or land breeze at all.

The climate cannot be considered healthful during the Northwest Monsoon. During the Southeast Monsoon there are fresh breezes. The heaviest rainfall occurs from October to January, at which time it rains during 20 days in each month. The driest months are August and September, when rain falls about 11 days in each month.

TIDES AND CURRENTS.—At Tjilatjap, the mean high water springs rise 6 feet and the mean high water neaps rise 4½ feet. The mean tide level is about 3½ feet.

The tidal current in Tjilatjap Inlet are mostly semidiurnal. In front of the entrance allowance must be made for a generally constant shifting current toward the northward. Along the axis of the channel the current in general follows the line of the channel, but on both sides it passes over the shoals. Tbe flood current sets southwestward over the hard sand bank and thence west-southwestward.

Abreast Karang Bali, the flood current sets southward and southwestward. To the westward the tidal current follows the direction of the channel into Segara Anakan, where it meets the flood current from Muara Tjitandu. Because of the influence of the Kali Donan, especially during the rainy season, the duration of the ebb is usually longer than that of the flood.

The ebb current flows in an opposite direction, round the bight opposite Karang Bali and thence northeastward through the narrow channel. The ebb current sets northward and northeastward over the hard sand bank.

The current changes direction 10 minutes after high water and low water. The strength of the current occurs 2 hours after high and low water.

The ebb current usually has a rate of ½ to 1 knot at neaps and is stronger than the flood current. At springs the ebb current attains a rate of 2½ to 4½ knots. During the rainy season the ebb current sometimes attains a rate of 5 knots.

DEPTHS—DANGERS.—Vessels drawing 21 feet can enter Tji latjap Inlet at all times. A maximum draft of 25 feet was reported in 1962. Vessels drawing 21 feet can berth alongside the piers.

The 6-fathom curve is located about 2 miles eastward of the east side of Tjilajap. At this position the insular shelf is hard sand and shoals gradually to the shore. Two drying patches are located west-northwestward of Tandjung Karangbalong. The entrance channel, which has a least width of 200 yards, leads southward of these patches and northward of a narrow steep-to reef fringing the northeast shore of Nusa Kambangan.

Shoal patches, with least depths of 3¼ fathoms, lie ¼ mile northeastward of Tandjung Karangbolong.

CAUTIONS.—An unswept minefield exists southward and westward of the entrance buoy and northward of the parallel running through Tjimiring Light structure. Vessels should avoid this area and approach the swept channel only during daylight hours. See section 4B–6 for additional cautions.

Numerous wrecks lie in the harbor and inlet. Some are marked by green or black buoys.

Two cable notice boards are located on the southeast point of Tjilatjap to mark the north landing places of two cables that extend across the inlet. Another notice board is located on Nusa Kambangan to mark the landing place of the two cables. Anchorage is PROHIBITED within 110 yards of the cables.

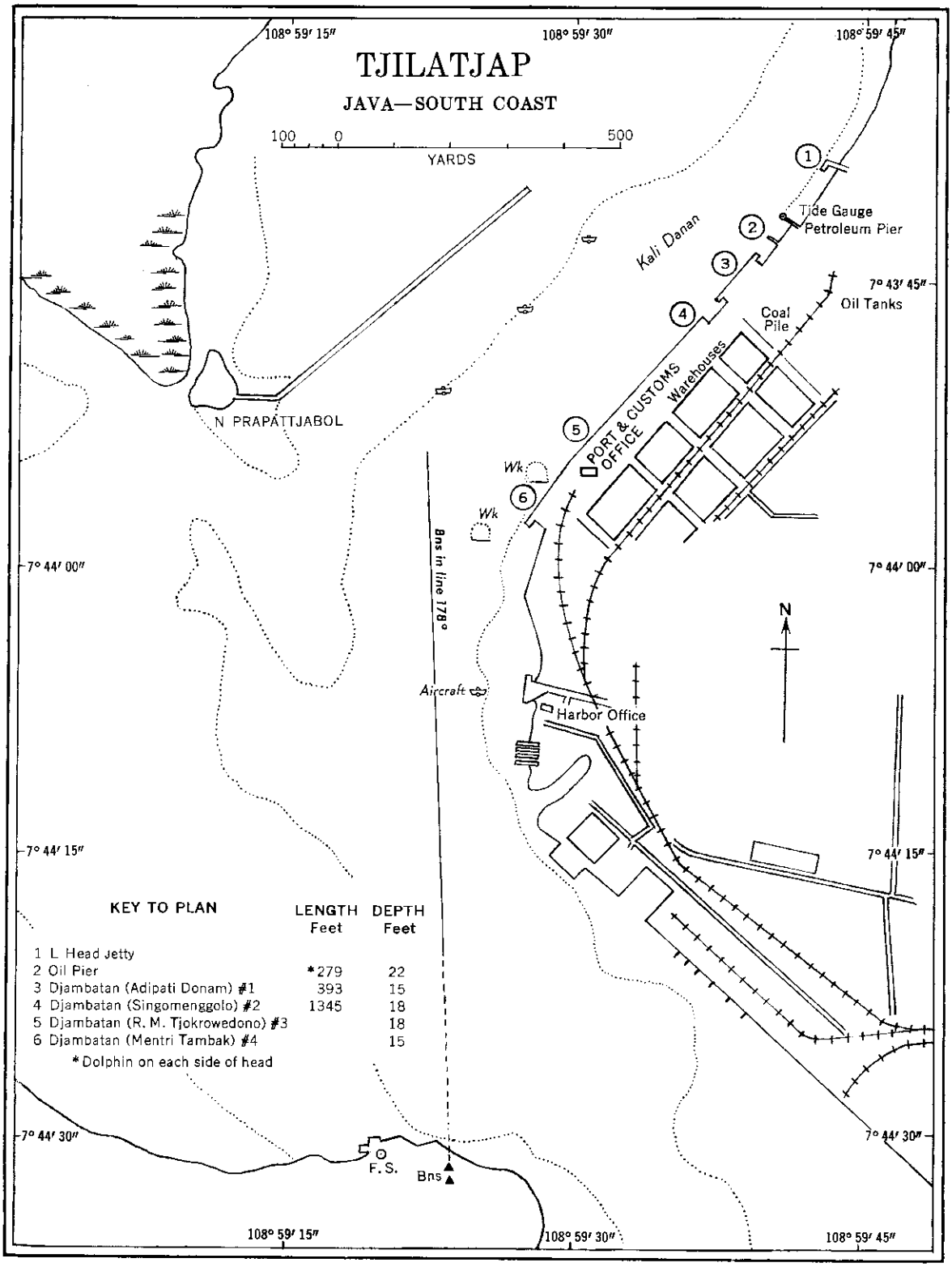
4B–11 NAVIGATIONAL AIDS.—Outer Buoys are moored 4¾ miles east-northeastward and 3 miles northeastward, respectively, of Tjimiring Light structure. The latter buoy was reported as missing (May 1962). The former buoy is a red conical buoy with a radar reflector. The inlet is marked in accordance with the Indonesian Buoyage System.

Tjimiring Light is shown from a hill on the southeast end of Nusa Kambangan. A light is shown on the east side of Tjilatjap.

RANGE BEACONS.—Two beacons in range 264° lead to the inlet. The rear beacon, a black 3-legged pile structure surmounted by white triangles, points down, stands on Nusa Kambangan in position about 1⅗ miles westward of Tandjung Karangbolong. The front beacon, a white iron structure, surmounted by white triangles, points up, is located on the hard sand bank on the north side of the channel, about ⅗ mile eastward of the rear beacon. Three sets of range beacons lead through the channel to Tjilatjap.

ANCHORAGES.—With westerly winds, safe anchorage can be taken in the outer roads under the lee of Nusa Kambangan in 6 or 7 fathoms. This anchorage is untenable during strong southeasterly winds. Vessels can anchor near the pilot station, in 8 fathoms, about ¾ mile east-northeastward of Tandjung Karangbolong.

Sheltered anchorage can be taken in 5 fathoms, sand, southeastward of Tandjung Sodung. Vessels having a greater length than


TJILATJAP
JAVA—SOUTH COAST
100 0 500
YARDS
108° 59′ 15″
108° 59′ 30″
108° 59′ 45″
7° 43′ 45″
7° 44′ 00″
7° 44′ 15″
7° 44′ 30″
Tide Gauge
Petroleum Pier
Kali Danan
Oil Tanks
Coal Pile
Warehouses
PORT & CUSTOMS OFFICE
Wk
Wk
N PRAPATTJABOL
Bns in line 178°
Aircraft
Harbor Office
N
F. S.
Bns
KEY TO PLAN
LENGTH Feet
DEPTH Feet
1 L Head Jetty
2 Oil Pier *279 22
3 Djambatan (Adipati Donam) #1 393 15
4 Djambatan (Singomenggolo) #2 1345 18
5 Djambatan (R. M. Tjokrowedono) #3 18
6 Djambatan (Mentri Tambak) #4 15
* Dolphin on each side of head

H.O. 72

262 feet should moor because of the tidal currents, winds, and limited swinging room. There is good holding ground in 3½ to 5 fathoms between the main wharves and the training wall.

DIRECTIONS.—Vessels bound for Tjilatjap should steer for the east end of Nusa Kambangan, which is prominent from the southward. During clear weather the conical peak of Gunung Slamet (sec. 2B-2) and Tandjung Karangbolong in range bears 018°. Vessels should not approach closer than 2½ miles from the light structure, when making for the entrance channel.

Vessels without local knowledge should not proceed beyond the inner fairway buoys as the channel is very intricate and is subject to change. The port may be entered and departed during daylight hours only. The maximum length of a vessel to be accommodated must not exceed 490 feet.

PILOTS.—Pilotage is compulsory and the pilot will take vessels in from 0700 to 1700 daily. The pilot usually meets vessels about ¾ mile east-northeastward of Tandjung Karangbolong. The pilot launch is white and flies the "H" flag. Ships arriving in front of the entrance by night should signal for a pilot at daybreak. The pilot requires 1 hour to 2 hours to get from the harbor to the station. Care should be taken not to approach the entrance too closely, especially during the Southeast Monsoon, as the currents set strongly on the hard sand bank. It is advisable to radio the ETA in advance to Djakarta, for relay to Tjilatjap, requesting pilot. Vessels departing should request pilot at least 2 hours before departure, except that ships departing before 0800 should make request before 1800 of the previous day. Several mooring buoys are positioned off the principal wharves to facilitate the undocking of large ships. Some harbor launches were the only craft available in 1962.

PILOT SIGNALS.—The signal station, located at Tjimiring Light Structure, shows the following pilot signals:

Indonesian flag at yardarm	Pilot is coming.
Black ball over 2 cones, points up.	Wait outside until further notice.
2 Black cones, vertically disposed, points up, with black ball between.	Ship cannot enter this day.
2 Cones, bases together	No pilot available; vessels may enter without a pilot.
Black ball over a cone, point up.	Pilot will not board vessel outside; proceed until pilot is met.

TJILATJAP (7°44′ S., 109°00′ E.)

4B-12 FACILITIES—Tjilatjap, with a population of 30,000 (est. 1958), is a port of call for coastal and foreign shipping. Exports included manganese ore and scrap iron (1960). It is the capital of the Tjilatajap District. The city was almost entirely destroyed during the war and reconstruction has been slow.

WHARVES.—Extensive wharfage, with rail facilities, fronts the southwest and west sides of the town. Djambatan (Mentri Tambak) No. 4 is available for small craft only because of an off-lying wreck. The oil pier and Djambatan No. 3 Wharf were reported (1962) to be in poor condition.

CARGO INFORMATION.—Cargo must be handled by ships gear. Adequate open and covered storage facilities are available. Heavy squalls, during the intermediate period between monsoons, sometimes impedes the working of cargo.

WATER is laid onto the wharves and can be taken at the rate of 6 tons per hour. It should be boiled before drinking.

PROVISIONS.—Fresh provisions are obtainable.

REPAIRS of a minor nature can be accomplished.

COMMUNICATIONS.—Tjilatjap is connected by rail, road, telegraph, and telephone with the principal ports of Java.

MEDICAL.—Tjilatjap has an emergency hospital. Cases of serious sicknesses or injuries are taken to Purwokerto or Djokjakarta. There is a port doctor who will board ships and treat seamen.

PART C. TANDJUNG KARANGBATA TO TANDJUNG BANTENAN

4C–1 TANDJUNG KARANGBATA (7°47′ S., 109°25′ E.) is a steep and almost inaccessible rocky promontory. It appears to be surrounded by lowland when seen from the eastward. From southeastward or south it has the appearance of an island with peaked hills.

COAST—GENERAL

4C–2 Between Tandjung Karangbata and the mouth of the Kali Opak, about 55 miles east-southeastward, the coast is less steep than farther eastward, and the beach rises into a chain of sand dunes, about 25 feet high. Eastward of the mouth of the Kali Opak, the coast is barren and backed by chalk mountains. The coast between the river mouth and Teluk Patjitan is fronted by a continuous line of breakers.

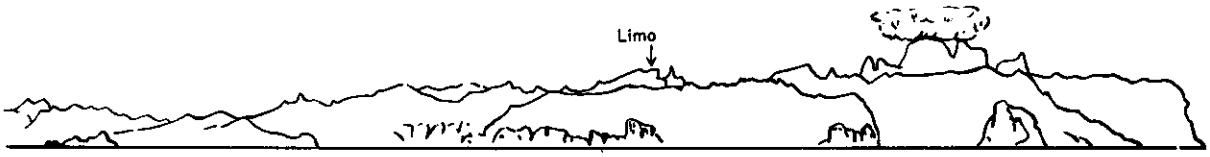
Gunung Kukusan (7°50′S., 110°04′E.), 1,644 feet high, isolated and conical shaped, is the most prominent peak of a ridge which runs almost north and south. The peak at the north end of the ridge is 1,522 feet high and the peak at the south end of the ridge is 1,194 feet high. Gunung Idjo, a prominent 2,051-foot peak, is located about 1½ miles northward of Gunung Kukusan. Gunung Rego 1,647 feet high, is located about 1½ miles west-northwestward of the same peak. Gunung Djeruk, a conical peak with a prominent white house at the foot of its south slope, is 1,142 feet high and is located 2 miles southeastward of Gunung Kukusan.

Between Teluk Patjitan and Teluk Semrawang, the coast is indented by numerous small bays and coves. The coast is high, rocky, and lined by continuous breakers. Gunung Limo, located 7 miles eastward of Teluk Patjitan, rises to a height of 2,536 feet. The mountain is very jagged and has three prominent summits.

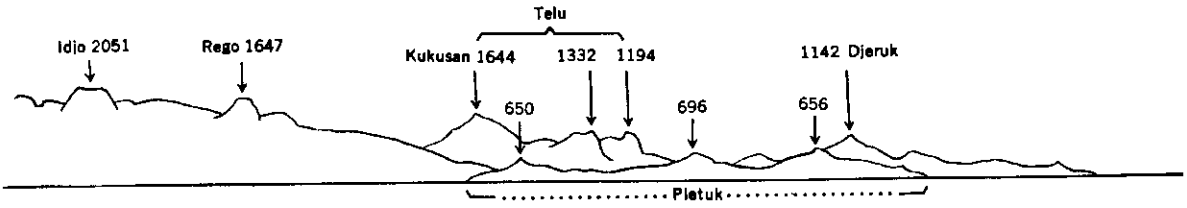
Between Teluk Semrawang and Pulau Sempu, the coast consists of a ridge of steep rocks fronted by an uninterrupted line of breakers. This shoreline has never been completely examined.

Between Pulau Sempu and Tandjung Bantenan, the coast is high, rocky, and steep, the east part of this coast is indented by many bays, the most important of which is Teluk Gradjagan.

Reku Pegunungan, a range to the westward of Teluk Bandialit, is the continuation of the high, desolate hinterland, and has several prominent peaks near the coast. The highest of these is Gunung Reka, 1,775 feet high, located about 17 miles east-southeastward of Tandjung Pelindu. Gunung Mandeng, a ridge rising to an elevation of 2,192 feet, is located between Teluk Bandialit and Teluk Meru, and a ridge runs in a southwesterly direction to the steep east entrance point of Teluk Bandialit. A somewhat isolated mountain stands close to the coast about 1½ miles eastward of this point. This mountain is 1,050 feet high.



SOUTH COAST OF JAVA, TELUK PATJITAN, LIMO 10 MILES, 034°



GUNUNG KUKUSAN, 19 MILES, 079°

A ridge runs in a north-south direction along the tongue of land separating Teluk Meru and Teluk Permisan. Its highest peak, westward of the head of the latter bay, attains an elevation of 1,116 feet. Gunung Permisan, on the east side of Teluk Permisan, is 1,860 feet high and prominent.

Gunung Djagatambe, 1,145 feet high, is located on the tongue of land on the east side of the entrance of Teluk Radjegwesi. Karang Tambak, a prominent peak, is located about 1½ miles northeastward of this peak. Tumpang Pitu, 1,601 feet high, is located on the east side of the unnamed bay eastward of this bay and about 5½ miles southeastward of Karang Tambak.

DEPTHS-DANGERS

4C–3 The south coast of Java, between Tandjung Karangbata and the mouth of the Kali Opak, is rather steep-to, although some soundings of 7 to 9 fathoms have been reported at some distance offshore. Between the river mouth and Tandjung Bantenan, the coast is fronted by rocks and rocky islets, none of which lie more than 2½ miles off the salient points.

WINDS AND WEATHER

4C–4 See section 4–2.

TIDAL CURRENTS-CURRENTS

4C–5 See section 4–3.

CAUTIONS

4C–6 Dangers, other than those chartered, may exist along this coast. See section 4–4, for additional cautions.

COASTAL FEATURES

4C–7 TELUK PATJITAN is open to southerly winds and sea. The north side of the bay is fronted by a sandy beach. The other shores are rocky, upon which the waves break with considerable force. Rivers empty into the northwest and northeast corners of the bay. Teluk Megelen, a narrow land-locked inlet, indents the east shore of the bay.

ANCHORAGE can be taken in 8 fathoms off a small sandy beach in a position about ⅖ mile north-northeastward of Tandjung Kowang. The holding ground is good, consisting of black sand, mixed with clay. A heavy swell runs into the bay during southerly winds. The entrance of the bay is not easily discerned, but Gunung Limo (sec. 4C–2) can be used as a landmark. Vessels should enter the bay by passing midway between the entrance points, on both of which a high surf always breaks. Small craft with local knowledge can anchor in Teluk Megelen.

PIERS.—A pier, about 230 feet long and suitable only for small craft, is located in the west side of the bay. A salt warehouse is located near the inner end of the pier.

BETWEEN TELUK PATJITAN AND TELUK PANGGUL, the rugged coast is indented by several small bays, all of which are too small and too exposed for anchorage. A reef, which breaks heavily, is located about 1 mile offshore, to the southeastward of Teluk Damas. The rugged coast continues to Teluk Sumbreng.

OFF-LYING ISLETS AND DANGERS.—Djaran, a low, rocky islet, lies about 1 mile offshore to the west-southwestward of the southeast entrance point of Teluk Panggul. A group of rocks, sometimes covered, but usually marked by breakers, lies about 700 yards southward of the islet. Teang, a group of islets and rocks, lies about 1½ miles eastward of the islet.

Pulau Prendjono and Pulau Panehan, two rocky islets which serve as good landmarks for vessels approaching Teluk Panggul or Teluk Sumbreng, lies about 2 miles off the coast.

TELUK PANGGUL, open to the southward and southwestward, is a port of call for coastal vessels. Two small rivers empty into the bay. A salt warehouse stands close northward of the

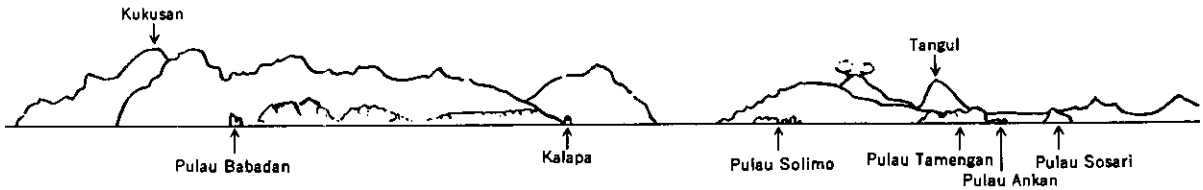
mouth of the eastern river. Teluk Djaketra, a shoal bight 600 yards wide at its entrance, has a small pier and some warehouses at its head. Mariners are CAUTIONED that dangers, other than charted, may exist in the bay or in its approaches.

ANCHORAGE can be taken off the northeast shore of the bay in 7 or 8 fathoms, sand, abreast the salt warehouse. A heavy swell is sometimes felt at this anchorage. Anchorage can be taken in 7 to 5 fathoms, sand and clay, off the entrance of Teluk Djaketra.

TELUK SUMBRENG is deep and clear of dangers in its middle part. Some rocks and islets extend nearly ¾ mile southwestward from the east entrance point of the bay. The sides of the bay consist of steep, rocky cliffs, and at the head is a sandy beach, 2 miles long, on which the surf always breaks heavily. A small river flows out at each end of this beach.

ANCHORAGE.—During the Southeast Monsoon, anchorage can be taken in 10 to 6 fathoms off a small bight, located about ½ mile northward of the east entrance point. During the Northwest Monsoon, anchorage can be taken in Teluk Ngadipura on the west side of the bay, abreast a sandy beach towards which the depths shoal regularly. These anchorages, although somewhat sheltered from the prevailing monsoon, are exposed to heavy southerly swells.

BETWEEN TELUK SUMBRENG AND TELUK PRIGI, the coast is rocky and is indented by several small bays. The depth of water near the shores is considerable. Pulau Sarah (8°23′ S., 111°39′ E.), a rocky islet with an above-water rock between it and the coast, lies about 1 mile offshore. A breaking reef is reported to lie 2 miles southeastward of the islet.



SOUTH COAST OF JAVA, TELUK PRIGI, PULAU SOSARI 9 MILES, 000°

TELUK PRIGI

4C–8 TELUK PRIGI is backed by high mountains and is the clearest and safest bay on the south coast of Java. The bay divides into two arms. Teluk Damas indents the west arm and Teluk Karanggonsa the east side of the north arm. Several villages stand along the shores of the latter bight. Ketawang, a village at the head of the north arm, has a pier with a warehouse at its root.

DEPTHS AND DANGERS.—Depths of 40 fathoms are found in the entrance of the bay. Islets and shoals extend up to ⅔ mile southward from the east entrance point and ⅓ mile eastward from the west entrance point. Pulau Negrembeng, a conical islet, lies about ¼ mile off the east shore of the bay. Numerous above and below water rocks lie close off the shores of the bay.

OFFLYING ISLETS.—Several small islets, which serve as good landmarks, front the bay. They lie within 2½ miles of the salient points. Pulau Babadan (Sebabahan) consists of two high, needle rocks standing on a narrow reef which is usually covered by high breakers. Pulau Sekel is an above-water rock which is usually marked by heavy breakers. Batang Rock, above water except at high water springs, is usually marked by heavy breakers. Pulau Solimo, a group of several rocky and thickly overgrown islets, stands on a steep-to reef. The west islet is the lowest.

Pulau Bajalangu, Pulau Tamengan, 378 feet high, and Pulau Ankan, 378 feet high, are a group of thickly wooded, rocky islets lying close together. These islets and Pulau Sigunung lie at the northeast and southwest edges of an area of foul ground which extends for about ½ mile from the shore. A coral patch with a depth of 52 feet lies about 1¼ miles northwestward of Pulau Tamengan.

Pulau Sosari, 426 feet high and rocky, is the easternmost danger in the approach to Teluk Prigi. It is thickly overgrown with vegetation.

TIDAL CURRENTS.—Very little current is reported in the bay. During the month of September, a 2½-knot current has been reported as setting eastward in the vicinity of Pulau Sekel.

ANCHORAGES.—Anchorage can be taken in 14 fathoms, mud and clay, off the village of Pager Gunung. Vessels can anchor at the head of the north arm in 3 to 6 fathoms, as close to the shore as prudent.

Anchorage in Teluk Labuan is not considered safe, especially during the Southeast Monsoon. A heavy swell sometimes rolls into the bay. Sudden gusts of wind sometimes blow down from the mountains.

DIRECTIONS.—The recommended track into the bay leads between Pulau Solimo and Pulau Tamengan. Soundings give no warnings of the approach to the dangers.

COASTAL FEATURES (CONTINUED)

4C–9 TELUK POPOH, small in extent and open to southerly winds and seas, can be identified by Gunung Tangul, a 2,172-foot peak located 2 miles northward of the head of this bay. Three lower peaks are located eastward of this peak. The shores of the bay, for the most part are rocky and very steep. Tandjung Lemiring is a narrow, rocky, and steep-to promontory located on the northeast side of the bay. The village of Popoh stands near the northeast shore of the bay. Some fresh provisions can be obtained.

DEPTHS AND DANGERS.—The bay is clear and deep in its middle part. A reef extends 600 yards off the west entrance point. The entrance of the bay is deep, whence the depths decrease gradually to 20 fathoms abreast Tandjung Lemiring and thence to 7 fathoms near the head of the bay. The water shoals gradually near the village of Popoh.

ANCHORAGES.—There is anchorage off the village of Popoh, close northward of Tandjung Lemiring in a depth of about 6 fathoms. Vessels are, however, advised not to anchor in depths of less than 11 fathoms in this vicinity as the shoals, due to lack of discoloration, are hard to identify. During the Southeast Monsoon, a heavy swell runs into the bay.

TELUK SEMRAWANG is a small and open bay. With southerly winds a high sea sets into this bay, but as the wind draws to the eastward, the water becomes smooth. The west entrance point is a flat rock bearing some resemblance at a distance to a dismantled wreck. Tandjung Pakis (8°18′ S., 111°54′ E.), the east entrance point, is rocky and has a round hill on it. The hills near it are high and steep on their seaward sides. The depth of water decreases regularly from 45 fathoms in the entrance to 3 fathoms off a small beach near the head of the bay. Anchorage can be taken off this beach. This bay is unsafe during the Southeast Monsoon.

BETWEEN TANDJUNG PAKIS AND PULAU SEMPU, the coast consists of a ridge of steep rocks, fronted by a continuous line of breakers. The coast has not been closely examined. Great depths are reported to exist close offshore.

PULAU SEMPU is a high, rocky, and desolate island. It is 853 feet high and is separated from the mainland by a narrow channel. Numerous dangers are found in the southwest part of this channel. A drying reef lies 1¼ miles eastward of the northeast end of the island. Small vessels with local knowledge can ANCHOR off the northwest side of the island by proceeding through the east channel. This channel is about 200 yards wide and has a

depth of 5¼ fathoms in its entrance. A PIER, reported to be in poor condition, is located on the northwest side of the island. Depths of 16 to 23 feet are reported alongside.

COAST.—To the eastward of Pulau Sempu the coast is indented by three small open bays. Between the easternmost bay and Tandjung Pelindu, the coast is somewhat indented forming a wide bight which has only been partly examined. The west part of this bight is rocky, and it is said that dangerous reefs project some distance from the shore. The east part of this bight has a sandy beach, backed by sand hills. Several small rivers discharge along this part of the coast. Gunung Mahameru (Semaru), described in section 2F–14, serves as a good landmark for vessels proceeding along this shore.

4C–10 NUSA BARUNG is a moderately high, rocky island. The south side is low near the sea, but the southwest, southeast, and east sides are steep, rocky, and moderately high. The north coast of the island is not so steep as the other sides, and there is a small bay here affording anchorage in 27 fathoms.

TELUK PUGUR KULON, an open bight between Tandjung Pelindu and an unnamed point about 5½ miles eastward, has a sandy beach at its head. The east side of the bight rises sharply to a 1,605-foot summit. Pugur Kulon, a village stands near the mouth of a river which flows into the northeast part of the bight. The village is connected to the telegraph and railroad systems. Some provisions can be obtained. Vessels can ANCHOR in the bay when conditions permit.

COAST.—Between the east entrance point of Teluk Pugur Kulon and Teluk Bandialit, the coast has only been partly examined. Some rocky islets lie within 2 miles of the rock fringed coast. Between the latter bay and Tandjung Tjapil, the mountainous coast is indented by a number of small bays. The aspect of this coast has been described in section 4C–2.

ISLETS AND DANGERS.—Pulau Bandialit, a steep rocky islet with a prominent needle-shaped peak on its east end, is located about 600 yards southeastward of the east entrance point of Teluk Bandialit.

Pulau Singa is a high rocky islet, with two lower rocky islets off its southwest extremity. Pulau Mustaka is a long, narrow, rocky islet. Pulau Lutung is a rocky islet. A drying rock lies about 1 mile south-southeastward of this islet. A rock lies close offshore in a position about 2 miles east-northeastward of the same islet.

TELUK BANDIALIT, which indents the coast to the northward of Pulau Bandialit, is wide and deep in its middle part. The west and east shores are rocky and the north shore is sandy. A steep rock, white in parts, lies close off the west entrance point. A detached reef, which dries and which has some rocky islets on it, lies off the east coast in a position about 1½ miles north-northeastward of Pulau Bandialit. ANCHORAGE can be taken, according to draft, in the northwest corner of the bay. This anchorage lies somewhat eastward of the bearing of the west rock off Pulau Bandialit in range with the small rocky point bearing 181°. There is a settlement on the southwest shore of this bight.

TELUK MERU has not been closely examined. Teluk Permisan can be identified by its high, rocky shores. Its north shore is a sandy beach. Two small islets lie close off the northeast shore of the bight. A cove, having a sandy beach and a warehouse at its head, indents the shore abreast these two islands.

Several islets lie close off the west shore of the outer part of the bay. A drying rock is located about 300 yards southward of the east entrance point. Rocks lie close under this point. An islet, surrounded by a reef and shoal ground, lies in the middle of the inner part of the bay. ANCHORAGE can be taken, according to draft, off the small cove, between the two islets, in the northeast part of the bay.

TELUK RADJEGWESI is entered between Pulau Kalong and a high promontory, about

2¼ miles southeastward. Pulau Kalong is very prominent as a small peak rises in its south part. This island lies close off the west point of the bay. Teluk Pantjamaja indents the southeast shore of the bay. Its south shore is formed by the high promontory. A small village stands at the head of this bay. Pondok Radjegwesi, a small village, stands at the head of Teluk Radjegwesi, just northeastward of Gunung Radjegwesi which rises on a small peninsula.

ANCHORAGES.—Vessels can anchor in 5 to 8 fathoms in Teluk Pantjamaja. Some protection from the swell is afforded here. Anchorage can be taken off the village of Pondok Radjegwesi in depths of 5 to 14 fathoms. This anchorage is exposed to southerly swells.

The bay, northward of Pulau Mustaka, has not been completely examined.

4C–11 TELUK GRADJAGAN indents the coast to the westward of Blambangan Peninsula. Tandjung Tjapil is high and steep. It rises abruptly to Gunung Dogong which is 1,260 feet high. Tandjung Purwo is low. Pulau Watupager, 65 feet high and prominent, lies about ¾ mile southwestward of Tandjung Tjapil. The village of Gradjagan stands at the northwest corner of the bay, at the mouth of the Segara Anak.

The bay is clear of dangers, except for a 6½-fathom shoal, located about 3 miles northward of Tandjung Purwo. The bay affords good ANCHORAGE during the Southeast Monsoon in 8 to 14 fathoms. The bay is reported to be unsafe during the Northwest Monsoon.

PART D. SELAT BALI

4D–1 TANDJUNG BANTENAN (8°47′ S., 114°32′ E.) is the southernmost projection of the great Blambangan Peninsula which is covered with a dense, monotonous forest. The land rises gradually from the sea to a height of 1,181 feet without a single prominent peak. The south and east sides of the peninsula are fringed by a drying reef to a distance up to 1 mile offshore. The sea breaks heavily on this reef. The reef terminates close northward of Tandjung Slokah, a low point forming the east extremity of the peninsula. Batu Mandi, a small islet, stands on this reef in a position about 4 miles eastward of Tandjung Purwo. A noticeable WRECK stands on the reef, abreast Tandjung Slokah.

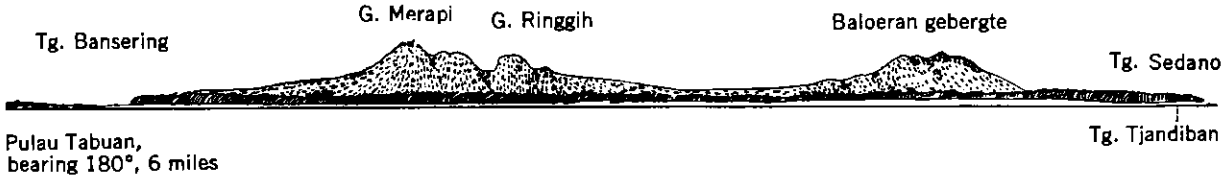
TANDJUNG MEBULU (8°50′ S., 115°05′ E.), the east entrance point of Selat Bali, is described in section 5A–17. Bukit Badung (Tofelhoek), the peninsula forming the south end of Bali, is described in section 5A–2.

GENERAL REMARKS

4D–2 SELAT BALI is deep and is used mainly by coastal and interisland vessels. Banjuwangi, an important shipping place, is located on the west side of the strait, southward of the narrows.

DEPTHS–DANGERS

4D–3 The strait is deep and for the most part clear of dangers. Prince of Orange Bank, nearly in the middle of the south entrance of Selat Bali, has depths of 6 to 24 fathoms, black sand mixed with stones and shells. This shoal



SELAT BALI, NORTHERN APPROACH.

bank is about 1 mile in diameter and is not marked by discoloration.

Pulau Tabuan, 3 miles northward of the narrows is a coral islet covered with brushwood. A disused lighthouse is charted on the islet, which is surrounded by a drying reef to a distance of ¼ mile. A detached coral patch, with a depth of 5½ fathoms, is located ½ mile southeastward of the islet. An 8¼-fathom bank has been reported to lie about 1½ miles northeastward of the islet.

The Java side of the strait is steep-to between Tandjung Slokah and Tandjung Sembulungan. Between the latter point and Banjuwangi, the 10-fathom curve lies up to 2½ miles offshore. Bromo Rock, the outer danger, has a least depth of 6 fathoms and lies about 2¼ miles south-southeastward of Tandjung Pakem. An 8-fathom bank lies about 1 mile southward of Bromo Rock.

Between Banjuwangi and Tandjung Bansering, the 10-fathom curve lies close offshore. Dangers with depths of 2½ to 3 fathoms lie up to 1¼ miles offshore. Between the latter point and Tandjung Sedano (sec. 3D–1), all dangers lie within 2½ miles of the coast.

The Bali side of the strait is rather steep-to with all dangers lying within 1½ miles of the coast.

TIDAL CURRENTS—CURRENTS

4D–4 The character of the tidal currents in Selat Bali is semidiurnal; the direction is affected by the monsoon, the east monsoon causing a constant southerly current and the west monsoon a constant northerly current. The resultant current due to the combined working of the tides and the monsoons is as follows:

In the narrows, during the east monsoon (May to August, inclusive), the current flows nearly in a constant southerly direction. It is strongest about 5 hours after the moons upper and lower transit, with a maximum rate of 6 to 7 knots. From about 3 hours before until the moons transit, a weaker current sets northward with a maximum rate of 3½ knots, although this may be replaced by an inconstant current or even by a weak southerly current with a maximum rate of 2 knots. During the quarters the south going current sets in 1 hour to 2 hours earlier than at full or new moon.

In the narrows, during the west monsoon (November to February, inclusive), the north-going current is the stronger, and flows for about 8 hours, from about 6 hours before to 2 hours after the moon's upper and lower transit. The maximum rate, from 6 to 7 knots, occurs about 3 hours before the moon's upper and lower transit. During the other periods there is a southerly current. The rate of the southerly current seldom exceeds 3 knots and is scarcely perceptible except near full moon or new moon.

In the narrows, during the transition months (March and April, September and October) the rate of either the north-going or south-going current does not exceed 5½ knots. The north-going current runs from about 4½ hours before to 2½ hours after the moon's upper and lower transit, and the south-going current during the remainder of the period.

As a general rule, the strongest currents can be expected in the first week after full or new moon. During neap tides (first week after the quarters) the rate never exceeds 3 knots.

Near Tandjung Sembulungan, the tidal currents start from about 2 to 2½ hours earlier than in the narrows; near Banjuwangi from 1 hour to 1½ hours earlier; and near Pulau Tabuan from 1 hour to 2 hours later. In the wider part of the strait the tidal currents usually occur later than close to the coast. The maximum rate of the current increases regularly as the narrows are approached.

Under the north coast of Bali, eastward of Tandjung Pasir, when the north-going current is running through the strait, there is an eddy or there is little or no current. At this time a

northeasterly current sets along the northeast coast of Java.

During the months (November to February, inclusive), the south-going current is most noticeable under the Java shore. Here a southerly current may be observed, while a northerly current is running strongly on the Bali side of the strait, the difference in the times of changing being sometimes as much as 2 hours.

During the daytime there is sometimes no south-going current during the west monsoon and no north-going current during the east monsoon, although at nights the change takes place as usual and the current is stronger. This phenomena, "Ajer Gunduk", occurs on the second, third, fourth, and fifth days after quarters.

The northerly current decreases in strength to the southward of the narrows, and off Banjuwangi the rate is about ½ of that off Tandjung Pasir. In the south part of the strait, during the west monsoon, the current sets strongly to the eastward toward Bukit Badung.

From observations made in December 1941 and January and February 1942 in this vicinity, the currents were observed to be setting southward at an average rate of ½ knot to 2 knots. The currents have never been reported to exceed a rate of 3 knots in this vicinity.

During the months May to October, inclusive, the southerly current is strongest, especially under the Bali shore. It attains a rate of 6 knots in the narrows, accompanied by strong eddies and whirlpools.

The currents near the shore are not as strong as those in the middle of the strait. They sometimes run in a contrary direction. The currents running in and out of the strait may set strongly on Pulau Tabuan.

WINDS AND WEATHER

4D–5 To the eastward of Tandjung Sedano (7°50′ S., 114°28′ E.), or when the strait is open, the prevailing winds from April to October are from south-southwest and southwest and after July are of considerable strength. Southward of Tandjung Sedano a change of wind often occurs suddenly as the strait opens up. Within the entrance and towards the Bali shore the wind abates and veers gradually to the southeast. Calms are often met with close to the Bali shore. The limit between these southwest and southeast winds seems to be abreast of Gunung Grogak. Variable baffling winds and calms are found in this part of the strait.

The south part of the strait is much wider and the wind does not blow so strong there. Regular land breezes usually occur near the Bali shore in this part of the strait.

During the west monsoon, from October or November to March, northward of Selat Bali, faint southerly breezes prevail in the morning, and at noon unsteady winds from north and north-northwest with calms occur. Southward of the strait westerly winds are found as far as the limits of the trade winds. Near the southeast coast of Java heavy north and northwesterly squalls occur. Squalls from the southwest are also experienced.

During the east monsoon the weather is always hazy and the high mountain peaks of Bali and Java can rarely be seen.

CAUTIONS

4D–6 Vessels are cautioned against mistaking Selat Badung (sec. 5A–13) for Selat Bali. From southward Bukit Badung (Tafelhoek) bears some resemblance to Blambangan Peninsula. For further cautions see section 4–4.

WEST SIDE OF SELAT BALI

4D–7 EAST COAST OF JAVA.—TELUK BANJUBIRU affords good ANCHORAGE in both monsoons, in about 20 fathoms, close offshore. The coast between this bay and Tandjung Sembulangan is rather steep-to. The latter point is the north extremity of a narrow and high peninsula. Gunung Ikan, an isolated hill with a flat top, rises to a height of 763 feet near this point.

TELUK PANGPANG indents the coast to the westward of the narrow and high peninsula. The east shore of the bay is fringed by a steep-to reef and fronted by a sandy beach. The west and south shores are fronted by a partly drying mudflat which partly fills up the bay. Depths decrease from 10 fathoms in the entrance to about 3 fathoms about 3 miles within. ANCHORAGE can be taken in the outer and wider part of the bay.

BETWEEN TELUK PANGPANG AND TANDJUNG PAKEM, the coast is thickly wooded as far as the village of Buntu. There are a few openings with some scattered settlements, such as the village of Bomo. Some houses are visible at the latter village. Northward of Buntu, the coast is fronted by a sandy strip and is marshy in places.

DEPTHS–DANGERS.—Bromo Rock and the dangers outside the 10-fathom curve have been described in section 4D–3. Parkem Reef with a least depth of 2½ fathoms is located 1¼ miles south-southeastward of Tandjung Pakem. A BEACON, surmounted by a truncated cone marks the reef. ANCHORAGE can be taken off this coast in 7 or 8 fathoms.

BANJUWANGI ROAD AND BANJUWANGI

4D–8 BANJUWANGI, a lighterage port of some importance, consists of an Outer Road, an Inner Road, and an Inner Harbor. The latter consists of a shallow rectangular basin with sloping walls and lighter jetties. The basin is connected to the town by rail and road bridges.

BANJUWANGI ROAD is divided into an Inner Road and an Outer Road by New Bank and the dangers to the northward. The Outer Road is safest during the east monsoon due to conditions of surf and sea. There is seldom any sea or swell during the west monsoon.

TIDES AND TIDAL CURRENTS.—Semidiurnal tides predominate. Springs occur about 2 days after full and new moon. The range at springs is 5 feet and at neaps is 1 foot.

The greatest range of the diurnal tide is 3 feet, about 36 hours after the moon's greatest declination. Neaps range 1 foot when the moon passes the equinoctial. The highest tides occur in May and November.

TIDAL CURRENTS.—Navigators should refer to the general description of the currents, as given in section 4D–4, before approaching the anchorage off Banjuwangi. The direction of the tidal currents, near the Java shore, often changes considerably earlier than farther out. The tidal currents in the Inner Road often run more strongly and in a contrary direction to those in the Outer Road.

WINDS AND WEATHER.—The winds and weather in Selat Bali are described in section 4D–5. The climate is hot and sultry due to Banjuwangi being shut in by lofty mountains to the westward. During the east monsoon the temperatures are lower and the nights are somewhat cooler.

DEPTHS AND DANGERS.—Shoals, with depths of 1¼ to 7½ fathoms are located north-northeastward to south-southeastward at distances of up to a little over 3 miles, respectively, of the main light structure.

Depths of 11 to 13 fathoms are found in Outer Road, and depths of 4 to 9 fathoms in the Inner Road. The Inner Harbor has silted up and can only be used by lighters at spring tides.

De Groots Rock, with a least depth of 2 fathoms, lies about ¾ mile southeastward of the main light structure.

Crocodile Reef, having a least depth of 2 fathoms and usually identifiable by discoloration, is marked on its north side by a beacon with a topmark of two red cylinders.

Ommen Shoal is a small coral patch with 2¾ fathoms over it. A BUOY, from which a LIGHT is occasionally shown, painted in red and yellow checkers, is moored on the north-

west side of the shoal. A similar patch lies close southeastward of this shoal.

New Bank has a depth of 3¼ fathoms and is marked by a conical BUOY, painted in red and white vertical stripes. A red LIGHT is shown, upon request, from the buoy when vessels are expected or leaving. About 200 yards to southward and southwestward, there are depths of 3¾ and 1¼ fathoms, respectively.

Deptford Rocks are two patches with a least depth of 4 feet over them. A conical BUOY, painted in black and white checkers, is moored on the south part of Deptford Rocks. A LIGHT is occasionally shown from this buoy. The north patch is marked on its north side by a BEACON with a topmark of two red cylinders.

A 2¼-fathom patch lies close westward of the north patch in position about ½ mile north-northeastward of the main light structure. A 3¼-fathom patch lies about midway between New Bank and Deptford Rocks.

North Rock is a small shoal with a least depth of 2 fathoms. It is marked by a BEACON with a topmark of 2 black cones, points up. A shoal, with a least depth of 1 fathom and extending in a north-south direction for about 300 yards, is located about 100 yards westward of North Rock. A BEACON, with a black conical topmark, point up, is located on the southeast side of this shoal.

A 3¾-fathom shoal lies a little over ¼ mile southeastward of North Rock. A 3¼-fathom patch lies nearly 1 mile northeastward of North Rock. Depths of 3¾ and 4 fathoms lie about ⅜ mile north-northeastward of North Rock.

A coral patch, with a least depth of 3½ fathoms, lies on the east side of the north fairway, 740 yards 098° from the chimney of the Sukowidi sugar mill. The patch is marked by a white conical BUOY.

CAUTION.—The position and existence of these buoys cannot always be relied upon. Lights are shown from some of these buoys, only upon request.

4D–9 LANDMARKS.—Banjuwangi is not readily distinguishable in the afternoon when the sun is behind the town. Gunung Bakungan, a triple-topped range on the Bali side of the strait, is then a good mark. The light structure, flagstaff, and the chimney of the Sukowidi sugar mill serve as prominent landmarks.

NAVIGATIONAL AIDS.—A light is shown at Banjuwangi, close eastward of the harbor office. A light is shown from a position about 355 yards 163° from the main light structure. A light is shown from the radio mast, located ½ mile west-southwestward of the main light structure.

ANCHORAGES.—Outer Road, which lies between Ommen Shoal and the shoals westward, affords good anchorage for large ships in 11 to 13 fathoms. Inner Road, which lies between the above shoals and the coastal bank, has depths of 4 to 7 fathoms. There is only room for a limited number of ships in Inner Road, and it is advisable to moor.

Anchorage is prohibited in the area enclosed by dashed lines. This area lies off the coast to the southward of Banjuwangi.

PILOTS.—A special pilot service is maintained by the agency for the various steamship lines which make use of the Inner Road. This service must be arranged for in advance. A motor boat meets all vessels well outside the channel and pilots them to the inner anchorage.

DIRECTIONS.—Vessels approaching the Outer Road from southward should avoid Bromo Rock (sec. 4D–3) and Parkem Reef (sec. 4D–7), and pass in midchannel between Ommen Shoal and Deptford Rocks, anchoring as convenient.

Vessels approaching from northward should pass well eastward of Ommen Shoal in depths of not less than 15 fathoms. When Banjuwangi light structure bears 275°, vessels may alter their course for the outer anchorage, paying particular attention to the tidal currents.

Gunung Ikan (sec. 4D–7) serves as a good mark for vessels approaching from either direction. Large vessels are requested not to enter the Inner Road.

Small vessels with local knowledge, entering or leaving Inner Road, should always stem the currents, noting that when the current is flowing northward in the main channel, that it is flowing southward in the Inner Road. Due to changing conditions, vessels not having the latest local knowledge are advised to seek the assistance of a pilot before attempting to enter the Inner Road.

BANJUWANGI (8°13′ S., 114°23′ E.)

4D–10 FACILITIES–BANJUWANGI, a lighterage port of some importance, is the capital of the Banjuwangi District. Banjuwangi is the eastern terminus of the Java railroad and road systems. It is the Java terminus of the Java-Bali ferry. The chief exports are rice, sugar, copra, and coconut oil.

BERTHS.—There are berths for lighters only.

CARGO INFORMATION.—Cargo is handled at the roadsteads. Two tugs and several lighters are available for handling cargo. Covered and open storage facilities are available.

PROVISIONS.—Some fresh provisions and ice are obtainable.

REPAIRS can be made to small craft only.

COMMUNICATIONS.—Banjuwangi is in telephone, telegraph, and railroad communication with other ports in Java. It is a port of call for ocean and coastal vessels.

MEDICAL.—A small hospital is located at Banjuwangi.

WEST SIDE OF SELAT BALI (CONTINUED)

4D–11 BETWEEN BANJUWANGI AND TANDJUNG BANSERING there are a number of small villages. The village of Watudal can be recognized by a bridge over a creek, with a small house near it. Tandjung Bansering is low, but can be identified by its light structures.

RANGE LIGHTS.—The front light is shown from a white iron framework, 42 feet high. The rear light, located 677 yards 005° from the front range, is shown from a similar structure, 65 feet high. Both light structures have red triangular daymarks. The target on the front range is point up; that on the rear range is point down. These lights in range 005°–185° lead through the narrows.

ANCHORAGE can be taken in Teluk Mana in 10 to 18 fathoms. This anchorage is somewhat out of the main tidal currents, but eddies are often met with.

BETWEEN TANDJUNG BANSERING AND TANDJUNG TJANDIBAN (Chandiban), the coast is fringed by reefs. The portion of the coast abreast Pulau Tabuan (sec. 4D–3) is fronted by a broad coastal reef. Several drying patches, covered with vegetation and resembling islands, are found on this reef.

DANGERS.—Many above-and-below water detached reefs lie off this coast. They all lie within 1½ miles offshore, except for Crocodile Rock. This danger is 200 yards long and has a depth of 2 fathoms. The dangers are usually marked by discoloration.

ANCHORAGE can be taken in Teluk Bajulmati in 22 fathoms, sand bottom with small stones, with the mouth of Kali Bajulmati bearing 271° and the hill on Tandjung Tjandiban bearing 023°. Small vessels with local knowledge can anchor in 9 or 10 fathoms, mud, with Pandean, a fishing village, bearing 230°. This anchorage lies about ½ mile from the shore.

TANDJUNG TJANDIBAN (7°53′ S., 114°28′ E.) is formed by a spur of Gunung Baluran (sec. 3D–2). A hill, 65 feet high, stands on the extremity of the point. There are a few coconut palms, some graves, and a triangular pillar on the hill. These are prominent from the offing. However, when viewed against the mountainous background, the point can only be discerned by the lighter color of the

hill. A steep-to and rocky reef fringes the point. A WRECK lies stranded southwestward of the point.

BETWEEN TANDJUNG TJANDIBAN AND TANDJUNG SEDANO (sec. 3D–1), the coast is fringed by a narrow coral reef intersected by several small creeks. Spurs from Gunung Baluran approach the coast, leaving only a narrow strip of land between them and the shore.

DANGERS.—Lanon Reef, about 400 yards from the shore, is narrow and about ½ mile long. It has a least depth of 3 feet and is marked by heavy breakers.

EAST SIDE OF SELAT BALI

4D–12 BETWEEN TANDJUNG MEBULU (8°50′ S., 115°05′ E.) AND TANDJUNGAN, the coast is indented by Pantai-barat, an open bay. A rounded projection, fringed by a broad coastal reef, divides the bay into two smaller bays, namely Labuhan Djimbaran and Labuhan Kuta. The coast, between Tandjung Mebulu (sec. 4D–1) and Tandjung Tegalowangi, is fringed by a narrow steep-to reef and has an occasional sandy beach. There is a heavy surf here.

Labuhan Djimbaran has a number of sheds at its head. The coast from the head of this bay to a position about 2 miles southeastward of Tandjungan is rather flat and is backed by a large fertile plain. Mountain spurs approach the coast. Several sheds stand on the beach in the south part of Labuhan Kuta.

DEPTHS–DANGERS.—The 10-fathom curve lies within 2 miles of the coast. Between this curve and the 20-fathom curve, the bottom is regular; inside this curve it is very uneven. A 2½-fathom patch lies in the south part of Labuhan Kuta. A ridge with a least depth of 3¼ fathoms extends 1¼ miles northward from this patch. Depths of 5½ to 7 fathoms are found between this ridge and the shore to the eastward.

LANDMARKS.—A tree with a white trunk stands on a point located about ½ mile eastward of Tandjung Tanguma. A group of trees with white trunks stands on the south shore of Labuhan Djimbaran. A round-topped tree stands on the projecting part of the coast between Labuhan Djimbaran and Labuhan Kuta. A fan-shaped tree stands southeastward of the boat sheds at the head of the latter bay. Two round-topped trees stand about ½ mile inland to the northward of Labuhan Kuta.

TANDJUNGAN can be recognized by some rocks, up to 50 feet high, lying on the coastal reef. A small temple stands on one of these rocks. A prominent temple is built on a low, rocky point, located about 2 miles southeastward of Tandjungan.

ANCHORAGE can be taken anywhere off the coast of Pantai-barat, but a heavy swell roles in during both monsoons. Only during the transition period can a calm sea be expected.

Anchorage can be taken in Labuhan Djimbaran in 5 to 6 fathoms, hard sand, with the group of trees with white trunks on the south shore of the bay in range with the double-crowed tree on the 517-foot summit of Bukit Bandung bearing 152° and a rock on the coastal reef off Tandjung Tanguma well open of Tandjung Batupunggal. Vessels are CAUTIONED against the heavy rollers on the shoals inside the 3-fathom curve.

Small vessels with local knowledge can anchor close off the road leading to Kuta village. The approach to this anchorage leads northward of the before-mentioned ridge and between it and the coast.

4D–13 BETWEEN TANDJUNGAN AND TANDJUNG PENGAMBENGAN, the coast, for the most part, is flat with a low plain extending to the foot of the mountains. In some areas, spurs from the mountain ridges run down close to the sea. The coast is fringed by a narrow reef and is intersected by several small rivers. The Sungai Djembrana, which flows

out about 1 mile eastward of Tandjung Pengambengan, is navigable by large praus. A white mosque with a red roof is located at the village of Prantjak (Pranchak). A LIGHT is shown from Tandjung Pengambengan. All dangers are contained within the 10-fathom curve which lies up to 1½ miles offshore.

BETWEEN TANDJUNG PENGAMBENGAN AND TANDJUNG PABUWAHAN, the coast is fronted by shoals to a distance of a little over 1 mile. Tjupel (Chupel) Road is a small indentation in the reef. The village of Tjupel is not visible from offshore, but a prominent shed stands near the shore at the head of the bight. Foul ground extends ⅗ mile offshore from the vicinity of the shed, but offshore the water deepens gradually and there are 5 to 6 fathoms, sand, about ¾ mile offshore.

TANDJUNG PABUWAHAN (8°20′ S., 114°31′ E.) is the south extremity of a long, low, narrow peninsula. A shallow lagoon is located eastward of the peninsula. Between this point and the south entrance point of Teluk Gili Manuk, the coast is rather steep-to and is intersected by a number of small rivers.

TJANDIKESUMA is a small village located just northward of the narrow peninsula. A white stone pyramid, 43 feet high, stands on a small hill near the village. The village is surrounded by an extensive coconut plantation, which can be seen from a distance of 4 to 6 miles. A 2-fathom shoal is located about 1 mile west-southwestward of the white pyramid.

ANCHORAGE can be taken in 5 or 6 fathoms, sand, with the white stone pyramid bearing 034°. A prohibited anchorage area, shown by dashed lines on the chart, is located northwestward of the white pyramid.

TELUK GILI MANUK, suitable only for small craft with local knowledge, is a narrow, reef-fringed inlet. The south entrance point is low and has some coconut trees on it. A BUOY, painted in red and white vertical stripes, is moored on the outer edge of the shore bank which extends ⅓ mile westward from the north entrance point of the inlet.

4D–14 TANDJUNG PASIR, the northwest point of Bali, is fronted by a narrow reef. A light is shown from the point. The coast eastward of the point is described in section 5A–6 and 5A–9.

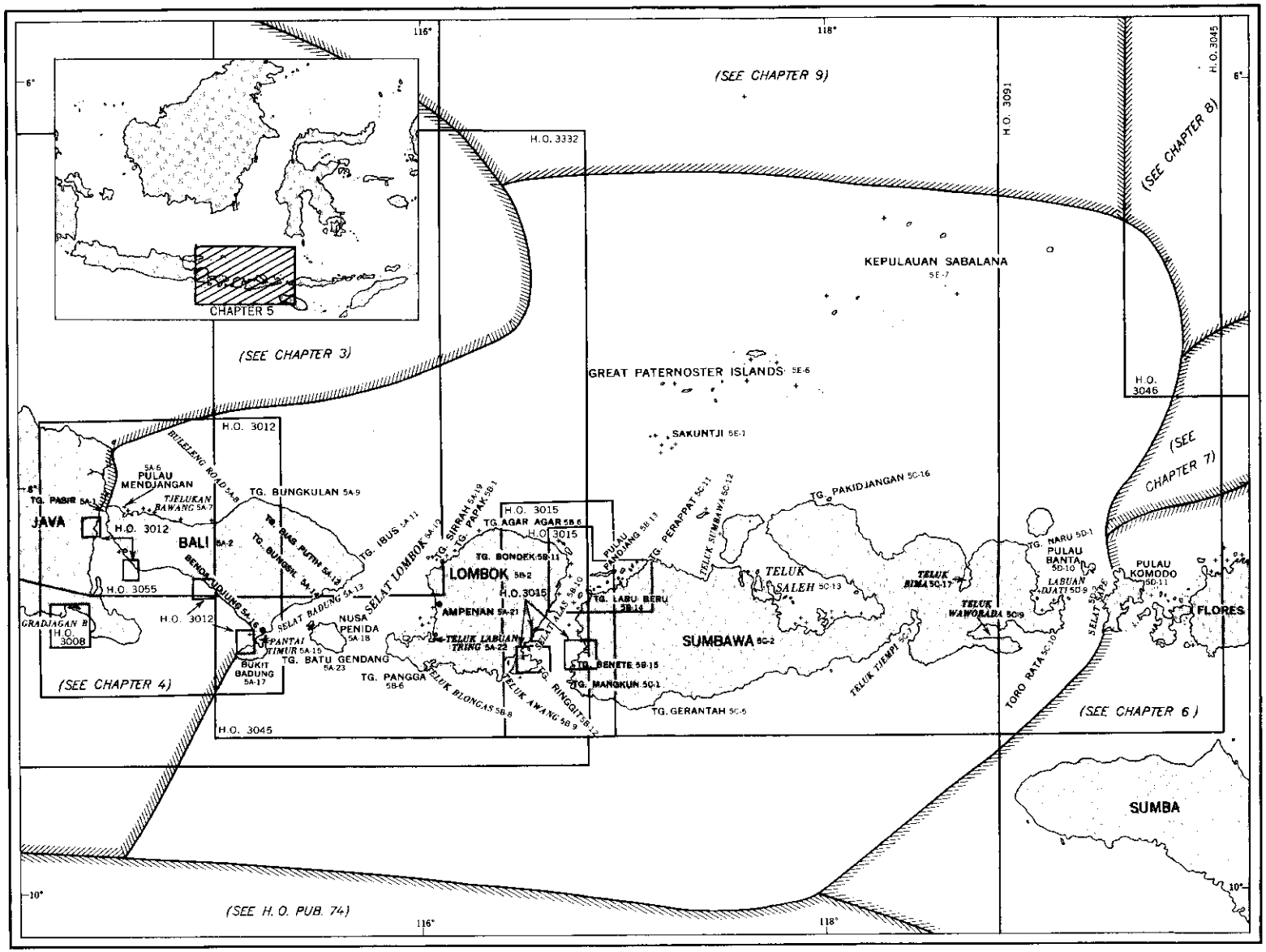


Chart limits shown are of the best scale charts issued to naval vessels by the U. S. Naval Oceanographic Office.
Numbers refer to the section in the text describing a designated locality.

CHAPTER 5—GRAPHIC INDEX

CHAPTER 5

BALI, LOMBOK AND SUMBAWA, WITH STRAITS AND OFF-LYING ISLETS

PLAN.—This chapter describes the islands of Bali (except the southwest coast), Lombok, and Sumbawa, and the related islands and straits.

GENERAL REMARKS

5–1 THE LESSER SUNDA ISLANDS (NUSA TENGGARA) extend some 750 miles eastward from Java to Timor. The principal chain of islands comprises Bali, Lombok, Sumbawa, Flores, Solor, Lomblen, Pantar, and Alor, plus dependent islets. The islands of Sumba, Sawu, Roti and Timor lie southward of this chain but are a part of the Lesser Sunda Islands.

The predominant physical feature of the principal chain of islands is a line of volcanic mountains running from end to end. The mountains are highest at the west end of the line, having their greatest elevation (12,224 feet) on Lombok. Several other peaks rise from 7,000 to 10,000 feet. Sumba, Sawu, and Roti are off the main volcanic line. The island of Timor, differing considerably in physical characteristics from the rest of the Lesser Sunda group, is traversed by a series of mountain chains seldom rising higher than 6,000 or 7,000 feet.

Selat Lombok is the most important passage between the Lesser Sunda Islands because it is widest and offers the easiest connection from Makasar Strait and the Bali Sea to the eastern Indian Ocean. Selat Alas is less frequently used.

The Great Paternoster Islands and the Kepulauan Sebalana lie northward of Sumbawa.

Bali, Lombok and Sumbawa, the westernmost of the Lesser Sunda Islands, are described in this chapter, and the remaining islands of the group in chapters 6 and 7.

NAVIGATION

5–2 The steamship route from Singapore and Java to the northeast part of Australia leads along the north side of the Lesser Sunda Islands on approximately 8° S., and thence through Wetar Strait. Vessels from the west part of Australia proceeding to Singapore of Makasar Strait generally use Selat Lombok, or sometimes Selat Alas.

WINDS–WEATHER

5–3 In that portion of the sea between Celebes and the Lesser Sunda Islands the characteristic features are: steadiness in direction of both monsoons and the prevalence of the eastern over the western; a small rainfall; and high percentage of haziness.

The eastern monsoon blows with force from east-southeast between April and October, it being strongest in June, July and August.

About the middle of December the western monsoon sets in from west-northwest and attains its maximum in January. In February the strength of the wind begins to abate, and in March the direction varies between southwest and north.

The dry season is from May to November; July to October are practically rainless near the coast. The greatest rainfall—about one day in three—is in December and January, and squalls are most frequent in January. The sky is seldom clear; in the western monsoon it is generally overcast, and in the eastern very hazy.

Near the north shores of the islands, winds in both seasons are steadiest in the night and less reliable by day, being influenced by land and sea breezes; longer periods of changeable winds and calms between the monsoons may be expected.

Southward of the Lesser Sunda Islands strong winds, overcast skies, and showery weather prevail. A very hazy atmosphere occurs during the Southeast Monsoon, with heavy swell and high seas.

The Southeast Monsoon begins early in March with winds from southeast to south, and blows most steadily from June to September between southeast and south-southeast.

In November, variable winds are experienced. It is only during December, January, and February that westerly winds blow between southwest and northwest, and these are never reliable.

January and February are the wet months; heavy squalls are frequent in January.

Within the influence of the islands, winds are at all times less reliable in direction and strength. Rain, as on the south coast of Java, depends greatly on local physical features of the land. In and near straits and passages, the winds always draw through, being strongest in the narrow parts.

CURRENTS–TIDAL CURRENTS

5–4 If a ship is not under the influence of powerful tidal currents flowing through the straits, there need be concern only with monsoonal drift both north and south of the western Lesser Sunda Islands. Currents generally run with the wind, but trend southeastward in the west monsoon and southwestward in the east monsoon.

When the tidal currents through the straits are powerful (as at new or full moon with large lunar declination) their influence is particularly felt on the south side of the straits, sometimes at great distances. This effect is less noticeable on the north side of the straits.

Races, eddies and dangerous breaking seas may be found in and near straits and passages when tidal currents run contrary to currents and winds.

5–5 CAUTION–NAVAL EXERCISE AREA.—The shore line of the north coast of Bali from Tandjung Pasir (8°05′ S., 114°26′ E.) to Karang Baru (8°03′ S., 115°10′ E.) northward to position 7°33′30″ S., 114°30′ E. thence to position 7°33′30″ S., 115°10′ E. is designated as a naval exercise area.

During the time of practice no vessel shall remain inside the exercise area.

PART A. BALI AND SELAT LOMBOK

5A–1 TANDJUNG PASIR (8°06′ S., 114°26′ E.), the northwest extremity of Bali, is fringed northward and southward by a narrow, drying reef. A LIGHT is shown from Tandjung Pasir.

COAST—GENERAL

5A–2 BALI is mountainous throughout, the main ridge running from west to east in apparent continuation of the volcanic ridge through Java. Most of the spurs of the ridge approach the north and northeast coasts very closely so that only occasionally does a narrow stretch of lowland remain. Southward of the

SEE SHORT CORRECTIONS

ridge the land is low or slightly hilly with the exception of the Bukit Badung peninsula and the hills around Labuan Amuk (sec. 5A–12). The lower area of the island is very fertile. Gunung Agung (Bali Peak), at the east end of Bali, rises 10,308 feet and is the island's highest peak. From as far as 80 miles it is recognizable by its regular volcanic cone with crater at the peak. Bukit Batu Kau, in mid-island, rises 7,467 feet; it is the second highest peak.

The coasts of Bali generally rise steeply from the sea, with great depths close to, so that there is anchorage close inshore only. Because the coast is entirely open, the only safe anchorage is off the east coast in the west monsoon and off the west coast in the southeast monsoon. The many small rivers—mostly dry in the southeast monsoon—have no navigational significance.

SELAT LOMBOK, between Bali and Lombok, is easily distinguished by the peaks of Bali and Lombok which are visible from 80 miles at sea. The south entrance of the strait is divided into two parts by Nusa Penida and adjacent islets which lie on a detached plateau of less than 100 fathoms. The portion of the strait westward of these islands is known as Selat Badung.

DEPTHS—DANGERS

5A–3 The 100-fathom curve lies between ½ mile and 2 miles off the entire north coast of Bali, and incloses all dangers.

Selat Lombok is without danger, having general depths of several hundred fathoms.

The east coast of Bali along Selat Lombok is clear outside the 100-fathom curve which here lies as much as 2¼ miles offshore. Farther southwestward, in Selat Badung (sec. 5A–13), the 100-fathom curve advances to mid-channel between the coasts of Bali and Nusa Penida. The farthest offshore danger is a 6½ fathom shoal lying about 1¾ miles off the south end of this Bali coast.

The west coast of Lombok along Selat Lombok is likewise clear beyond the 100-fathom curve. At the north end the curve lies 5½ miles off Tandjung Sirrah, inclosing all islets and dangers. Midway on the coast the curve is 1½ miles offshore. Across the large bight in southwest Lombok, the curve lies 5½ miles from shore and closely skirts the edge of a shoal ridge.

The southwest coast of Bali has depths under 100 fathoms up to 12 miles offshore. This portion of the Bali coast is described in Chapter 4.

CURRENTS—TIDAL CURRENTS

5A–4 The tidal currents in Selat Lombok are semidiurnal, with the flood setting northward and the ebb southward, but they are influenced by the monsoons in the Bali Sea and Flores Sea. Thus, during the east monsoon a predominant south-going current may be expected, and during the continuing west monsoon a predominant north-going current.

In the narrows of Selat Lombok, between Nusa Penida and Lombok, there are more powerful currents (up to 6 knots) than in the broader north part where currents up to 3½ knots can arise, and their direction is more clearly north or south than elsewhere. Counter currents may be felt in places along both shores.

South of the narrows a rough sea can arise. On one occasion a heavy breaking swell extended across the south entrance of the strait during a calm wind and sea. On another occasion heavy tide rips and whirling eddies appearing to extend across the south entrance were encountered.

Currents are noticeable far beyond the south end of the strait. One vessel experienced a 2-knot southwesterly set 20 to 80 miles south of the strait.

On the northeast coast of Bali the flood current from Selat Lombok runs westward until about midway between Tandjung Bungkulan and Tandjung Ngis, where it meets the flood

from Selat Bali. The ebb runs in the opposite direction. Along the shore is a counter current. Particularly strong currents have been noted near Gili Selang, the islet at the northwest entrance point of Selat Lombok.

The tidal currents in Selat Badung, chiefly semidiurnal, are complicated by the oblique angle of the strait with Selat Lombok, and by the quarter-circle course of the deep channel. In addition, they are influenced by the monsoons, similarly to Selat Lombok (see above). The strongest current (up to 8 knots) occurs in the east monsoon and sets southwest to south. In the west monsoon the strongest current (4 to 5 knots) sets in the opposite direction.

WEST MONSOON: About the time of the monsoon's transit the tidal current sets between north and northeast (up to 4 knots) over a strip about 2½ miles wide along the Bali shore from Tandjung Serangan to near Labuan Amuk. In the remainder of the strait the predominating current sets between south and southwest, with strong whirling eddies between the two contrary currents. (It often happens, however, that the current at about that time sets strongly north to northwest against the Bali shore.)

About 2 hours after the moon's transit the strip setting north to northeast narrows between Tandjung Serangan and Tandjung Sari, but eastward of the meridian of Tandjung Sari it diverges to such an extent that between Tandjung Bugbug and Tandjung Kramitan (on Nusa Penida) the current sets northeastward toward Selat Lombok almost throughout. At the same time there is a rather wide strip off Nusa Lembongan with a north- to northeast-going current. Toward the middle of Selat Badung, however, the south-going current (½ knot to 3 knots) causes strong, whirling eddies.

About 4 hours after the moon's transit the current sets southwest to south up to 4½ knots. Eastward of Tandjung Setra there is a rather broad counter-current setting northeast.

About 6 hours after the moon's transit the southwest- to south-going current weakens to 2 knots and the above-mentioned counter-current is observed to start farther southward in the strait, at Tandjung Petanu.

About 8 hours after the moon's transit the south- to southwest-going current practically disappears and from the outer roadstead of Benoa to near Labuan Amuk there is a north- to northeast-going current (1 knot to 2 knots) over a strip 3 to 4 miles wide along the Bali shore.

About 10 hours after the moon's transit the current over the whole strait sets north to northeast. About 3 miles from the Bali shore there are eddies and patches of much weaker current, and even southerly currents are to be observed. (During a north-going current these are often forced against the Bali shore).

EAST MONSOON: About the time of the moon's transit the tidal current sets between north and northeast over a strip about 3 miles wide along the Bali shore from Tandjung Petanu to Tandjung Bugbug. In the remainder of the strait there is then a southwest to south current (up to 5½ knots) with whirling eddies between the two contrary currents.

About 2 hours after the moon's transit the north- to northeast-going current practically disappears. Throughout the strait there is then a southwest- to south-going current averaging 3½ knots but reaching 8 knots for a short period.

About 3 to 4 hours after the moon's transit there is still a general southwest- to south-going current which generally reaches an average of 4½ knots at this time. (A maximum of 8 knots has also been observed). A counter-current sometimes is felt along the Nusa Lembongan shore, with whirling eddies where the main current and counter-current meet. The southwest- to south-going current is always weaker along the Bali shore.

About 6 hours after the moon's transit, the southwest-going current decreases to about 2

knots. In the bight between Tandjung Setra and Tandjung Serangan still water may now be expected, while the current may set northeast across the entrance of Labuan Amuk.

About 10 hours after the moon's transit the north- to northeast-going current (averaging 1½ knots and reaching 3 knots) commences along the Bali shore as far southward as Tandjung Patenu. A current also sets in to the Bali shore between Tandjung Serangan and Tandjung Patenu. Along Nusa Lembongan, on the opposite side of the strait, the current sets south to southwest. In the remainder of the strait the current is somewhat confused, but the tendency toward a southwest- to south-going movement becomes increasingly noticeable.

WINDS–WEATHER

5A–5 In Selat Lombok during the Southeast Monsoon calms are frequent from sunrise to noon. At noon a fresh southerly wind arises, turning to southeast on the Bali side and to south-southwest on the Lombok side, blowing strong during the night. In the Northwest Monsoon the winds are generally from northwest. In the north approach to the strait these winds are sometimes accompanied by violent squalls and a high sea.

BALI–NORTH COAST

5A–6 BETWEEN TANDJUNG PASIR (SEC. 5A–1) AND TANDJUNG BUNGKULAN, the coast has few suitable anchorages; scarcely one of them is safe in the west monsoon. The coast between Tandjung Pasir and Tandjung Gondol is practically uninhabited. From the latter point to Tjelukan Bawang the coast is high and populated; thence to Tandjung Bungkulan there follows a prosperous, low coastland.

LANDMARKS.—A 1,378-foot peak rises 3½ miles southward of the entrance of Teluk Pegametan. Randung Agung and the somewhat lower Gunung Prapatagung are coffin-shaped, and lie between Tandjung Pasir and Teluk Trima, 6 miles southeastward. Tandjung Gondol is a steeply rising spit marked by a 161- foot hillock.

The range southward of and parallel to the coast between Tandjung Gondol and Tjelukan Bawang slopes close to the sea, but its higher portion is irregular with few or no conspicuous peaks. The least difficult to distinguish is Gunung Grogak, 4,733 feet high.

Bukit Batu Kau (sec. 5A–2), south-southeastward of Tandjung Bungkulan, is the highest point of the Tabanan Mountains. This range is of no significance to navigation because its summits are of almost equal height. Of more importance is Buleleng Peak, 3,936 feet high, the east terminus and highest point of the ridge extending eastward from Temukus.

PULAU MENDJANGAN (HERTENBEEST), 4 miles eastward of Tandjung Pasir, is 236 feet high and is steep-to only on its east side. The 7-fathom channel between the island and the Bali shore has a least width of 150 yards at its west end. The reefs on both sides show good discoloration. A 3¼-fathom shoal lies toward the Bali shore shortly within the west entrance, and a 2¾-fathom shoal lies ⅔ mile within the same entrance, close off the same shore.

TELUK TRIMA, entered about 2 miles south-southeastward of Pulau Mendjangan, is fouled in its inner half by drying and below-water reefs. Two patches of ½ and 1 fathom, respectively, lie on the west side of the outer half of Teluk Trima. Good ANCHORAGE may be taken in about 22 fathoms eastward of the north end of the drying reef in the center of the bay. Such anchorage is not advised in July or August with a strong south-southwest wind because movement between the reefs then becomes very difficult.

TELUK BANJUWEDANG, entered 1½ miles eastward of Teluk Trima, is a narrow inlet with a least depth of 7 fathoms in the en-

trance, and greater depths within. The shore reefs on either side show up well. Although a vessel can ANCHOR in about 10 fathoms midway within the bay, the precaution stated above for Teluk Trima applies here also.

TELUK PEGAMETAN, entered 2⅓ miles eastward of Teluk Banjuwedang, extends about 1¼ miles southward to its head. Very good ANCHORAGE for larger vessels is afforded. The fringing reefs on both sides of the bay show up well. A drying reef, fronted by a ½-fathom rock, protrudes almost ½ mile from the head of Teluk Pegametan, and a 6½-fathom shoal head lies in midchannel ¼ mile within the entrance; otherwise, the bay as far as the protruding reef has depths of more than 8 fathoms. The west fork at the head of the bay also has these depths. To enter Teluk Pegametan, steer 192° on the 1,378-foot mountain southward of the bay.

The bay in the reef eastward of Teluk Pegametan is not recommended because of hidden reefs.

BETWEEN TELUK PERAMETAN AND TJELUKAN BAWANG, 15 miles eastward, detached coral reefs—many showing discoloration—lie within one mile of shore. Except for the roadsteads to be mentioned, the steep-to coast between Tandjung Gondol and Tjelukan Bawang offers few or no anchorages. Ships find virtually no quiet anchorage in the west monsoon.

LANDMARKS.—Tandjung Sendang is conspicuous for a 426-foot hill just southward of it. Takat Djaran, the islet close eastward of the point, is barely dry at high water. Tandjung Gondol is a steeply rising landspit marked by a 161-foot hillock.

5A–7 TJELUKAN BAWANG is identified by the broad, steep-to, drying coastal reef at its west entrance point; Karang Rata, a narrow, low island partially covered with mangroves, is situated on the drying reef. The east entrance point of the bay is fringed by a smaller drying reef which is not steep-to but which is marked by a BEACON at its outer end. In the center of the bay is a 1½-fathom patch also marked by a BEACON. Remaining depths are from 13 to 33 fathoms.

ANCHORAGE in Tjelukan Bawang is protected against the west monsoon. Vessels may enter on an unofficial range of 198°. Larger ships, however, do better to anchor in the entrance of the bay in around 30 fathoms. A sand beach is located westward of the village at the head of the bay.

TEMUKUS ROAD, 9½ miles eastward of Tjelukan Bawang, is the best roadstead on the north coast of Bali. Very good ANCHORAGE is offered in the Southeast Monsoon. In the West Monsoon the anchorage is fairly well sheltered behind Pulau Kramat—a steep-to, drying reef ¼ mile offshore—but is barely sufficient for two vessels. There is also anchorage in 14 fathoms in the narrow passage between Pulau Kramat and the coast. The reef fringing Tandjung Sangeang, the east boundary of the roadstead, is working seaward so that vessels approaching from this direction should not shoal to less than 11 fathoms.

5A–8 BULELENG ROAD, 7 miles northeastward of Temukus Road, affords ANCHORAGE, probably the poorest on the north coast of Bali. The bottom rises steeply in the roadstead. The roadstead is defined by a line drawn 225° 1$\frac{1}{10}$ miles from Panarukan Reef beacon (see below), thence southward to shore from either end of the line.

BULELENG LIGHT is shown from the coast about 2 miles southwestward of Tandjung Panarukan. A lesser light is shown from near the customhouse about ⅓ mile southwestward of Buleleng Light.

Panarukan Reef, at the northeast end of Buleleng Road, is steep-to stone and coral, with a least depth of 3 feet. A BEACON with two red cylinders stands toward the southwest end of the reef. Between the reef and the shore (a distance of ⅓ mile) are depths from 4¼ to

12½ fathoms, but ships do not venture into this area without need. Small vessels, however, have ANCHORED here satisfactorily in 12 fathoms, good holding ground.

A dangerous WRECK, marked westward by a green BUOY, lies sunk about 110 yards offshore in the south end of the roadstead. Obstructions charted northward of the wreck consist of lost anchors and chains.

A SUBMARINE CABLE extends northwestward from shore about ½ mile northeastward of Buleleng Light.

FIRING AREA.—A rifle range extends 1¼ miles seaward from a position one mile westward of Buleleng Light. During firing practice a red ball is shown from a signal mast on the coast near the range. If a vessel should stray onto the range, a black ball will be hoisted as soon as possible and firing will cease.

BULELENG is a major commercial center of Bali. The dense coconut groves westward of Buleleng give place here to warehouses and dwellings. Eastward of the main street of the town is the fairly broad (but shoal) mouth of the Sungai Buleleng. Beyond the river mouth fishermen's huts and then rice fields front the black volcanic sand beach.

Provisions are scarce and water is unobtainable. A government doctor visits the port daily. The town is connected by telephone and highway to Singaradja, 2½ miles inland. Auto roads also extend to Tandjung Gondol and to Sangsit.

BALI—NORTH COAST (CONTINUED)

5A-9 SANGSIT ROAD, 3 miles southwestward of Tandjung Bungkulan, affords fairly good ANCHORAGE in 13 to 16 fathoms about ½ mile 021° from a red-roofed house on the beach.

TANDJUNG BUNGKULAN (8°03′ S., 115°11′ E.), the northernmost point of Bali, is a low, stony point. A 6-fathom patch lies 1⅓ miles eastward of Tandjung Bungkulan, in a position a little more than ⅔ mile offshore.

From Tandjung Bungkulan to Tandjung Ibus, 36 miles southeastward, many mountain spurs descend to the sea. Sand beaches with salt pans mark the lower coastal area around Ambat Labuan. Farther eastward the spurs of the Seraja Mountains are usually separated by stony ground. Along this coast the insular shelf is steep-to, so that other than the open roadsteads to be mentioned, there are few or no anchorages.

LANDMARKS.—At the east end of the Tabanan Mountains is the Batu complex, in the middle of which is Batur, an active volcano whose glow may sometimes be recognized. The crater is on the east side of the summit, and the top of it may occasionally be seen from northward above the encircling mountains. On the spur descending to Tandjung Bungkulan is Tadjun (Saddle Hill), 2,402 feet high, recognizable by its saddle, though this is not particularly striking.

On the northeast slope of Gunung Abang, the highest peak of the Batur complex, is the bare hill Kubu, 797 feet high, conspicuous by its light color and three darker trees on its summit. Gunung Agung, the highest mountain in Bali, lies southeastward of Gunung Abang and was described in section 5A-2. The Seraja Mountains near the east extremity of Bali, have four summits when seen from north-northeastward; the highest is 3,851 feet.

TANDJUNG BATU, a low, stony point, lies 5 miles southeastward of Tandjung Bungkulan; between is an open road 600 yards offshore with depths around 11 fathoms, soft mud and sand. Westward of Tandjung Sanih, a point about 1 mile westward of Tandjung Batu, is a sand beach and low terrain; eastward, mountain spurs descend to the sea. A conspicuous coconut grove lies between Tandjung Gulah, 5 miles eastward of Tandjung Batu, and Tandjung Ngis 7½ miles farther eastward. Small craft ANCHOR near the east end of the grove in fine weather.

SEE SHORT CORRECTIONS

TIANJAR ROAD, 11 miles eastward of Tandjung Gulah, is identified by its village which lies at the foot of Gunung Agung. A temple is situated at the west end of the village, and a broad-crowned tree at the east end; farther eastward are two ancient lava flows sloping directly toward the sea. Good ANCHORAGE in about 20 fathoms may be taken 550 yards from shore, somewhat westward of the line "Kubu in range 193° with the eastern broad-crowned tree".

From Tianjar Road to Labuan Ambat, 11½ miles southeastward, the coast is flat but the slopes of Gunung Agung rise sharply behind it.

Tandjung Sukadane, 4 miles southeastward of Tianjar Road, is low. This point is further identified by a temple and houses in the vicinity, and by three lava flows which can be traced far up into the mountains. Tandjung Muntik and Tandjung Batu Niti, 3½ and 5¼ miles southeastward, respectively, of Tandjung Sukadane, are spurs of Gunung Agung. Tandjung Truna, 1 mile southeastward of Tandjung Batu Niti, is a steeply rising point, the center of a high coastal ridge. The insular shelf is too steep to to anchor between Tandjung Sukadane and Tandjung Truna.

LABUAN AMBAT is formed by a slight bend in the coast between Tandjung Truna and Tandjung Djambelo, 2¼ miles southeastward. The shore behind the bight is a plain covered with coconut and nipa palms. The village of Ambat has a fairly lively prau traffic and is the port for Tjulik, 2 miles inland. Small vessels ANCHOR off the village in 20 to 30 fathoms, but are unsheltered in both monsoons. The sea breeze quickly raises a heavy surf. Sudden violent squalls can be experienced night or day.

The coast from Tandjung Djambelo to Tandjung Ibus, 3 miles southeastward, is steep and unapproachable.

SELAT LOMBOK

5A–10 SELAT LOMBOK, about 27 miles long, lies between Bali and Lombok. Selat Lombok is 18½ miles wide at its north end, and 11½ miles wide at its south end, eastward of Nusa Penida. That part of the strait westward of Nusa Penida is called Selat Badung, and is 5¾ miles wide.

Information on the currents in Selat Lombok is given at the beginning of this part (Part A.); general information about the strait is also given there. There now follows a coastal description of the southeast coast of Bali and the west coast of Lombok, which coasts together comprise the shores of Selat Lombok.

BALI–SOUTHEAST COAST

5A–11 FROM TANDJUNG IBUS (8°22′ S., 115°42′ E.) TO TANDJUNG LOKAN the steep spurs of the Seraja Mountains reach the sea. Thence to the entrance of Selat Badung the coast is low and flat, with low, undulating hinterland to the slopes of Gunung Agung. The only interruption is Bugbug, a coastal hill, described below. Ships can ANCHOR on this coastal stretch southward of Tandjung Batu Tiga where the bottom is less steep. In the Southeast Monsoon, however, the anchorage is poor. Labuan Amuk offers passable anchorage.

From the entrance of Selat Badung to the Bukit Badung peninsula (Tafelhuk) the hills approach the coast only between Labuan Amuk and Tandjung Setra. Otherwise the coast is low, and the hinterland low and rolling. The Bukit Badung peninsula rises 709 feet, but is low in comparison with the neighboring mountainous country. Ships can ANCHOR on this coastal stretch southwestward of Tandjung Setra, but in the Southeast Monsoon there is much rolling and surf. Outside the coastal reef at Pantai-Timur, anchorage may be taken almost anywhere.

LANDMARKS.—Bugbug (8°30′ S., 115° 36′ E.), an isolated coastal hill, rises 945 feet between Tandjung Bias Putih and Tandjung Bugbug. The hill is conical with a rather sharp peak, and is an excellent landmark. The 1,230-foot peak, about 2½ miles west-northwestward of Bugbug, is the sharp conical, most easterly peak of a short east and west ridge northward of Labuan Amuk.