

manner with low, level country to the westward. Of these mountains the Owen Stanley Range, which may be termed the backbone of this part of New Guinea, extends as an almost continuous chain from Mount Victoria to the head of Milne Bay.

Mount Victoria, a summit of the Owen Stanley Range, is remarkable for its square top and its great height, 13,244 feet; from it a sharp ridge descends southwestward toward the sea.

At 10 miles northwestward of Mount Victoria there is a sharp slope from the top of this lofty mountain chain, which here joins two ranges of less height; one of these ranges extends southwestward for about 25 miles toward Redscar Bay, and the other range trends northwestward for about the same distance at a much greater elevation. Mount Cameron, the highest point in the latter range, attains an elevation of 7,270 feet at its southeastern end.

Mount Yule, 31 miles northeastward of Cape Possession, is a remarkable table-topped mountain, 10,046 feet high, the crowning summit of a detached portion of the Owen Stanley Range; the dividing gap in the range is a deep valley located about 20 miles southward of Mount Yule. This mountain has been seen from a distance of 117 miles.

The country between this mountain and the coast is hilly but apparently fertile.

7-54 The coast for the first 9 miles south-eastward of Cape Possession is a sandy beach backed by wooded hills. Between these hills and the shore is a strip of level land on which are several villages; back of the villages is a continuous forest of coconut trees that extends landward for several miles to the base of the hills.

From the end of the beach to Au Point, 4 miles farther eastward, the land is very low and covered with dense jungle. Very few soundings have been taken off this part of the coast.

Villages.—The coast southward of Cape Possession to Au Point, a distance of 13 miles, is thickly populated. The principal villages are Maiva and Kevori, both mission stations.

Au Point, the northwestern extremity of Hall Sound, is low and sandy; within it the ground is swampy and covered with large mangrove trees. Pinupaka village, at which there is a mission station, is situated one-half of a mile northward of the point.

7-55 Ravao (Roro) (Lolo) (Yule) Island ($8^{\circ}50' S.$, $146^{\circ}32' E.$, *H. O. Chart 2947*), the northern extremity of which is about 1 mile off Au Point, fronts Hall Sound. It is $4\frac{1}{2}$ miles long northwest and southeast and $\frac{1}{2}$ to $1\frac{1}{4}$ miles wide; it has many peaks, the highest of which, located $1\frac{3}{4}$ miles from the southern end of the island, is 526 feet high. The hills slope gently toward the sea. The northern end of the island is wooded, but at the southern end there are many clearings, with occasional small clusters of huts. Along the coasts of the island there are several caves.

Reef.—The seaward side of the island is fronted by a moderately steep-to reef to a distance varying from 400 yards to 1 mile, increased off its northern and southern extremities to $1\frac{1}{4}$ miles. The 20-fathom curve lies at a distance of $3\frac{1}{2}$ to 5 miles off the reef and the bottom shelves gradually as the reef is approached. The inner side of the island, within the entrance to Hall Sound, is clear of reefs, the depths shoaling gradually toward the shore of the island.

Anchorage.—Good temporary anchorage may be taken about 1 mile westward of the northern extremity of Ravao Island in depths of 10 fathoms, mud.

A tripod beacon, about 12 feet high, is located about $\frac{1}{2}$ mile southward of Mauru Point on the southeastern edge of the reef that fronts the seaward side of Ravao Island. Two piers are located in the bight between Kairuku

and Mauru Points. A white house is conspicuous on the shore in the vicinity of the south pier.

A government station is located near Kairuku Point.

Villages—Mission.—Chiria village lies on the western side of Ravao Island. There is a mission station between Chiria and Mauru Point, the southern extremity of the island. The climate of the island is considered to be more unhealthful than that of the mainland.

7-56 Hall Sound (Bia Ata), situated eastward of Ravao Island, affords sheltered anchorage in depths of 4 to 12 fathoms, mud, good holding ground; it is available to all classes of vessels. The southern entrance, located southward of Ravao Island, is $1\frac{1}{2}$ miles wide but is reduced by the reefs on both sides to a width of three-fourths of a mile; there are depths of 12 to 24 fathoms in midchannel. The water in the channels is frequently so turbid that the reefs on either side are concealed.

The northern channel is one-half of a mile wide between the mud flat off Au Point and the reef that extends northward from the northern end of Ravao Island; there is a least depth of $11\frac{1}{2}$ fathoms in the fairway of this channel.

7-57 Off-lying dangers.—A 6-fathom and an 8-fathom shoal lie, respectively, $6\frac{1}{4}$ miles westward of Kapripata Point and $11\frac{1}{2}$ miles westward of Mauru Point.

Musgrave Reef ($8^{\circ}53' S.$, $146^{\circ}31' E.$, *H. O. Chart 2947*), one half of a mile long within the 5-fathom curve, has a least depth of $2\frac{3}{4}$ fathoms near its southern end, which lies $2\frac{1}{2}$ miles south-southwestward of Mauru Point. The reef is directly in the approach to the southern entrance to Hall Sound.

Reefs extend 1,600 yards into the southern entrance from Kapripata Point, a low mangrove-covered point on the mainland south-

ward of Ravao Island. Reefs also extend into this passage for about 1,000 yards from the hilly point northward of Delena village, which is located nearly 2 miles northeastward of Kapripata Point.

Mauru Mauru Reef, on the northern side of the southern passage into Hall Sound, is the southern part of the extensive reef that projects out from the west coast of Ravao Island.

7-58 The eastern shore of Hall Sound is a mangrove swamp through which the Bioto and St. Joseph Rivers discharge; it is fronted by an extensive drying mud flat that makes the rivers accessible only to boats, and to them only from about half flood to half ebb. The depths shoal gradually toward this flat.

7-59 Cable area—Prohibited anchorage.—A cable area lies abreast the south entrance, extending in a northeasterly, thence northwesterly direction, and ending at a position about 1 mile southeastward of Roro-Ituna, the north extremity of Ravad Island. Anchorage is prohibited in the area.

7-60 St. Joseph (Angabunga) (Makunga) River, discharging into Hall Sound, has depths of 5 to 6 feet at high water in its entrance. For the first 10 miles of its course the river has a width of 50 to 100 yards and depths of 2 to 3 fathoms. The current in the river has a rate of 3 to 4 knots.

The lower part of the river, for about 20 miles from its mouth, flows through a flat and almost swampy country, much of which is subject to inundation.

The **Bioto** is said to have greater entrance depths than the St. Joseph; inside the entrance the river has a depth of $11\frac{1}{2}$ fathoms and a width of 120 yards.

Tides.—In Hall Sound it is high water full and change at 9h. 15m.; springs rise 5 to 7 feet, neaps 2 to 3 feet.

Tidal currents.—In the southern entrance to Hall Sound the flood runs northeastward

with a velocity of 1 knot and the ebb southward at a rate of 1 to 2 knots.

7-61 Directions.—In order to avoid Musgrave Reef, vessels approaching Hall Sound from the northward steer for Napru Hill, 720 feet high, the northern high peak of the range on the southern side of the south entrance, bearing 106° ; when the eastern extremity of Ravao Island bears 025° , change course to 039° and continue on that course through the fairway into the sound.

Vessels coming from the southward steer for the western extremity of Ravao Island, bearing 350° , passing between Musgrave Reef and the shore reef that extends out from abreast Kapripata Point. When the southeastern extremity of Ravao Island bears 025° , steer for it until Napuru Hill bears 106° , and then steer 039° up the fairway into the sound.

Caution.—The points of the reefs make it dangerous to enter at night.

7-62 Settlements.—Delena village, on the south side of the southern entrance to Hall Sound, is a mission station. There is a mission station and church at Inawi, on the St. Joseph River, about 16 miles north-northeastward of Au Point. The district northward of Hall Sound, as far as the Inawi River, is known as the Mekeo District; there are several mission stations in this district. This country is flat, swampy in places, and unhealthful.

Climate.—The rainfall at Inawi for the six months ending June 1893 amounted to 18 inches; rain fell on 77 days. The mean temperature for each of the six months was about 72° .

7-63 Coast—Cape Suckling ($9^{\circ}02' S.$, $146^{\circ}35' E.$, *H. O. Chart 2946*).—From Hall Sound the coast trends south-southeastward for about 12 miles to Cape Suckling; it is backed by a range of hills 500 to 700 feet high. Mount Ripachina, 720 feet high, is the highest peak in the northern portion; and

Mount Boria, 730 feet high, located $2\frac{1}{2}$ miles northeastward of Cape Suckling, is the highest peak in the southern part. The latter part of the range consists of sand hills covered with scrub. The cape is low, gradually rising to Mount Boria, which, with Mount Kupata, at the termination of the range, serves to identify the cape. Mount Lolopata, 870 feet high, located 7 miles north-northeastward of the cape, is also a prominent landmark.

When the rivers are in flood there are often large quantities of driftwood in the open sea off this coast; at such times the sea has a muddy, discolored appearance.

7-64 Shoals.—Patches with depths of $2\frac{1}{2}$ to $2\frac{3}{4}$ fathoms over them are situated 800 to 1,200 yards off Gubbins Point, midway between Kapripata Point and Cape Suckling. Another shoal with a least depth of $3\frac{1}{2}$ fathoms over it lies $1\frac{1}{4}$ miles off Cape Suckling. There is a $4\frac{1}{2}$ -fathom patch 1 mile offshore about $2\frac{1}{2}$ miles southward of Gubbins Point.

A coral shoal over which there is a depth of 5 fathoms lies about $5\frac{1}{2}$ miles westward of Gubbins Point.

Pike Shoal, over which there is a depth of $4\frac{3}{4}$ fathoms, coral, lies $2\frac{1}{2}$ miles southward of Cape Suckling. A 4- and a 5-fathom shoal lie, respectively, 4 and $4\frac{3}{4}$ miles southward of Cape Suckling and 2 miles offshore.

7-65 Coast.—From Cape Suckling the coast trends east-southeastward for about 16 miles to Redscar Bay; the first 8 miles of this coast is fronted by a coral reef to a distance of $\frac{1}{2}$ to 1 mile.

Aroa River discharges at about 11 miles from the cape; its mouth is apparently dry at low water. The eastern branch of the river is the Tutu.

Kekeni (Skittle) Rocks, three in number, the highest of which is 70 feet high, are situated $1\frac{3}{4}$ miles southward of the entrance to Aroa River, on the western part of a drying coral reef and nearly connected with the

shore flat. These rocks, showing above the low land at the back, which is chiefly mangrove swamp, are conspicuous from seaward.

7-66 Redscar Bay ($9^{\circ}09'S.$, $146^{\circ}50'E.$) lies between Kekeni Rocks and Lagaba Island, $11\frac{1}{2}$ miles to the southeastward. The shores of the bay are low, swampy, and thickly wooded.

Off-lying shoals.—A shoal, the depth on which was reported in 1930 to be 5 fathoms, was first reported in 1893 to lie 4.7 miles 312° from Varivari Island. The position of this shoal, however, is doubtful.

A 7-fathom patch lies near the 100-fathom curve about 9 miles west-southwestward of Kekeni Rocks.

Anchorage.—Redscar Bay is, during the southeast monsoon, an exposed anchorage. Vessels should not anchor in a depth of less than 10 fathoms, and, if in the northern part of the bay, Kekeni Rocks should not be brought to bear westward of 329° . There is better anchorage at Varivari, to the southward.

7-67 Galley Reach.—The bar across the estuary into which the Vanapa and other rivers discharge is at times dangerous to boats and, being formed by the deposit of sediment brought down by the rivers, is liable to shift. A depth of about 6 feet may be found in the channel over this bar at low water. Abreast of Manumanu there are general depths of 6 to over 10 fathoms in Galley Reach, which is bordered by mangrove swamps.

Submarine cable—Prohibited anchorage.—A submarine telegraph cable is laid from Manumanu to the opposite shore. Anchoring and fishing are prohibited within 500 yards of the cable.

Directions.—A conspicuous palm bearing 359° leads over the bar and midway between the two entrance reefs which nearly always break. Upon passing over the bar, the two

beacons at Manumanu in line 048° lead to the center of the channel.

7-68 The Vanapa River drains a large section of the Owen Stanley Mountains and discharges into the sea through Galley Reach at the head of Redscar Bay. Its junction with Galley Reach is hidden by mangroves. It was ascended by boat for about 40 miles in April 1889 and was found to be a rapid stream, with numerous snags and boulders. That part of the river between Mount Musgrave and the sea was considered suitable for the transport of timber, but beyond that it is too much obstructed by boulders.

The Laloki (Tilley) River, entering Galley Reach from the southeastward, is apparently some 50 miles in length; its principal tributaries are the Goldie and Hiwhick Rivers.

Settlements.—A mission station and a sawmill are maintained at Manumanu village, on the southern side of the entrance to the Vanapa River. In the clearings, generally hidden from the river, there are several small villages, and at the head of Galley Reach are several rubber plantations.

The coast between Galley Reach and Lagaba Island, 9 miles to the southward, is low and swampy.

7-69 Lagaba Island (Redscar Head), situated at the southeastern extremity of Redscar Bay, is about 2 miles long and one-half of a mile wide; it attains a height of 360 feet near its center and is very conspicuous. The western extremity is a bold point rising to a hill, 254 feet high, with cliffy patches on its southern side. The island stands on a coral reef which extends out about 600 yards from its western and southwestern sides; it is connected with the shore by a mangrove swamp.

7-70 Varivari Island ($9^{\circ}15'S.$, $146^{\circ}53'E.$), situated about 2 miles northwestward of Lagaba Island, is about one-half mile in length east and west, and has at its southern and western extremities two peaks which are,

respectively, 114 and 140 feet high; these peaks, being connected by a strip of low land, appear from a distance as two islets. The island stands on a reef which extends one-third of a mile northwest and southeast of it and to a less distance in other directions. Two rocks, one of which is 91 feet high, are situated on the southern part of the reef.

The Bagubada, Kadora, and Kido Rivers discharge through mangrove swamps into the bight eastward of Varivari Island.

Anchorage can be taken in a depth of about $5\frac{1}{2}$ fathoms, mud and sand, with the westernmost hill on Lagaba Island bearing 151° , distant 1,700 yards, with shelter during southeast monsoons. Small craft can anchor nearer the island. There is considerable swell in this anchorage during the northwest monsoon, but by anchoring in a depth of 12 fathoms at a distance of 400 to 600 yards off Varivari Reef fair shelter could be obtained.

Caution.—In approaching Varivari Anchorage or Caution Bay a good lookout from aloft should be kept when nearing the edge of the barrier reef, because the soundings taken in this locality have been very scattered. This caution applies with equal force to other parts of the barrier reef.

7-71 Dareba Hill ($9^\circ 16' S.$, $146^\circ 57' E.$), $2\frac{1}{2}$ miles eastward of the summit of Lagaba Island, is isolated and rises abruptly from the low land to a height of 554 feet; from the southward it appears wedge-shaped, but from the northward and westward it has a rounded appearance.

7-72 Caution Bay.—From Lagaba Island the coast trends eastward to the mouth of Lealea River, and then southward to Bura Head, forming Caution Bay. This bay is 8 miles wide and is encumbered with numerous patches known as Pullen Shoals, in the central part of which there are depth of $1\frac{3}{4}$ to 3 fathoms. Reefs and foul ground lie in the southern and southwestern approach to the bay; they extend from Idiha Island,

which is 20 feet high, covered with brush, and located on the outer edge of the barrier reef, to within 1 mile of Bura Head. Strong tide rips have been encountered in a position about 3 miles northward of this island.

Piri Patch, on which the depth is $1\frac{3}{4}$ fathoms, lies a short distance off the edge of the shore reef northward of Bura Head. A $2\frac{1}{2}$ -fathom patch lies $9\frac{1}{2}$ miles northwestward of Idiha Island, with shallow water in places between. This patch may be considered as the commencement of the barrier reef. A $5\frac{3}{4}$ -fathom patch and an unexamined shoal area lie between $5\frac{1}{2}$ and $6\frac{1}{4}$ miles north-northwestward of Idiha Island at the entrance of Caution Bay. Bavo Island, with some tall trees on it, stands on the reef 3 miles eastward of Idiha Island.

Lealea River empties into the head of Caution Bay.

7-73 Bura Head is a conspicuous red cliff, 163 feet high, located at the southern end of a short range of coastal hills. Since it is separated by a plain from the Pyramidal Hill Range, which rises to a height of 1,000 feet at a distance of about 5 miles to the northeastward, this point is conspicuous from the southward.

Anchorage.—There is good anchorage in a depth of 14 fathoms at about 1 mile northeastward of Idiha Island, where there is shelter against the southeast monsoon. In approaching this anchorage a good lookout should be kept from aloft in order to avoid the reef that extends nearly 1 mile northward from Idiha Island and the shoal spit that lies northwestward of the island.

Cable area—Prohibited anchorage.—A submarine cable crosses Caution Bay in a northwesterly direction from Bura Head to a point about 1 mile southwestward of Lagaba Island. Anchorage is prohibited within three-fourths of a mile on either side of the cable.

Villages—Mission.—Just eastward of Bura Head is Bura village, where there is a mis-

sion station, and $2\frac{1}{2}$ miles southeastward is Burapada village.

7-74 The barrier reef, commencing abreast Caution Bay and extending to the eastward of the Louisiade Archipelago, is a remarkable line of barrier reefs, 500 miles in length, which are composed of living coral. In many parts it does not reach to the surface of the sea; in such parts it is known as the "sunken barrier." Varying in its distance from the land from 1 to 10 miles, it has many breaks and passages; but it may, nevertheless, be considered a unit.

A remarkable feature of the reef is that where it is submerged it is, insofar as is known, not dangerous to vessels of moderate draft. The depths in such localities are seldom less than 5 fathoms.

The outer edge of the barrier, in every place yet examined, is very steep, 100 fathoms being found close to the reef.

The government of the Territory of Papua has published Sailing Directions for the Territory of Papua, wherein are given detailed directions for passage inside the Barrier Reef from Redscar Bay to San Roque Passage, about 200 miles to the east-southeastward.

7-75 Coast.—From Bura Head ($9^{\circ}24' S.$, $147^{\circ}01' E.$) the coast, fringed by a coral reef and backed by hills, most of which are wooded, has a general southeasterly direction for $7\frac{1}{2}$ miles to Palli Palli Point, where it turns to the northward, forming the western side of Port Moresby. Haidana Island, 26 feet high and consisting of a coral plateau covered with sand and grass, stands on the coral reef which fronts the coast to a distance of 2 miles. The island lies about 1 mile southward of Burapada and $2\frac{3}{4}$ miles south-southeastward of Bura Head.

7-76 Anchorage.—There is protected anchorage westward of Haidana Island in depths of 8 to 9 fathoms, sand and mud, with the northern extremity of the island

bearing 079° and the southwestern extremity bearing 137° . Small craft with local knowledge can find sheltered anchorage eastward of the island, the only approach being from southward through a break in the reef between the island and the mainland.

Clarke Patches, situated in the fairway southeastward of Liljeblad Passage and southward of Haidana Island, are scattered shoals over which there are depths of 2 to 3 fathoms.

Idlers Bay, the entrance to which lies about 3 miles southeastward of the southern extremity of Haidana Island, is nearly choked with reefs, leaving only an anchorage for coasters in its eastern corner. The shores of the bay are fringed with mangroves, and at the head of the bay is Roku village.

Inshore channel.—There is a channel within the barrier reef passing from Caution Bay close along Bura Head and Haidana Island, and leading to Port Moresby, which is available for coasting craft with local knowledge.

A wide valley that trends northwestward behind the coast hills extends from the head of Bootless Inlet to Redscar Bay and the mouth of the Laloki River.

7-77 PORT MORESBY APPROACHES

—**Aspect**—Bura Head to Tupuselei.—This coast line, about 20 miles in length, has been surveyed. It has an off-lying barrier reef and includes Port Moresby and Bootless Inlet. There are several islands and islets in this space, those on the fringing coast reef being low, sandy, and rocky, with a few trees and scrub, while those which are detached are higher. They are visited by natives for fishing purposes.

The district consists of hills, some wooded and others with patches of cultivation. They rise from the shore to a height of 400 to 600 feet on the western side of Port Moresby, to about 900 feet on the eastern side of that

port, and to nearly 1,400 feet northward of the port.

7-78 Landmarks.—**Taurama** ($9^{\circ}32' S.$, $147^{\circ}14' E.$), standing above Pyramid Point, the western point of Bootless Inlet, is a pyramid-shaped hill 599 feet high. Tupuselei Head, the eastern entrance point of the inlet, is 169 feet high. The eastern side of the inlet is composed of valleys and small hills that rise gradually from the coast to the Astrolabe mountain range, which attains heights of 2,000 to nearly 4,000 feet. Mount Lawes, situated in a plain about 9 miles northward of the head of Bootless Inlet, is a conspicuous hill 1,600 feet high.

From seaward, the coast in the vicinity of Port Moresby is not distinctive, due to the mass of the Owen Stanley and Astrolabe Ranges in the background. On the western side of the entrance to Port Moresby is Mavarololo, a conspicuous 641-foot hill with a clear summit. Huhunamo, 1,322 feet high, and Iovabada, 1,334 feet high, are two conspicuous tree-covered mountains close northward of the head of the bay. On the eastern side of the port is Mount Pullen, 834 feet high, located nearly $2\frac{1}{2}$ miles north-northeastward of Bogirohodobi Point. A mast from which a red obstruction light is shown is located on the summit of a hill, 827 feet high, about $\frac{1}{2}$ mile south-southeastward of Mount Pullen. The white houses between Paga and Tuaguba Hills are easy to distinguish in clear weather by vessels approaching Basilisk Passage. The wreck of the *Pruth* on Nateara Reef shows up when within a few miles of Basilisk Passage.

7-79 Barrier reef—Passages.—Through the barrier reef there are three passages, Liljeblad, Basilisk, and Padana Nahua, all of which lead to Port Moresby. The first mentioned is between the foul ground southward of Caution Bay and Sinavi Reef, 8 miles westward of the port; this passage involves a circuitous route through an area that is encumbered with reefs, and, because of the shoal patch lying in the fairway, the

shoals between it and the entrance to the port, the lack of any definite marks, and the strength of the tidal currents, it should be used only by vessels of shallow draft and with local knowledge. Basilisk Passage, abreast the port, between Sinavi and Nateara Reefs is deep and clear, and is the recommended channel into the port. There is a least charted depth of $5\frac{1}{3}$ to 8 fathoms near the range line of the fairway in this channel.

Padana Nahua, at the eastern end of Nateara Reef, is about one-half of a mile wide and very deep; but, because of its inferiority to Basilisk Passage, its use is not recommended except by vessels with local knowledge.

Basilisk Passage Range Lights are shown from beacons at Yupukuri (Vabukori Point) $2\frac{1}{2}$ miles east-southeastward of Bogirohodobi Point. In range bearing 054° they lead through Basilisk Passage and clear of Lark Patch.

Sinavi Reef is the part of the barrier reef fronting the shore and shore reefs at an average distance of $1\frac{1}{2}$ miles between Liljeblad and Basilisk Passages. Commencing about 1 mile southeastward of the foul ground southward of Caution Bay, this reef extends $9\frac{1}{2}$ miles to the southeastward; the seaward edge of the reef is well defined and plainly visible in clear weather. Sinavi Reef dries in places.

7-80 Tauko (Daugo) Island, situated near the middle of Sinavi Reef, is $2\frac{1}{2}$ miles in length by about one-half of a mile in width and 24 feet high. This island and the smaller ones just eastward of it are all low, flat, sandy, and covered with trees; the easternmost of these small islets is 20 feet high.

7-81 Lark Patch ($9^{\circ}32' S.$, $147^{\circ}08' E.$), with a least depth of 2 fathoms, lies $\frac{1}{2}$ mile northeastward of the northeastern extremity of Sinavi Reef on the western side of Basilisk Passage. Depths of less than 6 fathoms extend southeastward and eastward from the above 2-fathom patch to within 600 feet and 300 feet of the 054° and 354° range, respectively.

7-82 NATEARA REEF, the next one eastward of Sinavi Reef and separated from it by Basilisk Passage, is a main part of the barrier reef fronting Port Moresby. Nateara Reef dries in places. The seaward edge is well defined except toward the southeastern submerged section.

A LIGHT is shown from a beacon with a triangular topmark, 35 feet high, situated near the northwestern point of Nateara Reef. The light is equipped with a RADAR REFLECTOR.

The WRECK of a steamer, which has broken in half, lies on Nateara Reef about 3 miles east-southeastward of the light beacon.

7-83 EASTERN APPROACH TO PORT MORESBY—SHOALS.—A sunken rock lies about 700 yards northward of the northern end of the reef that forms the eastern side of Padana Nahua Passage.

The western side of Padana Nahua Passage is formed by the eastern end of the sunken barrier reef extending about 3 1/2 miles east-southeastward from the drying section of Nateara Reef. Shoal depths fringe the eastern and northeastern part of the sunken reef and vessels rounding this area should exercise caution.

Southwestward of Tupuselei Head, and close northward of the turning point after entering Padana Nahua Passage, is South Patch, over which there is a depth of 1 1/3 fathoms. A BEACON stands on South Patch.

MIDDLE PATCH, with a depth of 3 2/3 fathoms and North Patch with a depth of 1 1/2 fathoms lie a little more than a 1/2 mile north-by-westward and about 3/4 mile north-northeastward, respectively, of the beacon on South Patch.

A 5 1/4-fathom patch and a 7 1/3-fathom patch lie about 2/3 of a mile east-southeastward and about 3/5 of a mile southeastward, respectively, of the beacon on South Patch.

The southern end of Hanudamava Island situated on the western side of the entrance to Port Moresby, in range with the southern extremity of Manubada Island bearing 297°, leads close southwestward of South Patch.

7-84 MANUBADA ISLAND, 212 feet high, about 4 miles northwestward of Pyramid Point, is surrounded by a reef which extends

out only a short distance from its southwestern side. Between Manubada and the mainland northeastward there is a narrow channel with depths of 10 to 14 fathoms.

ANCHORAGE.—Good anchorage may be obtained during the southeast monsoon in 10 fathoms, mud, off the northwestern side of Manubada Island.

7-85 PARI VILLAGE (9°31'S., 147°13'E.), lies on the coast at the foot of Maata Hill, the 782-foot summit about 2 miles northwestward of Pyramid Point. A shore reef that varies in width from about 1/8 to 1 mile fronts the coast between Pyramid Point and Yupukuri Point, about 4 miles to the northwestward.

Some houses standing in the valley north-eastward of Kila Kila, the prominent 516-foot hill within Yupukuri Point, are visible from the southeastward when approaching Port Moresby from Padana Nahua Passage.

7-86 WALTER BAY is a semicircular recession in the coast between Yupukuri and Bogirodobi Point, about 2 1/2 miles apart. A reef extends out about 300 yards from the shores of this bay; at the head of the bay, on this shore reef, is Gabatu Motu Motu Islet, 45 feet high. In the eastern part of the bay, close off the shore reef, is Daunagena (Danuagua) Islet. A rocky islet, 22 feet high, lies about one-half of a mile northwestward of Daunagena Islet.

ARAKJTI REEF, lying in the western part of Walter Bay close southeastward of Bogirodobi Point, is about 3/4 of a mile long in an east and west direction; it is separated from the fringing reef off that point by a narrow channel about 150 yards in width and with a depth of 4 fathoms.

In northwesterly weather local craft obtain good ANCHORAGE between Arakuti Reef and the beach to the northward.

7-87 PORT MORESBY is about 4 1/2 miles long and 1 to 2 miles wide, with general depths of 7 to 12 fathoms. Strong southeast winds drive a heavy sea into the port, but there is sheltered anchorage in 6 to 8 fathoms in the east part of the bay; in the bays in the northern part of the port, the principal of which is Fairfax Harbor, there

is secure anchorage at all times for vessels of moderate draft.

HANUDAMAVA, an island off Palli Palli Point, the western entrance point of Port Moresby, is 285 feet high and covered with grass and brushwood on the western side. The reef upon which it stands is connected with the shore and extends eastward 670 yards from the island.

LOLORUA ISLANDS consists of two small islands, joined at low water, the southern of which, is 96 feet high. There is a channel between the northern island and the reef off Hanudamava, about 400 yards wide, with depths in the middle of about 1 fathom to 4 fathoms.

BOGIROHODOBI POINT, 1 1/2 miles east-northeastward of Lolorua Islands, is the east entrance point of Port Moresby; it is dominated by Paga (Ela) Hill, 360 feet high, upon which there is a signal station with a flagstaff.

RADIOBEACON.—An aeronautical radio-beacon is located about 2 1/2 miles east-northeastward of Paga Hill.

7-88 The entrance to Port Moresby is slightly more than 1 mile wide between Bogirohodo Point on the east and Hanudamava and Lolorua Islands on the west, and has depths of 8 to 14 fathoms.

BARUNI RANGE LIGHTS are shown from the shore eastward of Tatana Island, near the head of Port Moresby. These two lights in range bearing 354° lead into the port.

PROHIBITED ANCHORAGE.—A prohibited anchorage extends from a position about 1/4 mile northward of Paoa Point to a position about 760 yards north-northwestward, thence west to the western side of the entrance to Port Moresby.

7-89 DANGERS.—Northward of Hanudamava isolated reefs exist in places to about 300 yards offshore; the largest of these reefs is Esede Motu Motu. The western side of the port is clear of dangers at a distance of 1200 yards off that shore.

The greater part of the east side of the port is fronted by a solid reef to above one-half of a mile. Tatana Island, 414 feet high, is situated on an extension of the shore reef in the northern part of the port. A causeway extends from the eastern shore of Tatana Island eastward to the mainland.

COGLAN HEAD, about five-eighths of a mile northward of Tatana Island and at the head of Port Moresby, is 257 feet high and fringed with mangroves. Reefs extend as far as 1,100 yards off the head and the shore eastward, but between this reef and Tatana Island there is sheltered anchorage for small vessels in all weathers.

7-90 LOGOLU MOTU MOTU—Light beacons.—Logolu Motu Motu (9° 29' S., 147° 08' E.), a drying reef about 300 yards in extent, lies about 300 yards off Elakurukuru, the northern extremity of the eastern entrance point.

Lights are shown from pillar beacons marking the northern and southern extremities of Logolu Motu Motu.

A 5-fathom shoal lies about 200 yards eastward of the southern end of Logolu Motu Motu.

A rock over which there is a depth of 5 fathoms lies about 350 yards eastward of the light beacon at the northern end of Logolu Motu Motu.

Liberty Patch, on which are sunken rocks, lies about 1/2 mile northeastward of the northern beacon of Logolu Motu Motu. It is marked by a light beacon.

7-91 VAHUNABADA REEF, a drying reef about 600 yards long, lies about 3/4 mile north of Logolu Motu Motu north beacon. A spit with less than 1 fathom at its end extends about 250 yards northward from the northern end of the reef. A black BEACON marks the southern extremity of Vahunabada Reef. A BEACON with yellow triangular topmark stands on the northeastern side of the reef, and a BEACON with yellow spherical topmark stands on the eastern side of the reef. The east side of the port is foul with little depth for more than 1/2 mile offshore. Elavera (Elevala) Peninsula is a small rocky peninsula, 67 feet high, projecting out from the shore, in a position about 3/4 mile north-eastward of the southern extremity of Vahunabada Reef. A jetty, in ruins, extends about 500 yards southwest from Elavera.

A 3 3/4-fathom patch lies about 800 yards north of Vahunabada Reef. A 5 1/2-fathom patch lies about 400 yards northeastward of the southern extremity of Vahunabada Reef.

OFFSHORE OIL BERTH.—An offshore pipeline berth, equipped with six mooring buoys, is located close northward of the northern extremity of Vahunabada Reef. The berth has depths of about 8 fathoms, and accommodates large tankers. Its use is not recommended during the Southeast Monsoon.

PROHIBITED ANCHORAGES.—A prohibited anchorage area surrounds the offshore pipeline berth. This area, extending westward from the shore, is about 3/4 mile long on its west side and extends south-southeastward to a point about 1/3 mile westward of the beacon on the south extremity of Vahunabada Reef. Legs of this prohibited anchorage area extend in a south-southeastward and north-westward direction off the west side and southeastward off the east side, respectively, of Vahunabada Reef.

Aircraft moorings are located in that part of the harbor northeastward of Logolu Motu. There are several seaplane landing areas adjacent to Vahunabada Reef in which anchorage is prohibited.

WRECK.—A conspicuous wreck is stranded about 1/2 mile north of Vahunabada Reef.

7-92 FAIRFAX HARBOR (NUGU NUGU), comprising the northwestern part of Port Moresby, is a landlocked basin with an entrance width of about 500 yards, between Idumava Point and Raven Rock. The general depths in the entrance are 5 to 6 fathoms, and 4 to 5 fathoms within the harbor. The water in the harbor is always smooth, even during the heaviest gales. The shore is low and fringed with mangroves and mud which extend a considerable distance from the northern and northwestern shores. These mud banks and the shoal depths that extend out from them restrict the anchorage area considerably. There are two detached reefs in the northwest part of the harbor. There is safe anchorage in all weather. It is not recommended because of the unhealthy locality.

On a reef in the southern part of the harbor is Taima Islet, 12 feet high. The heads of this bight are named Geugeana and Adeha.

Motukea is a small island, 177 feet high, covered with scrub, and fringed with dense mangroves, lying in the northern part of Fairfax Harbor.

7-93 RAVEN ROCK, over which there is a depth of 1 fathom, lies 1,200 yards south-eastward of Motukea, close westward of the southern end of a reef which extends from the north shore of Fairfax Harbor.

ANCHORAGES.—Port Moresby is commodious and sheltered, with good holding ground of mud, affording anchorage for all classes of vessels at all seasons.

The southeast monsoon often blows strongly, and raises a short sea in the harbor, making boat work uncomfortable. At this season vessels are advised to anchor as close inshore as possible under the lee of the town peninsula.

During the northwest monsoon season strong gusty winds, known locally as gubas, sometimes blow, generally at night. At this season vessels should anchor more toward the western shore, off the shipyard at Napa Napa.

Until pratique has been obtained no vessel is allowed to enter the area limited by a line drawn from Elakurukuru to the southern end of Logolu Motu and from the northern end of that reef in an 081° direction to the shore.

PROHIBITED ANCHORAGE.—Anchorage is prohibited in an area bounded by the following positions, bearings and distances from the 300-foot summit of Paga Hill, about 1/4 mile northeastward of Paga Point:

- (a) 330°, 2,900 feet.
- (b) 291°, 800 feet.
- (c) 289°, 12,400 feet.
- (d) 291°, 12,800 feet.

TIDES—CURRENTS.—In August springs rise 9 feet; neaps about 6 feet. The tidal range is said to be greatest in July and least in January; during January and February the rise is reported to be imperceptible.

The tidal currents, generally speaking, are regular and vary in direction according to the positions of the openings of the barrier reef and the strength of the prevailing winds. Small tide rips may be experienced southward of the Lolorua Islands, also off Pyramid Point, and in the three entrance channels leading to the port.

7-94 DIRECTIONS.—LILJEBLAD PASSAGE should be approached with Huhunamo Hill (9° 24' S., 147° 06' E.) bearing about 006°.

A steamer proceeding to Port Moresby from Liljeblad Passage should, when inside the barrier reef, alter course to the south-eastward and con the vessel between Clarke Patches and the northern edge of Sinavi Reef, keeping close to the latter until abeam of the northwestern end of Tauko Island; then steer for Lolorua Islands and pass southward of them into Port Moresby as directed below for Basilisk Passage.

Liljeblad Passage should be used only by vessels of shallow draft having local knowledge.

7-95 BASILISK PASSAGE.—Vessels coming from seaward steer a course of 017° for the white houses of the settlement as soon as they are distinguished, until the light beacon on Nateara Reef, on the eastern side of the passage is made out. The range lights at Yupukuri, in line bearing 054°, lead through Basilisk Passage and should be followed until clear of Lark Patch when course should be altered to bring Baruni Range Lights in line bearing 354°. Steer into port on that range line, passing Logulu Motu Motu at a distance of about 400 yards. When past the reef alter course for the desired anchorage.

Should the visibility be low when making Basilisk Passage, the conspicuous wreck on Nateara Reef should be seen before getting into dangerous proximity to the reef; this wreck will serve as a useful mark for pointing out the direction in which to steer in order to find the passage.

Basilisk Passage is used almost exclusively and it is the entrance recommended.

7-96 PADANA NAHUA CHANNEL.—Steer in with Mount Sadowa, 1,295 feet high, in range with the northern extremity of Loloata Island, bearing 010°, and when the Barrier Reef, on the eastern side of the entrance, is abeam, change course slightly to the eastward in order to bring Mount Sadowa into range with the southern end of Loloata Islet, bearing 006°; this course will give a safe berth to the shallow water fringing the western reef. When abreast the end of the western reef change course in sufficient time to bring the southern end of Hanudamava Island in range with the southern end of Manubada Island bearing 297°, which leads southward of South Patch. Thence ves-

sels should pass southward of Manubada Island and, when southward of Bogirohodobi Point, bring the Baruni Range in line; thence proceed as directed for Basilisk Passage. During the southeast monsoon season, Mount Sadowa is often obscured by haze, and vessels should proceed with caution.

7-97 PILOTAGE.—Pilotage is compulsory for merchant ships, and advisable for military ships. Pilots are available at all hours, and board vessels about three-fourths of a mile southwestward of the lighted beacon on Nateara Reef on the eastern side of Basilisk Passage. Masters of vessels arriving between 5 p.m. and 8 a.m. local time are requested to notify the harbor master prior to 4 p.m. The pilot vessel displays the International Code flag "H".

Vessels will not be berthed after 2200 local time. Vessels may enter the harbor at all hours.

NOTE.—Pilots are also secured at Port Moresby by prior arrangement with "Torres, Sydney" for passage through Great Northeast Channel (H.O. Pub. No. 75).

7-98 MORESBY (9°29'S., 147°08'E.).—The town of Port Moresby, which is the seat of government of the Territory of Papua, is situated on the eastern shore of the bay, between Ela and Tuaguba Hills. This vicinity is considered more healthful than the neighborhood of the villages to the northward.

Government House, situated on the slope of the hill, 144 feet high, about 1,200 yards southeastward of Elevala Peninsula, is marked by a flagstaff. A conspicuous low building, used as police barracks, is situated one-fourth of a mile southward of Government House.

The villages of Tanubada and Hanuabada are situated on the eastern shore of the bay on either side of Elevala Peninsula. At the former is the head station of the London Missionary Society, with a church and school. There is also a village on Tatana Island.

Port Moresby is a port of entry for the Territory of Papua.

The population was estimated to be about 29,700 in 1964. There is a covered warehouse located near the Government Wharf. The principal exports are copra, timber, trochus shells, hides, rubber, gold, silver, and plati-

num. The principal imports are foodstuffs, petroleum products, machinery, and manufactured items.

During the period between March 1957 and March 1958, 196 ocean-going vessels entered the port. During the same period 849 coastal vessels entered the port.

WHARVES.—There are about 1,400 feet (linear) of wharfage suitable for general cargo transfer.

GOVERNMENT WHARF, located about 1/4 mile northward of Paga Hill, is connected to the shore by a causeway about 400 feet in length. The outer side of its T-head has a berthing length of 700 feet with a depth of 27 feet (MLWS) alongside. The west part of its inner side is 250 feet long and the east part is 350 feet long. Depths of 17 feet (1965) are found along the inner side.

An L-head pier with a berthing length of 80 feet and a depth of 9 feet alongside is located about 800 feet eastward of the Government Wharf. This pier is used for unloading of packaged petroleum products.

Four small craft piers are located between the Government Wharf and the L-head pier. They are suitable only for vessels up to 120 feet in length with drafts less than 12 feet.

A small tug is available. A mobile crane of 6-ton capacity and several fixed cranes of about 7-ton capacities are located at the port. Ships use their own gear for cargo handling. Several barges are available.

A large pier is located on the northwestern end of Tatana Island. There is a depth of 23 feet alongside the northwestern end of the pier. Vessels of 450 feet in length can be accommodated.

In 1963 the pier facilities were unserviceable.

REPAIRS.—Minor repairs can be effected on large vessels and major repairs can be effected on vessels up to 500 tons. There are several marine railways in the port area. The largest has a cradle 153 feet in length, and has a lifting capacity of 500 tons. Draft 2 1/2 feet forward and 4 feet aft.

SUPPLIES.—Fresh provisions are obtainable and there are limited stocks of meat. Water, fuel oil, and diesel oil are piped onto the Government wharf.

COMMUNICATIONS.—There is regular steamer communication with Australian ports and the territory of New Guinea. There

is also irregular steamship service between Indonesia, New Zealand and Australia. Air mail and passenger service is maintained to Rabaul, Sydney, and eastern Australia. There is a telegraph station as well as a short-wave radio station at the port. The voice call sign is "Port Moresby Radio," and the CW call sign is "VIG", and is guarded on frequency 6280 kcs. A local broadcasting service is maintained by the Australian Broadcasting Commission from Port Moresby.

HEALTH.—The climate of Port Moresby is not unhealthful. There is a small amount of malaria and dengue fever to which Europeans are susceptible. The diseases most frequently found among the natives are ringworm and New Guinea sore. Europeans are most liable to fever during and at the end of the rainy season, between December and May.

HOSPITALS.—There is both a European and a native hospital at Port Moresby.

METEOROLOGICAL TABLE.—See Appendix II.

7-99 BOOTLESS INLET is 4 miles wide between Pyramid Point and Tupuselei Head (9°34'S., 147°18'E.). Both sides of the inlet are encumbered with reefs, but a narrow deep-water channel leads toward the head of the inlet between Manunua (Namunouha) Islet, 76 feet high, which stands on the eastern extremity of the reef extending 2 miles eastward from Pyramid Point, and Loloata and Motupore Islets on the reefs on the eastern side of the inlet. The latter two islets are 134 and 201 feet high, respectively, and are fringed with reefs. Manunua Islet is locally known as Lion Island, due to its resemblance to a crouching lion. There are depths in the entrance fairway of 20 fathoms, decreasing to 10 fathoms at the entrance to Bogoro Inlet on the eastern side about one-half of a mile northward of Motupore Islet.

The shores of Bootless Inlet are fringed with mangroves backed by hills, except at the head, which is low lying and foul, and where there is a village.

TUPUSELEI HEAD is a long point surrounded by a reef. The shoals between it and Padana Nuhua have been mentioned in the description of that passage.

Tupuselei village lies one-half of a mile northward of Tupuselei Head. Farther northward, between the village and Bogoro Inlet,

are two shallow reef-encumbered inlets. Another small, shallow inlet is located in the northwestern part of Bootless Inlet.

Bogoro Inlet is about one-fourth of a mile wide between the reefs on either side, and there are depths in the middle part of 5 to 10 fathoms. A BEACON stands on the reef at the western entrance point. On the eastern side of Bogoro Inlet are the ruins of a jetty and the plant of an abandoned copper mine.

DIRECTIONS.—A vessel with local knowledge can approach Bootless Inlet through Padana Nahua Passage, as previously directed. When the eastern end of Nateara Reef is abeam the vessel should steer north-northwestward to bring Manunua Islet in range about 355° with Idumava Hill, the 370-foot summit on the western side of Bogoro Inlet. Maintain the 355° range until North Patch is abeam, thence steer northeastward and con the vessel to the entrance of the inlet. A vessel can anchor in 12 to 14 fathoms, mud, in midchannel abreast the northern end of Motupore Islet.

7-100 ASPECT.—MOUNT ASTROLABE, 3,824 feet high, is a remarkable, square, flat-topped mountain, situated 7 miles east-northeastward of Tupuselei Head. The flat top of this mountain extends 15 miles in a northwest-southeast direction and terminates abruptly at each extremity, but from the southeastern shoulder a sharp ridge of barren looking hills with scrub and some trees growing on them gradually descends to Round Hill.

Near the edge of the mountain are precipitous cliffs, but on the southwestern side, below these cliffs, it slopes gently toward the sea with numerous valleys, in which the richest vegetation may be seen. High on this side of the mountain are many villages with patches of cultivated ground. Mount Sadowa is about 8 miles northwestward of Mount Astrolabe.

7-101 COAST.—From Tupuselei Head a low coast, with hilly points and with several rocky islets lying off it, trends southeastward 9 miles to the village and mission station of

Kaile, situated on a sloping point of the mainland. Thence the shore assumes a bolder and more regular aspect, extending in the same direction 14 miles farther to Round Head. Extending from Kaile village to Round Head is a low coastal range, the southeastern and greater portion of which consists of sterile looking sandy hills covered with scrub and stunted bushes.

7-102 ROUND HEAD (9° 52' S., 147° 30' E.), a flat, heavily-wooded point, is not distinguishable from a position outside the reefs when seen against the high, dark background. Round Hill, 666 feet high, situated 2 3/4 miles east-southeastward of Round Head, is very conspicuous from the north-westward and looks like an island when seen from the vicinity of Port Moresby. Because of the imperfect nature of the survey in the vicinity of Round Head, vessels should proceed with caution when navigating in that vicinity.

A BEACON is moored about 2 3/4 miles 235° from Round Hill.

DANGERS.—A rock, with less than 6 feet over it, lies about 5 3/4 miles, 352° from the above-mentioned beacon. A rock, awash, lies about 5 1/2 miles, 336° from the same beacon.

ANCHORAGE.—Fair anchorage may be taken in 3 to 5 fathoms inside the reef at a distance of 200 to 400 yards southward of Kapakapa village. The sea, however, is felt at this anchorage.

RIGO-GOVERNMENT STATION.—The Government station of the southeast central district is at Rigo, about 3 miles northeastward of Kapakapa.

7-103 BARRIER REEF.—Southward of Padana Nahua Passage the barrier reef follows the trend of the coast at an average distance of about 2 1/2 miles toward Round Head; southward of that point it is nearly 7 miles from the shore.

Immediately southward of Padana Nahua Passage there are several openings in the reef, none of which should be attempted without further information. In the vicinity of

Round Hill there are two other openings, the southern of which is named Round Hill Entrance.

The main part of the reef, until within a few miles of Round Head, is awash and plainly marked by breakers; the continuation of the reef to the southward is submerged, but is easily discernible by the pale green color of the water over it.

7-104 INSHORE CHANNEL.—The channel between the barrier and the mainland from Port Moresby to within 5 miles of Round Head has been found to be clear of dangers, except for a few coral shoals which are easily seen. In the vicinity of Round Head the reefs are more numerous. This channel is not considered navigable for other than light-draft vessels. It is stated that after passing southward of South Patch the course inside the reef is 141° with the southwestern side of the summit of a peak in range with Manunua Islet, bearing 321° , as a stern mark.

7-105 ROUND HILL ENTRANCE is nearly 1 mile wide, and will be found by steering a course of about 023° for Round Hill. Inasmuch as the end of the barrier that forms the northwestern side of the entrance is always covered, the sea does not break upon it in fine weather, but the reef on the southeastern side is nearly awash and the breakers on it distinctly point out the channel.

ANCHORAGE.—There is good anchorage, sheltered against all winds, in a depth of 15 fathoms at one-half of a mile within the reef on the southeastern side of Round Hill Entrance.

7-106 BEAGLE ENTRANCE, situated $9\frac{1}{2}$ miles southeastward of Round Hill Entrance, leads to Beagle Bay. There is sufficient depth over the reefs for vessels drawing 22 feet. Ellengowan Entrance, westward of Beagle Entrance, is said to be 200 yards wide, with a depth of 15 fathoms.

BEAGLE BAY, located close westward of Beagle Entrance, affords fine anchorage. There is a village on the east shore of the bay.

7-107 WOLVERINE ENTRANCE lies close westward of Hood Point. Nothing is known about this entrance beyond what is shown on the chart.

COAST.—Midway between Round Head and Hood Point a red cliff, Paira Point, juts out and has a bay on either side of it. A range of barren sandy hills extends southeastward from Round Head. Between these hills and the coast the land is low and wooded.

The natives in this neighborhood are friendly. There are many mission stations along this stretch of coast.

7-108 HOOD POINT ($10^{\circ}07'S.$, $147^{\circ}44'E.$), is a tongue of low, wooded land, 5 miles in length, with the village of Hula and a mission station situated near its extremity. There are extensive groves of coconut trees in the vicinity of the point. A **LIGHT** is shown from the point. Hood Point is encircled by a reef to a distance of about $1\frac{1}{2}$ miles, but a **BEACONED** channel leads to Hula village. Fronting Hula are four villages that are built over the water.

CURRENT.—In August 1914 a current was found setting south-southwestward at a rate of 20 miles a day off the coast in the vicinity of Hood Point.

7-109 HOOD BAY, immediately eastward of Hood Point, is about 6 miles wide from east to west. Its shores are low and wooded. Kalo village is situated at the head of the bay.

Wanigela (Kemp Welch) River discharges into the head of Hood Bay.

HOOD LAGOON.—The eastern point of Hood Bay forms the western side of a narrow opening leading into Hood Lagoon, which is said to be about 5 miles long by 3 or 4 miles wide and surrounded by flat, wooded land. The entrance is almost closed by a broad point of the reef extending about $3\frac{1}{2}$ miles from the eastern point. This reef is steep to on its seaward side. A steep-to mud and shingle flat with 9 feet over it at high tide extends about 200 yards from the western entrance point of the lagoon.

The approach to the lagoon is through Hood Bay and thence through the very narrow channel between the reef and the mud flat. No vessel should attempt to enter Hood Lagoon without local knowledge.

In 1878 a vessel entered the lagoon by circling around within about one-half of a mile of the shore of Hood Lagoon; this vessel found a least depth of 5 fathoms in the entrance channel and anchored in a depth of 8 fathoms, mud, about 1 mile inside the entrance. In 1884 another vessel anchored in a depth of 6 3/4 fathoms off Kerepunu village, having first buoyed the entrance channel.

The discolored water from Hood Lagoon renders it difficult to see the reef at the entrance even from aloft. Inasmuch as some shoals of about 2 1/2 fathoms are said to be situated within a mile of the entrance, a large vessel should not attempt to enter until the channel has been surveyed. Anchorage may be taken in depths of 6 to 8 fathoms outside these shoals under shelter of the reef.

7-110 DUNDEE RIVER, which is about 300 yards wide at its mouth, narrowing to 80 yards at 1 mile within, discharges at the head of Hood Lagoon. The river is shallow at the entrance, but the depth just inside is 9 feet.

VILLAGE—MISSION.—On the point at the eastern side of the entrance to Hood Lagoon is Kerepunu village at which there is a mission station and a church. Immediately behind Kerepunu stands another village on a tree-covered sand dune overlooking the sea; its inhabitants are fishermen who belong to a tribe different from that of the people at Kerepunu.

MACGILLIVRAY RANGE extends for a distance of 18 miles from back of the hills behind Paira Point; the range is moderately high, scantily wooded, and sandy at the western end. The land between it and the shore is flat and thickly wooded.

7-111 COAST.—From the entrance to Hood Lagoon the flat, wooded coast trends eastward 9 miles to Paramana Point (10°10'S., 148°00'E.). Mangrove swamps, extending several miles inland, commence about 5 miles eastward of Hood Lagoon and continue around Keppel Point.

The barrier reef in this vicinity is broken and touches the coast in several places. It passes about 1 mile seaward of Keppel Point, off which is Aroma Passage, an opening for small craft.

It was reported (1963) that the position of reefs between Aroma Passage and the coast of Papua were incorrectly charted.

KEAKARO BAY is situated immediately eastward of Keppel Point. On the shore of this bay is Maopa village, where there is a mission station. The best landing is opposite the mission flagstaff near Keppel Point.

CURRENT.—In November 1886, during the northwest monsoon, a vessel was set 20 miles to the southward between Keakaro Bay and Port Moresby during the night; this set has also been experienced by other vessels.

COAST.—Between Keakaro Bay and Macfarlane Harbor, about 11 miles to the eastward, the land near the beach is sandy and dry, but farther back it appears to be low.

7-112 MACFARLANE HARBOR (10°08'S., 148°11'E.) is a small bay into the northwestern part of which the Devitt River discharges through Marshall Lagoon. The lagoon is separated from the bay by a narrow strip of land that extends westward from Kopieno Point.

On the western side of the bay there is a low sandy beach behind which is grassy land with palms and timber. A village stands on the inner point, and on a small islet is another village named Vilirupu, a name now applied to the whole place. The deepest water is found on the western side of the bay.

On the eastern side of the entrance to the bay is a high wooded bluff surmounted by a small village, and a little way across a cove

is a steep point on which stands a large village; a mission church and other buildings are located between the two.

Extending from the western side of the entrance is a long spit which, with several patches, encumbers the entrance to the bay. The entrance is reported to have a width of about 150 yards with a bar stretching nearly across it. By keeping close under the high bluff point forming the eastern side of the entrance a vessel will find a narrow channel in which there are depths of 3 to 5 fathoms. BEACONS mark both sides of the entrance. A narrow channel in which there is a depth of 2 fathoms leads from Macfarlane Harbor between a large sandbank and some mudflats to Marshall Lagoon.

This lagoon is shallow in the middle and narrows toward its head where it receives the waters of Devitt River, which is 120 yards wide at the mouth. About 1 1/2 miles above its mouth this river widens into a small lagoon from which run two branches, one in a north-northwesterly and the other in a southeasterly direction. The eastern branch was followed for a short distance and was found to have a width of 100 yards and a depth of 2 fathoms.

REEF—BEACON.—A reef which dries, marked by a beacon with a square topmark, is located about 3 miles south-southwest of Petoagolo Point.

COUTANCE ISLAND, about one-half of a mile in length, low and wooded, stands on the barrier reef about 9 miles south-southwestward of Petoagolo Point.

7-113 DIRECTIONS.—The approach to Macfarlane Harbor is between Coutance Island and the reef off Keppel Point. Vessels should attempt it only when the sun is in such a position that the shoals are visible from aloft. Coutance Island should be sufficient identification for the approach. In entering the harbor keep midway between the beacons at the entrance, passing about 50 yards eastward of the inner beacon and the same distance off the bluff on the eastern side, and thence proceed up the middle of the harbor.

COAST.—The coast for the first 7 miles eastward of Macfarlane Harbor is high and steep, but from there to Cape Rodney (10° 12'S., 148° 24'E.) about 7 miles farther, the coast is low and wooded.

7-114 CHESHUNT BAY is about 8 miles east-southeastward of Macfarlane Harbor. A bank which uncovers at low water extends some distance from the shore at the head of the bay. Channels to Cheshunt Bay Anchorage have been surveyed, marked by beacons, and swept to a depth of 35 feet. The anchorage has been swept to a depth of 29 feet.

MAWAI (AURO) RIVER, a fairly large stream, discharges into the head of Cheshunt Bay. A depth of 3 feet (1963) was found at the entrance, but immediately inside the entrance the water in midchannel deepened to a least depth of 5 fathoms and maintained that depth for one mile. At about 6 miles from the entrance the depth was found to be 10 feet.

Some wooded hills of moderate height and visible from a distance of about 25 miles are situated at the head of Cheshunt Bay, 5 to 8 miles northwestward of Cape Rodney. The southeastern hill is saddle-shaped.

It was reported (1963) that the reefs in the vicinity of Cheshunt Bay are incorrectly charted and that entrance into the bay should not be attempted without local knowledge.

CAPE RODNEY (Otomata Point), a low, wooded point, is not easily recognized. Eaula (Aiula) village, at which there is a coconut plantation, is situated on the coast about 3 miles westward of the cape.

A shoal extends about one-half of a mile off Cape Rodney, and detached coral dangers lie between it and the barrier reef.

7-115 BARRIER REEF.—The barrier reef in the vicinity of Cape Rodney is scattered and assumes irregular shapes; it offers numerous openings by which vessels may enter the inner waters which, however, are greatly encumbered by detached reefs and have not been surveyed. The outer edge of the barrier reef is steep-to and easily seen, but the shoal ground northward is visible only in conditions of good light.

SUNDAY ENTRANCE (10°16'S., 148°12'E.), has a navigable channel about 800 yards wide, with a least depth in the fairway of 8 fathoms. It is located about 2 1/2 miles east-southeast of Coutance Island. There are several reefs within the entrance.

A small passage has been reported to lie between Coutance Island and Sunday Entrance.

7-116 ANCHORAGE.—There is anchorage near Sunday Entrance. Anchorage in 15 fathoms about 3 1/2 miles north of Coutance Island, affords reasonable shelter from the swell during the southeast monsoon.

Small vessels have used the channel inside the barrier reef between Coutance and Grange Islets, located about 43 miles to the eastward, but until this channel is surveyed it should be used only when the sun is in a position favorable for observing isolated dangers.

7-117 RODNEY ENTRANCE, situated about 7 miles south-southeastward of Cape Rodney, is 2 miles wide and clear of dangers. There is well sheltered anchorage in about 20 fathoms immediately within the inner point that forms the eastern side of the entrance.

The breakers on the reef are said to be a sufficient guide for vessels entering, and the only precaution necessary in picking a berth is to anchor clear of the numerous detached coral patches inside.

Depths of 25 to 40 fathoms are found at 1/2 to 1 mile outside the barrier; there is a 13-fathom patch in the fairway of the entrance.

7-118 SANDBANK BAY is situated about 7 miles eastward of Cape Rodney. The eastern side of the bay is low and is formed of sandbanks that extend from a mangrove swamp. There are depths of 5 to 7 fathoms close along the outer edge of these banks, gradually shoaling to 3 1/4 fathoms on the (Continued on page 267)

western side of the bay. A forest of large trees lines the shore around the head of the bay. On the west side of the entrance to the Domara River, which empties into the western side of Sandbank Bay, is Domara village.

Anchorage has been taken on the western side of the bay, and a vessel drawing 6 feet has anchored off the mouth of the Domara River in a depth of 2 fathoms.

From its anchorage in the western part of Sandbank Bay the British schooner *Beagle* steered a course of 231° to the western side of Rodney entrance without observing any shoals.

Coast.—From Cape Rodney the low wooded coast continues eastward to Mariamata Point, where it curves around first in a northeasterly and then in a southeasterly direction to Dedele Point, forming Cloudy Bay. Hills of no great height back this 21-mile stretch of coast; the water off it is apparently shallow.

7-119 Dedele (Dedere) Point ($10^{\circ}14' S.$, $148^{\circ}44' E.$), a low, narrow, sandy point of land that is fringed with coconut palms, lies on the east side of Cloudy Bay. The point is difficult to distinguish, but Table Top Hill, a flat-topped elevation located 9 miles eastward of Dedele Point is a good landmark for the locality.

7-120 Cloudy Bay, lying between Mariamata and Dedele Points, is probably quite shallow throughout and is being silted up by the several shallow rivers that empty into it. The coast around the bay is low and fringed with mangroves, but near Dedele Point it is somewhat higher and has a sandy beach. The Robinson River, which can be ascended for several miles by boats drawing not more than 3 feet, empties into Orchard Inlet, an estuary on the northeastern side of Cloudy Bay. Abavi, a low swampy island with Pyramid Hill, 196 feet high, at its eastern end, lies close southwestward of the entrance to Orchard Inlet. Abau Island, located

close westward of Abavi Island, is covered with coconut palms; the government station for the district is located on this island. On the east side of the island is a jetty, alongside which vessels drawing 10 feet can lie. There is a boat jetty on its west side. Near Mariamata Point, the western extremity of Cloudy Bay, lies Eugenie Island. During the southeast monsoon clouds hang low over Cloudy Bay and envelop the surrounding mountains and foothills.

7-121 Rothery Passage, leading through the outer barrier reef between East and West Reefs, is about one-half of a mile wide and has depths of 19 to 43 fathoms. For a distance of 3 miles inside the passage there are no dangers in the channel leading to Dedele Anchorage. Beyond this distance the area is encumbered with reefs and shoals. Rothery Passage is marked by a black beacon with a square top mark on the eastern end of West Reef. The channel is marked on the starboard hand entering by red beacons with triangular top marks, and on the port side by a black beacon, surmounted by a cylinder, on Neutral Reef.

7-122 Dangers—Beacons.—Hodson Rock ($10^{\circ}18' S.$, $148^{\circ}41' E.$), with less than 6 feet over it and steep-to, lies about 3 miles northward of West Reef Beacon; the rock is unmarked.

Chapman Reefs lie about $3\frac{1}{2}$ miles northward of the West Reef Beacon. A red beacon marks the west edge of Chapman Reefs.

Silvio Reefs consist of numerous sunken reefs, which lie on the west side of the channel. The south extremity of this group is located about $\frac{3}{4}$ mile northward of Hodson Rock.

Rot Reef, marked by a red beacon standing on its west side, and Elevala Reefs located about $\frac{1}{2}$ mile eastward of it, lie on the east side of the channel about $1\frac{1}{2}$ miles northward of Chapman Reefs.

Nell Rock and Neutral Reef, between which

there are depths of 16 to 25 feet, are located northward of Rot Reef. Nell Rock is marked by a red beacon.

Flint Rock, over which there is a depth of 8 feet, lies about $\frac{3}{4}$ mile southwestward of Neutral Reef. Two drying reefs lie about $\frac{1}{2}$ mile southward of Flint Rock. The southeastern edge of Cloudy Reefs, located about $\frac{1}{2}$ mile northwestward of Flint Rock, is marked by a red beacon and a black beacon.

7-123 Dedeke anchorages.—Dedeke anchorage is available for vessels less than 400 feet in length, with a maximum draft of 20 feet. There is an anchorage on each side of Dedeke Point. Anchorage can be taken in 6 fathoms, westward of Dedeke Point, with Fan Reef southwest beacon bearing 208° . Vessels can anchor in 5 fathoms, mud, eastward of Dedeke Point, with Burumai Point bearing 104° . Both of these anchorages afford shelter. During the northwestern monsoon the eastern anchorage should be used; this anchorage can also accommodate larger vessels than can the western anchorage.

Smith Rock and Clay Reef lie on the east side of the western anchorage. The latter is marked by a beacon. The tangent of Burumai Point, bearing 104° , leads in to the western anchorage between these two dangers.

Fan Reef extends about $\frac{3}{4}$ mile southwestward from Dedeke Point; a red tripod beacon marks the southwest edge of this reef.

Cole Reefs, parts of which dry, lie about 1 mile southward of Dedeke Point; they extend about $1\frac{1}{2}$ miles in an east and west direction.

Varoe Reef, about 1 mile southeastward of Dedeke Point is marked by a black beacon.

Kerevin Reef, located about $\frac{1}{4}$ mile east-southeastward of Dedeke Point, is marked by a red beacon.

7-124 Directions.—Rothery Passage ($10^\circ 21'S.$, $148^\circ 41'E.$). A vessel should approach Rothery Passage steering about 068° , when West Reef beacon bears 000° ; thence steer about 042° through the middle of the passage, caution being taken to avoid the sunken reefs extending southwestward from East Reef. Once clear of these dangers steer 000° to pass 300 yards westward of Chapman Reefs beacon; thence steer 004° until about abeam of Rot Reef beacon; thence alter course to 035° to pass about 200 yards northwest of Nell Rock, thence steer 079° to pass 150 yards north of Clay Reef beacon; follow this course until Burumai Point bears 104° , then steer 104° which leads to the anchorage. Vessels are advised to navigate within this area during daylight only.

Vessels bound for the eastern anchorage follow the above directions until northward of Nell Rock, when they steer to pass 200 yards southward of the tripod beacon on the southwestern end of Fan Reef, thence steer 106° until about $\frac{1}{4}$ mile from Varoe Reef beacon bearing 078° ; thence steer 045° to pass about $\frac{1}{4}$ mile beyond the 3-fathom curve around Kerwin Reef, until the Fan Reef south beacon bears 258° ; thence change course to anchorage.

Water.—Good water may be obtained at Abau Island or at Dedele.

Communication.—A steamer that runs to Port Moresby and Samarai calls monthly at Dedele. A small coastal mail vessel also calls once a month.

7-125 Baxter Bay—Batumata Point.—Between Dedele Point and Batumata Point the low, wooded shore forms two indentations, the eastern and larger of which is named Baxter Bay, and the western, Henderson Bay. The latter has a sandy shore that is bordered by coconut trees. Off Burumai Point, which separates the bays, there are several shoals. There is reported to be a passage around Burumai Point through these shoals; it is only 150 yards wide, but is deep. A black beacon stands 1,600 yards westward of Burumai Point and another beacon stands about 400 yards southward of the point.

Batumata (Table) Point is low but well defined. On the beach in Baxter Bay, about 2 miles northwestward of Batumata Point, is Magaubo (Mogubo) village, at the mouth of the Bedile River. Anchorage may be taken off Magaubo village. The *Ellengowan* found good shelter in the bay during the southeast monsoon. There are several shoals in the western part of the bay.

7-126 The barrier reef from Rodney Entrance trends eastward for 25 miles to Grange Islet, with three openings between. Rothery Passage, the westernmost of these openings, lies 12 miles westward of Grange Islet. Mindora Passage, between East Reef and Grange Islet, has not been examined; it is marked by heavy tide rips. The easternmost opening, between Grange Reef and Grange Islet, is foul. It has been reported that there is at least 9 feet of water in this opening. Eastward of Grange Islet there is another opening; it seems to be the best approach to the anchorage in Baxter Bay.

Heavy breakers have been reported eastward of Mindora Passage.

7-127 Grange (Banabana) Islet ($10^{\circ}19'$ S., $148^{\circ}52'$ E., *H. O. Chart 2949*), low and wooded, lies on an isolated part of the barrier reef 4 miles southwestward of Batumata Point. This island is very similar to Coutance Island, but the anchorage off it is not so good. A reef extends southeastward $1\frac{3}{4}$ miles from Grange Islet.

7-128 Owen Stanley Range trends southeastward from Mount Victoria for a distance of 95 miles and then turns abruptly northeastward; at the elbow thus formed, lying only 7 miles northward of the head of Cloudy Bay, the range makes its nearest approach to the south coast of New Guinea.

There is great uniformity in the profile of this mountain chain between Mount Victoria and the elbow northward of Cloudy Bay.

Mount Clarence, about 20 miles northeastward of Cape Rodney, has nothing peculiar to distinguish it from the other peaks of the range except that its top is perfectly flat on the western side and that it is nearer the shore than any other high mountain of the chain. It rises to an elevation of 6,330 feet.

Mount Obree, 40 miles northward, and Mount Brown, 32 miles northeastward of Keppel Point, have nothing remarkable in their appearance; the former is 10,246 feet and the latter 7,947 feet high.

From its nearest approach to the sea, northward of Cloudy Bay, the Owen Stanley Range takes a sudden turn northeastward for 20 miles to Mount Suckling, the summit of which is 11,226 feet high and flat-topped on its eastern side; it is the second highest peak in the range.

From Mount Suckling the highest part of the range trends east-southeastward 60 miles to Mount Thomson, which is 5,901 feet high

and lies about 20 miles northward of Mugula Island.

The only intermediate summits worthy of notice are Mounts Dayman and Simpson; the former and western peak is 9,167 feet and the latter 9,972 feet high. The top of Mount Simpson is round at each end, with a peak in the center.

Most of the peaks of this chain of mountains are visible in very clear weather at a distance of 90 miles, but within 20 or 30 miles of the coast they so alter their shape as to be difficult to distinguish. They are visible for the longest periods during the northwest monsoon; during the greater part of the southeast monsoon they are generally capped with clouds. No timber exists within 1,000 feet of the summit of the range.

7-129 Table Bay ($10^{\circ}17' S.$, $149^{\circ}02' E.$, *H. O. Chart 2949*), between Baxter Bay and Selai Dudu Bays, is a slight indentation, about 17 miles in length, on the eastern side of Batumata Point. The shores of this bay are backed by Table Top and Inskip Ranges, situated 2 to 3 miles inland; the space between these ranges is a tract of thickly-wooded level land.

A shoal extends southwestward about 1,350 yards from Onibu Point, about $2\frac{1}{2}$ miles southeastward of the mouth of Darava Creek, and shoal water extends 200 to 300 yards off the mouths of the Agesama and Bailabo Rivers, about 6 miles southeastward of Onibu Point.

7-130 Barrier reefs.—From the opening about 2 miles eastward of Grange Islet the barrier reef extends in an easterly direction across the whole breadth of Table Bay, with patches north and south of it, as shown on the chart. One of these, named Kidd Reef, with but little water over it, lies about 2 miles southeastward of Batumata Point. Shallow water is also shown westward of Kidd Reef, and there probably are dangers in addition to those charted.

Eastward of this the barrier reef is sunken; its probable trend is shown on the chart.

The best track is said to be within $1\frac{1}{4}$ miles of the shore of Table Bay, over depths of 11 to 13 fathoms. The depths in the entrance eastward of Grange Islet are not known, but this entrance is probably deep. The channel eastward of the long reef fronting Table Bay has a charted depth of 7 fathoms in the fairway; but, inasmuch as the area has been only very sketchily surveyed, considerable caution is necessary in entering. There is shelter under the uncovered (eastern) portion of the barrier reef.

Darava village and Creek are situated in Table Bay at about 10 miles eastward of Batumata Point. According to the chart two creeks, both bearing the name "Evata", empty into Table Bay between Darava Creek and Batumata Point.

7-131 Kwaipomata Point ($10^{\circ}19' S.$, $149^{\circ}19' E.$, *H. O. Chart 2949*).—At about 6 miles eastward of the eastern point of Table Bay is Kwaipomata, a bold point forming the western extremity of Selai Dudu Bay. Kurere, the only village on the coast in this neighborhood, is situated eastward of Kwaipomata Point.

Selai Dudu (Selae Doudou) (Amazon Bay), lying eastward of Kwaipomata Point, is shoal, and its shores are fringed with reefs.

7-132 Launoka Dudu (Mayri Bay), about $1\frac{1}{2}$ miles wide at its entrance, affords well-sheltered anchorage during southeasterly winds in depths of 6 to 10 fathoms, mud. Off the southern entrance point a spit extends nearly one-half of a mile, and the shores are fringed with coral reefs extending offshore for some distance; the head of the bay is shoal. The shores of the bights in Launoka Dudu are sandy.

Brady Hills, a thickly-wooded steep range, lies about $1\frac{1}{4}$ miles northward of the head of the bay; Mt. Goldie, a remarkable peak,

ANCHORAGE sheltered against southeasterly winds may be obtained in Selai Dudu, Launoka Dudu, and the adjoining bays in depths of 6 to 10 fathoms, mud.

WATER.—Fresh water is obtainable in Launoka Dudu.

7-133 OFF-LYING ISLETS AND DANGERS.—Amazon Islands, two in number, are small, low, and wooded. They are 1 1/4 miles apart and surrounded by a coral reef. The northwestern island is named Ainoro, and the southeastern, Laraoro (10° 21' S., 149° 20' E.). The former lies about three-fourths of a mile southward of Kwaipomata Point. There is a mission station at Laraoro. Danava (Double Rock) is situated on the eastern extremity of the reef that encircles Laraoro; this reef is connected with another on which there is a sand cay, lying southwestward of Ainoro.

Sheltered anchorage will be found during southeasterly winds northwestward of Laraoro.

7-134 TOULON (MAILU KOLO) ISLAND, the northern of two small islands seaward of the Amazon Islands, is nearly 3 miles in circumference. It is encircled by a reef and, in the center, rises sharply to a height of 300 feet from the narrow belt of low land which extends half way around the island. It is covered with trees and grass, with numbers of coconut trees at the foot of the hills.

A village with a mission station is located on the northern side of the island. Anchorage can be taken in a bight in the reef off the northwestern side of the island, but it is not a good anchorage.

TURTLEBACK (KOIKOI) ISLAND lies 1 mile southward of Toulon Island. It is smaller than that island and, as its name implies, is round topped. Uruoio, a rock above water, lies nearly midway between the two islands.

SHOALS.—Several shoals with depths of 4 fathoms over them lie off the eastern side of Toulon Island.

Two shoals with depths over them of 5 fathoms and 4 1/3 fathoms, respectively, are located approximately 5 1/2 miles 120° and 4 3/4 miles 129°, respectively, from the south extremity of Turtleback Island.

The Espiegle passed over a 4-fathom shoal situated 2 3/4 miles south-southwestward of the northwestern point of Toulon Island. There are apparently other shoals between this one and the island. These shoals necessitate the exercise of caution in approaching Toulon Island, particularly in approaching it from the eastward.

7-135 BARRIER REEF—ANCHORAGE.—A portion of the sunken barrier reef, about 3 miles in extent and situated about 3 1/2 miles southwestward of Toulon Island, breaks heavily; formerly a sand cay stood on its western end.

There is anchorage in a depth of 20 fathoms just within this reef, with smooth water during the southeast monsoon.

A shoal which breaks heavily is reported to lie about 3 1/2 miles westward of the western end of the above-mentioned reef.

7-136 EUNAURO (CETTE) ISLET (10° 24' S., 149° 27' E.), 5 1/2 miles eastward of Toulon Island, is small and rocky with a few trees on it. Two high rocks lie near the island, one close to its southern side and the other, named Oriobu, three-fourths of a mile to the westward. The reef on which Eunauro stands extends 2 miles to the eastward, with a patch of 3 fathoms 1 mile beyond.

A large shoal is situated about 1 1/2 miles northwestward of Oriobu and a 3-fathom patch about 1 1/4 miles southwestward of the same rock.

JULIADE (Imsa) is a low and wooded islet,

situated 6 1/2 miles eastward of Eunauro and 3 miles off the entrance to Port Glasgow; it is situated on the western end of a reef 2 miles in length.

A 3-fathom patch lies 3 miles southwestward of Juliade; there are probably other shoal patches in the neighborhood.

7-137 This section has been deleted.

7-138 COAST — LOSOA DUDU (Millport Harbor).—This excellent harbor of an oval shape, the longer diameter extending in an east and west direction for a distance of 2 miles, lies 3 miles southeastward of Launoka Dudu. Clumps of coconut trees and mangroves, with white sandy beaches between, surround the shores of the harbor; a coral reef 30 to 200 yards wide fringes its shores.

Off the eastern entrance point are two wooded islets and a rock, and near the western entrance point is an islet. In the eastern part of the harbor a rocky patch extends about 400 yards from the shore.

The entrance is about one-half of a mile wide and has in it a depth of 9 fathoms, gradually shoaling to 4 fathoms, the general depth over the harbor; the bottom is of mud. This harbor is considered a good anchorage, but there are several uncharted reefs between its entrance and the sunken barrier reef.

On the eastern entrance point of Losoa Dudu, at an elevation of about 500 feet, is Kauauro village, and on the western side of the harbor, at an elevation of 800 feet, is Pediri village.

Water can be obtained from a cove at the head of the harbor. Close westward of this cove a reef extends a short distance from the shore.

7-139 GEAGEA DOUDOU (Port Glasgow) (Nobanoka Bay) (Nobu Noga Bay) (19°22'S., 149°31'E.), a landlocked inlet with high land

all around, is 2 miles long in an east and west direction and three-fourths of a mile wide; it has depths of 4 to 7 fathoms. The entrance, which, being open to the southeastward, is difficult to make out, appears to be clear of dangers and has a depth of 8 fathoms.

It is the best small harbor on the coast, and is reported to be a good anchorage at all times; there is a depth of 8 fathoms and room for three or four large vessels in the anchorage.

Borasomari and Vere-veré villages are situated on the shores of this bay. Fresh water is available.

For information regarding the reefs in the approach, see the chart.

7-140 ASPECT.—From Kwaipomata Point to a few miles eastward of Port Glasgow the hills, covered with vegetation, lie close to the shore; plantations, situated 1,000 feet above the water, are seen on the sides of many of these hills. From Island Bluff, at the eastern side of the entrance to Port Glasgow, the eastern extremity of these prominent headlands, a lower coast range extends about 3 1/4 miles northward and 6 miles eastward.

7-141 ORANGERIE BAY, between Island Bluff and Debana Point, is about 22 miles wide, but is encumbered with an extensive reef, and is probably fronted by off-lying dangers. The low, wooded shore forms a continuous curve from one end of the bay to the other. For the first 6 miles eastward of Island Bluff the steep coast range rises from the shore, but eastward of these hills a flat and thickly-wooded country that is intersected by numerous creeks extends a considerable distance inland. The greater part of this bay has not been examined.

7-142 BAIBARA ISLAND lies near the shore at about 3 miles eastward of Island Bluff, with a channel for small craft between it and the shore. The island is uninhabited, but there are small villages on the mainland abreast it and farther to the eastward. A government coconut plantation is located on the mainland nearly opposite Baibara Island.

SUABINA VILLAGE, with a small stream close westward of it, is located on the east side of Orangerie Bay about 15 miles eastward of Baibara Island.

DEBANA POINT is nearly 6 miles south-southeastward of Suabina village; the intermediate coast is a sandy beach exposed to southerly winds but free of surf. It is the northern entrance point of Mullens Harbor.

7-143 MULLINS (Puro) HARBOR (10°29'S., 149°52'E.), located eastward of Debana Point, is 10 miles long, east-west, and about 5 miles in width. There are depths of 2 to 7 fathoms in the entrance and 2 and 3 fathoms within the harbor. A charted mudbank lies near the middle of the harbor. Vessels with local knowledge can anchor in the harbor.

On the shores of the harbor are numerous sandy beaches of considerable length, with groves of coconut trees. The villages in the vicinity are numerous and well populated.

MARUTA PASS between Debana Point and Wabitu Point, one mile southwestward, has a least depth of 2 fathoms.

COAST.—Between the entrance to Mullins Harbor and Eagle Point, the southern extremity of Argyle Bay, the coast is low and wooded for the first 2 miles, and then becomes steep and hilly at the point.

7-144 BONA BONA (Mugula) ISLAND, lying on the east side of Orangerie Bay about 2 1/2 miles westward of the entrance to Mullens

Harbor, is hilly, nearly 3 miles in length in a north and south direction, and about the same in width.

The island is thickly wooded, and in most parts rises abruptly from the sea to its summit, which is 1,501 feet high. On its southwest side are two bays with groves of coconut trees. Tiveni and Bonatina villages lie on the shores of the two bays on the southwestern side of the island, and Gogora and Isikokoiria villages, near which there are coconut trees, lie on the northern side of the island.

There are several detached rocks near the northwestern point of Mugula Island; Tantanwata Islet (Orange Rock), the largest, lies three-fourths of a mile westward of this point and has deep water on either side of it. A rock, with less than 6 feet of water over it, lies one mile eastward of the northeast extremity of Bona Bona Island.

The southwestern part of the island is connected with Delami (Ropo), a bold island, 412 feet high, by a reef which dries nearly its whole extent.

FOUL GROUND.—A bank, over which the seas break heavily, lies one mile to 4 miles westward and 2 miles northwestward of Bona Bona Island. The depths between its southeast side and the island vary from 7 to 30 fathoms.

7-145 ANCHORAGES.—A readily accessible anchorage which is well sheltered against the southeast monsoon will be found westward of the reef connecting Mugula and Delami Islands, in a depth of 12 fathoms, stiff mud, but this anchorage area is somewhat restricted by the fringing reef that extends one-half of a mile from Mugula Island.

The best anchorage is at one-half of a mile northeastward of Tantanwata Islet; it can easily be reached by passing close along the north side of that rock.

7-146 SAN ROQUE PASSAGE (10°31' S., 149°50' E.),—Southeastward of Mugula Island and separating it from the high promontory of the mainland is San Roque Passage, which leads to the entrance to Mullins Harbor. This passage is 3/4 mile wide and has depths of 7 to 10 fathoms. Tua (Quoin) Islet lies on the southern side of the fairway of San Roque Passage, about 1 mile northward of Eagle Point. Northeastward of this islet there are some rocks above water. Sheltered anchorage may be taken in San Roque Passage in depths of 8 to 10 fathoms.

A rock with less than 6 feet over it is located about 3 miles northeast-by-north of Tua Islet.

EAGLE POINT, the western extremity of the promontory of the mainland southward of Dehana Point, is easy to pick up; the bold land in the vicinity makes it easy to leave the anchorage at night. About one-half mile westward of Eagle Point, is Eagle Rock, which from seaward has the appearance of a vessel under sail. The water in the neighborhood was observed to be of a pale green color, but in passing through it no difference was found in the soundings.

7-147 ARGYLE BAY is a deep indentation in the mainland just northward of Eagle Point.

ANCHORAGE.—Argyle Bay affords good anchorage over a muddy bottom, well sheltered against the southeast monsoon. Inasmuch as the rocks northeastward of Tua Island are only a few feet above the water, vessels approaching the anchorage in Argyle Bay should pass southward of that island.

A naval vessel anchored in 7 fathoms with Eagle Point bearing about 237° and the northwestern entrance point bearing 303°.

A sunken rock lies within 1/2 mile north-northwestward of Eagle Point.

7-148 CAUTION—BARRIER REEF.—There are patches with depths of 5 and 6 fathoms, and possibly less, over them on the sunken barrier reef southwestward and southward of Mugula Island. Northward of these patches there are irregular depths. There are similar depths on the sunken barrier farther to the eastward. Caution is necessary when approaching the barrier, and the vessel should be navigated from aloft.

The COAST trends east-southeastward from Eagle Point to South Cape, a distance of 25 miles, along an irregular line that is broken by lengthy bays and inlets. The country for the first 9 miles consists of wooded valleys and hills, most of which are under cultivation. A steep, lofty coast range then takes its rise, trending eastward 12 miles to Mount Gugusari (Cloudy Mountain), 4,430 feet high; this peak, which is situated 10 miles northward of South Cape, when seen from the southward, appears as a well-defined rounded peak.

BARRIER REEF.—The barrier reef from southwestward of Eagle Point to the vicinity of South Cape is indicated on the chart by dotted lines. Near the reef the soundings are irregular. From South Cape they become more even. The area between the reef and the shore has been only sketchily surveyed; in one place, southward of Ava Point, breakers have been reported. Breakers have also been reported on the barrier reef southward of the entrance to Gabugoghi Bay.

CURRENT.—During the northwest monsoon a southeasterly current is set up along the southeastern side of this part of New Guinea; during the southeast monsoon there is northwesterly current with a velocity of 1/4 to 1 1/2 (continued on page 275)

knots, varying with the strength and duration of the wind.

Ava (Cone) Point, 2 miles southeastward of Eagle Point, is surmounted by a conical hill 543 feet high; its shore is steep and rocky. A light is shown on Ava Point. Gabutanoteri Bay, small but deep, lies between these points.

Shoals.—Shoals, the depths over which are unknown, were reported in 1945 to lie 3 miles 264° and 5 miles 267° from Ava Point.

Boruada Bay (Port Dudfield), lying about 1¾ miles northeastward of Ava Point, is almost completely landlocked and has depths of 7 to 10 fathoms.

Good anchorage in a depth of 10 fathoms, mud, will be found northward of the island lying off the western entrance point.

7-149 Ulawaboi (Webb) Islets (10°35' S., 149°54' E. [redacted]), consisting of two or three small islets near the shore between Boruada and Gabusuaiaru Bays, have coconut trees on them.

Gabusuaiaru (Ellengowan) Bay lies eastward of Ekutoro Point, the extremity of a tongue of land that separates this bay from Boruada Bay. Paupauri Island lies in the entrance to Gabusuaiaru Bay, and Silasila village is situated at its head.

Gabusanrea (Meikle) Bay, the next inlet to the eastward, is 3 miles in length and has general depths of 4 to 10 fathoms. A sunken reef lies in the fairway of the entrance to the bay. Warumari village lies at the head of this bay, and Waru, Rekoa, and Teru villages are situated on the eastern shore of the bay.

Gabugoghi Bay (Isabel Cove), the next bight to the eastward, is a small but good

anchorage, sheltered from all winds. Yamiga Islet, a remarkable rock that is situated eastward of the entrance and about one-half of a mile offshore is a guide to the location of this cove.

There are three villages on the shores of the cove; the one on the eastern shore is named Bau. Fresh water is easily obtained from a stream near the beach, close to one of the villages.

7-150 Fyfe Bay (10°38' S., 150°00' E. [redacted]), situated eastward of Gabugoghi Bay, is about 2½ miles in length and 1¼ miles in width; it is divided into two passages, the eastern about 400 yards and the western about 450 yards wide, by Opea and Seuseu Islets, which are joined by a reef. Several other islets lie off the southeastern side of the entrance, and Geduna Islet stands on a reef at the head of the bay. An isolated 4¼-fathom patch lies midway between Seuseu Islet and Isuleilei Point, which is located on the eastern shore of the bay. A 2-fathom shoal lies about ½ mile 225° from the southern extremity of Geduna Islet. A reef lies about 350 yards south-southwestward of Geduna Islet.

About a dozen native villages are located on the shores of the bay. A mission station together with a hospital and college are situated near Isuleilei Point, on the eastern side of the bay; there is a flagstaff near the station. Two small jetties extend from the southeast side of the point.

7-151 Anchorage.—Fyfe Bay is not considered a well-sheltered anchorage; there is always a swell during both monsoons, and southwesterly winds raise a sea in the bay.

7-152 Roux Islets (10°39' S., 150°00' E.

), five islets on which there are coconut trees, lie a short distance off the eastern entrance point of Fyfe Bay.

A shoal, with a depth of 2 fathoms over it, is reported to lie in the approach to Lawes Bay, 2½ miles southeastward of the southernmost of the Roux Islets.

A 5-fathom shoal lies about 6 miles 237° and a 6-fathom shoal about 6½ miles 254° from Tree Point, the eastern entrance point of Lawes Bay.

Lawes Bay, lying between Roux Islets and Tree Point is divided by a long tongue of land that projects in a southerly direction. Tree Point, the eastern entrance point, terminates in a bluff 472 feet high.

7-153 Baxter Harbor (Farm Bay) is a deep inlet 4 miles wide at its entrance between Tree Point and Rugged Head; the latter is a bold, steep headland that rises to

Farm Peak, 1,578 feet high, and is conspicuous when seen from the westward. The northern shore of the bay is, for the most part, low and wooded, rising to a small coast range the seaward side of which is extensively cultivated. A shoal spit projects nearly one mile offshore at a position 2¼ miles northeastward of Tree Point. The steep eastern shore rises abruptly from the water to rugged hills of considerable height; these hills are covered with dense scrub through which many sharp points of rock protrude.

Anchorage has been taken in 17 fathoms, mud, just within the entrance; at this anchorage the water is smooth during the southeast monsoon.

Guna Isu (Rugged Head), the southernmost point of New Guinea, is dominated by Oia-boabo, 1,145 feet high, which is situated about one-half of a mile northeastward of the point.

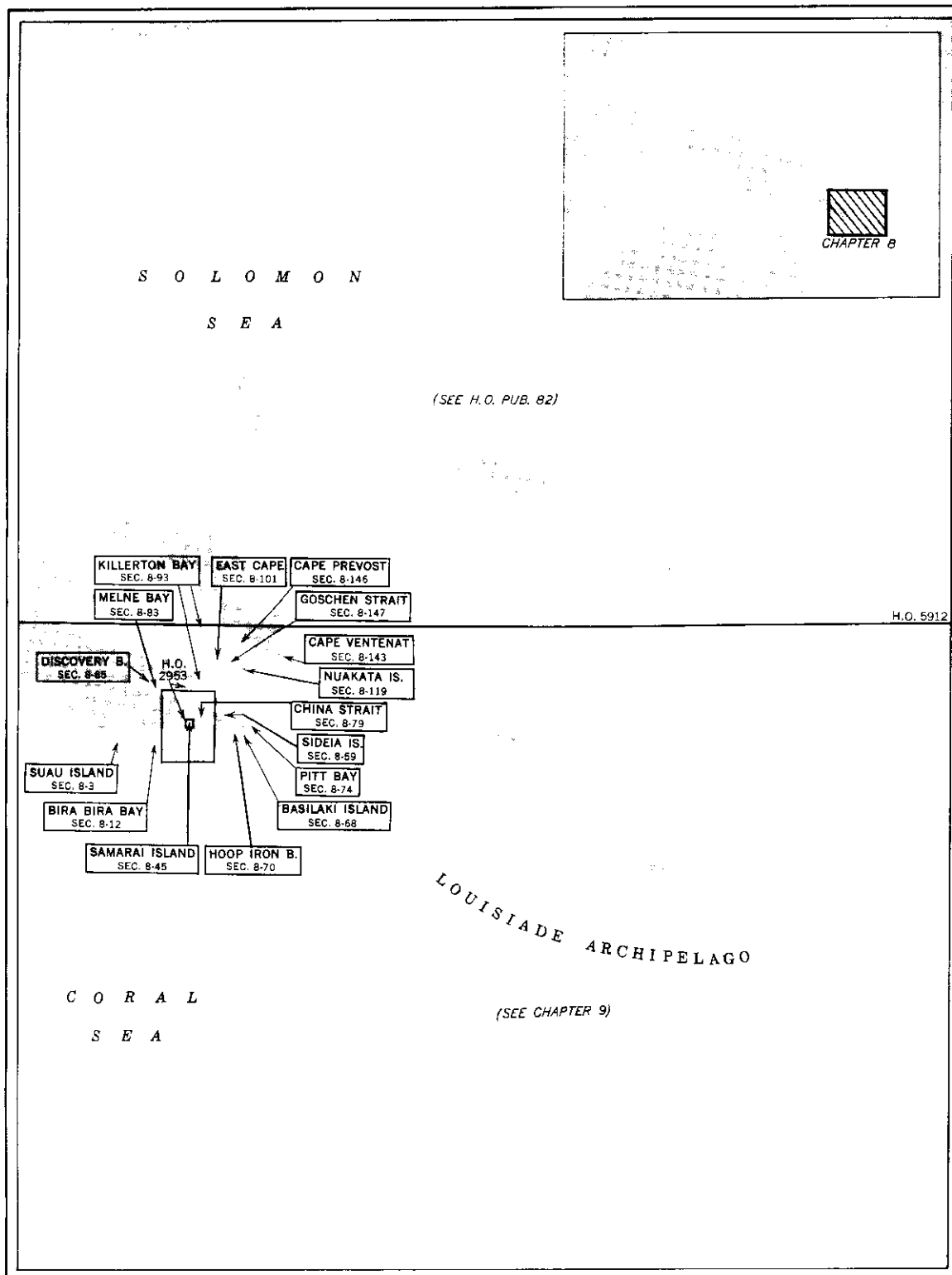


Chart limits shown are of the best scale charts issued to naval vessels by the U.S. Naval Oceanographic Office.
Section numbers refer to the place in the text where a description of the designated locality begins.

CHAPTER 8—GRAPHIC INDEX

H.O. 73

CHAPTER 8

EASTERN EXTREMITIES OF NEW GUINEA—SOUTH CAPE TO EAST CAPE

8-1 COAST.—Eastward of Guna Isu the coast trends to the east-northeastward for a distance of about 31 miles to the China Strait. It preserves the same broken character as to the westward of Guna Isu, but the mountain range eastward of the cape, closely following the bends of the coast, rises to heights of from 1,000 to 2,000 feet, and slopes steeply toward the sea.

8-2 Barrier reef.—Passing South Cape at a distance of nearly 4 miles, the sunken barrier reef extends in patches in an east-southeasterly direction, having over it, to the southward of South Cape, a least known depth of $5\frac{1}{2}$ fathoms.

Breakers have been observed about 5 miles southwestward of South Cape, in the vicinity of the barrier reef.

8-3 Suau (Starey) Island.—South Cape ($10^{\circ}44'S.$, $150^{\circ}14'E.$) is the southern point of Suau Island. This island is crescent shaped, 2 miles in length in a northeast and southwest direction, and narrow except in the eastern part, where it rises to an elevation of 787 feet, the western end being 430 feet high.

Its shores are fronted by a reef which extends to a distance of about 200 yards in places on its northern side. Isolated patches, with depths of from $1\frac{1}{2}$ to 3 fathoms, lie in the bay on the southern side of the island,

and here the shore reef extends farther off.

A flagstaff stands near the mission station located on the northern side of the island.

Vehi (Wedge) Islet, 900 yards westward of South Cape and 137 feet high, has a reef, with rocks above water, extending 450 yards from it in a west-northwesterly direction. A patch with a depth of $3\frac{1}{2}$ fathoms lies within one-fourth of a mile of the western shore of Suau Island, 900 yards 352° from Vehi summit. A 7-fathom patch is situated 600 yards westward of the $3\frac{1}{2}$ -fathom patch.

Baibesiga (Tissot) Island, 597 feet high and 1 mile southeastward of Suau Island, is remarkable for having a rounded peak at either end, the eastern being wooded and slightly the higher. The island, $1\frac{1}{2}$ miles in length by one-half of a mile in width, is cultivated to a considerable extent and has a village on its northern side, off which is a fringing reef; the southeastern side is steep-to, but a shoal extends 400 yards from the southwestern extremity and breaks with any swell.

8-4 Marri Pass ($10^{\circ}42'S.$, $150^{\circ}15'E.$), separating Suau Island from the mainland, is about 250 yards wide in its narrowest part, with a least depth of 8 fathoms in the fairway. The land on both sides is high. Vessels should not use the pass without local knowledge.

Good water can be procured one-fourth of a mile eastward of the pass, either on the island or from the mainland. Yams, sweet potatoes, pumpkins, bananas, and coconuts can be obtained in small quantities; pigs can be obtained occasionally, but fish is scarce.

Stapleton Patches lie in the fairway of the western approach to Marri Pass, about midway between Monoli Point, situated about 1 mile eastward of Guna Isu, and the western point of Suau Island. The easternmost, with a depth of 3 fathoms, lies one-half of a mile northward of the western point of Suau Island; the other two, having, respectively, $3\frac{1}{4}$ and 3 fathoms over them, lie 316° distant 1,100 and 1,600 yards from the same point.

Black Rock, always above water, on the southern side of a shoal 300 yards in length, lies 300 yards off the northwestern shore of Marri Pass, 800 yards westward of Mau-giliou Point.

Cawston Rock, with a least depth of 1 fathom, lies 1,500 yards northward of Niania Point, the eastern extremity of Suau Island, in the eastern approach to Marri Pass.

Ship Patches lie in the fairway, east-southeastward of Cawston Rock, the easternmost, with a least depth of $3\frac{3}{4}$ fathoms, lies about one-half of a mile northeast of Dagwa Isu Point, the northeastern point of Baibesiga Island. From this patch the shoals, with depths of from $3\frac{3}{4}$ to 5 fathoms, extend in a northwesterly direction for about three-fourths of a mile. During a southeast swell these patches break heavily near the time of low water.

8-5 Anchorage.—Marri Pass affords good anchorage for small vessels during southeasterly winds, in about 10 fathoms mud,

with the mission flagstaff on the northern point of Suau Island bearing 130° and Mau-giliou Point 054° .

For large vessels and during the northwest monsoon the best anchorage is in the approach to Arotau lagoon, westward of Black Rock, in 11 to 15 fathoms, mud. The location of this anchorage is best shown on the chart.

Tides.—The mean high-water interval at South Cape is 9h. 21m., mean range 3.2 feet, spring range 4.4 feet.

Current.—The current sets almost continually to the westward through Marri Pass at rates from $\frac{1}{2}$ to $1\frac{1}{2}$ knots during one observation in the month of July.

8-6 Arotau (Dubaguri Bay), a shallow lagoon, has its entrance, 400 yards wide, about 3 miles northeastward of Guna Isu. In many places it is too shallow for a boat, but on the western side a channel, with a depth of 6 feet, has been followed as far as a native village on the shore of the lagoon.

8-7 Modeiwa Bay, which is entered 3 miles east-northeastward of the eastern extremity of Suau Island, has a depth of 11 fathoms in the entrance, and then the depth gradually decreases toward the head of the bay. Coral reefs, which partly dry and are steep-to on the seaward sides, extend from both entrance points for about $1\frac{1}{2}$ miles, with off-lying patches in places, narrowing the entrance to about 1 mile.

There are several villages on the eastern shore of the bay, and behind the villages the land rises steeply to Kwai-Amikwati, a hill 1,450 feet high, with several peaks of but little less height in its vicinity.

Gara River discharges into the northwest-ern side of the bay and is joined a few hundred yards above its mouth by the Modiewa (Yaraama) River. The entrance is obstructed by a shallow bar, which cannot be crossed when there is much swell, but there are greater depths within the river and a boat has ascended for 2 miles.

The surrounding country is thickly wooded, though the lower parts of the delta are cleared and cultivated, and several villages are situated in the locality.

8-8 Reefs and islets.—Isu Diudiu Reef, which dries 1 foot, extends southeastward from the western entrance point of Modeiwa Bay. Gogo Oioima Islet, 80 feet high, stands on the inner part of this reef, close to the shore.

Three high islets front the sandy western and northern shores of the bay namely, Kei-ewa, 175 feet high; Darimomo, 105 feet high; and Gadogadoa, 100 feet high.

The eastern shore of the bay is, for the most part, fringed by a reef, with a patch nearly dry at low water lying about $1\frac{1}{4}$ miles northwestward of the easternmost point of the bay.

Maramara and Wara Nibonanadi Reefs, which dry 1 foot, lie southward and south-eastward, respectively, of the eastern entrance point of the bay. A 3-fathom shoal lies 670 yards westward of the southwestern extremity of Maramara Reef and another about 150 yards westward of the middle point of the western side of the reef. On the northern part of Maramara Reef stands Rourou, a sandy cay, 10 feet high.

Iguari Kiukiu, a rock appearing at a distance like a canoe, is awash at high water and stands on the eastern end of a reef between Maramara Reef and the fringing reef of the mainland.

Northward of the reefs on the eastern side of the entrance to Modewa Bay there is an inshore channel, which is only available for

boats, being much obstructed by reefs at the eastern end, but the depths between them are from 6 to 7 fathoms. A sunken rock lies in the fairway, 800 yards eastward of Iguari Kiukiu. The channel leading to sea at the eastern end is between the eastern end of Wara Nibonanadi and Oi-oi-ma Reefs.

8-9 Anchorage.—There is sheltered anchorage in a depth of 8 fathoms, over mud, with Rourou in range 155° with the summit of Badila Beddabedda Bonarua and Iguari Kiukiu bearing 077° . Farther eastward in the inshore channel there is apparently good anchorage for small craft, avoiding the sunken rock situated in the fairway.

8-10 BRUMER ISLANDS (*western extremity, $10^\circ 46'$ S., $150^\circ 22'$ E.* [redacted])

[redacted] are a group of small basaltic islands, five in number, lying about 8 to 12 miles eastward of South Cape and about 4 miles off-shore. Between the islands and the mainland there is a channel, 2 miles wide, having depths of from 19 to 30 fathoms, but the shoals off the southern edges of the reef forming its northern side should be approached with caution, as they do not always break.

The Brumer Islands produce yams, bananas, coconuts, breadfruit, and a few pigs.

Badila Beddabedda Bonarua, the westernmost and largest, is $2\frac{1}{2}$ miles in length and one-half of a mile in breadth at its widest part; the summit of the island is a peak, 686 feet high. A narrow steep ridge of hills extends the whole length of the island, terminating at the southwestern extremity in a remarkable castellated peak, 395 feet high. This ridge is covered with vegetation and has plots of cultivated ground on its sides. There are two villages on the northern and one on the southern side of this island. A large cascade was seen near the northern part of the island.

A light is shown from the summit of Ba-

dila Beddabedda Bonarua Island.

Shoals.—Two 6-fathom patches lie about 5 miles south-southwestward of the lighthouse, on the sunken barrier reefs, and several 5 to 6-fathom patches lie west-southwestward of the lighthouse.

An 8-fathom patch lies nearly 4 miles west-northwestward of the lighthouse.

Harikoia, the second in size of the Brumer Islands, lies $\frac{1}{2}$ mile eastward of Badila Beddabedda Bonarua. Its summit is 541 feet high, and a village is situated on the shore of the bay on its western side.

Gobi gobi is a rocky islet 320 feet high, 670 yards southeastward of Harikoia, with which it is connected by a reef. Between the two is a rock awash at high water.

Bugomaki is a still smaller islet, 313 feet high, 250 yards farther southeastward. Eight hundred yards beyond is Ahana Rock, 122 feet high, with a few trees on its summit.

Rae Patches are coral reefs with depths of from 4 to 5 fathoms, and perhaps less, with their western extremity lying $1\frac{1}{2}$ miles southward of the middle of Badila Beddabedda Bonarua; thence they extend eastward toward the smaller islands.

Within the 20-fathom curve the soundings southeastward and southwestward of the Brumer Islands are irregular, and as a heavy swell rolls in, this space should be avoided.

Brooke Banks, of coral, with depths of from 7 to 9 fathoms, lie from 5 to 10 miles eastward of the Brumer Islands and are apparently steep-to.

Dangers.—Within the 20-fathom curve, the soundings south-southeastward through southwestward of Brooke Banks are ir-

regular. Depths within this area vary from 7 to $8\frac{1}{2}$ fathoms.

Anchorage can be taken on the northwest side of Badila Beddabedda Bonarua, it is not good, as the swell, with the prevailing southeast winds, rolls round both points. The depth of water is from 30 to 40 fathoms, over blue mud.

8-11 COAST.—From Modeiwa Bay the coast, fringed with a reef and fronted by the previously mentioned reefs, trends eastward about $4\frac{1}{2}$ miles to Dui dui hani Peninsula, which has three grassy conical hills, the highest being 345 feet high. Northeastward of Dui dui hani Peninsula are Bira Bira and Guau Gurina Bays.

Mount Bramble, with a double peak, 1,300 feet high, is situated in the coast range, and between it and the Baia baia una Mountains, $4\frac{3}{4}$ miles southwestward, the land falls sufficiently to permit a view of the country behind.

Mount Bossim, also in the coast range, is a conspicuous peak, 1,395 feet high, on the northern side of the approach to China Strait, and here the main range turns northward to Mount Dabarima, 1,390 feet high.

8-12 Bira Bira (Inverary) Bay

lies between Dui dui hani Peninsula, off which is Deirina Island and Dituna Point, 3 miles apart. Its shores are fronted to a distance of one-half of a mile by a coral reef, through which are several small openings leading to the mangrove-covered coast. There are several villages in the bay. Koia Kawasi, a hill 225 feet in height, and the

Baia baia una Mountains, 1,210 feet high, are distinctive features when entering the bay.

8-13 **Deirina Island**, lying on the southern side of Bira Bira Bay, one-fourth of a mile eastward of the southern extremity of Dui dui hani Peninsula, is three-fourths of a mile in length and nearly one-half of a mile in breadth, and has a conical summit, 280 feet high, the bright-green color of which, in contrast with the dark-green of the wooded hills on the mainland, helps to indicate the island. Isu Maragali, the eastern extremity of the island, is a dark, bold headland, off which lies a rocky bank with depths of from 3 to 5 fathoms, extending about 1,600 yards in a 063° direction. A reef extends 600 yards northward from the northern end of the island. Also on the northern end of the island, which is low and sandy, is Barubaru village. The island is separated from the peninsula by a very narrow channel, having depths of 5 fathoms.

Koia yama yama is a grassy islet, 155 feet high, 200 yards southward of Deirina Island.

Reefs.—Westward of Koia yama yama is a reef, with depths of from 2 to 3 fathoms, impeding the entrance to the narrow channel, and about 600 yards northward of it is a 6-foot patch. Oi-oi-ma is an extensive reef to the westward of Koia yama yama and dries 1 foot.

8-14 **Wasima Island** (10°40' S., 150°28' E.), a small islet, 175 feet high, lies on the shore reef about 200 yards southeastward of Dituna Point.

Bonarua tau tau pusuri, a rock, 30 feet high, lies about 1 mile eastward of Wasima Island. Shoal water with depths of from 3 to 5 fathoms extends from the eastern and western sides to a distance of 800 yards and from the southern side about 600 yards.

Dui dui bani, an islet, 26 feet high, stands on the shore reef below Bitutu Mount, situated on the eastern side of Bira Bira Bay.

A reef, 400 yards in length, with a least depth of 2 fathoms, lies $\frac{1}{2}$ mile east-south-eastward of the above islet. A 2 fathom patch lies $\frac{3}{4}$ mile westward of the reef.

8-15 **Smith Patch**, a coral patch, with a least depth of 4 fathoms and 12 to 16 fath-

oms close around, lies $1\frac{1}{4}$ miles south-south-eastward of Wasima Island.

The southern peak of the Baia baia una Mountains in range with Koia Kawasi, the northernmost summit on the peninsula, bearing 279° leads into Bira Bira Bay southward of Smith Patch, and northward of the shoal extending northeastward of Deirina Island.

Dangers.—A 4 $\frac{1}{3}$ -fathom patch lies 2 miles southeast of Wasima Island.

A 6 $\frac{3}{4}$ -fathom patch and a 7-fathom patch lie about $2\frac{1}{2}$ and 2 miles, respectively, south-southeast of Wasima Island.

8-16 **Anchorage.**—Good anchorage in a depth of 9 fathoms, over mud, will be found in the southern part of Bira Bira Bay, northward of Deirina Island, between the island reef and the shore reef. This anchorage, named Ilo Ilo Bay, affords swinging room of about 250 yards, and is well sheltered; the entrance is 400 yards wide, but the reefs are not steep-to, and caution is necessary in rounding that off the island, as the shoal water extends for more than 600 yards from its northeastern edge.

Tides.—It is high water, full and change, in Bira Bira Bay at 9h. 0m.; springs rise $5\frac{1}{2}$ feet; neaps rise $3\frac{1}{2}$ feet.

8-17 **Directions.**—Having entered Bira Bira Bay on the clearing mark for Smith Patch bring the southeastern point of Dui dui hani Peninsula in range with the summit of the largest Brumer Island, bearing 215°, which mark will lead between the reefs at the entrance to the anchorage; then anchor in a depth of 9 fathoms when the eastern and northern extremities of Deirina Island are in range 133°.

8-18 **Guau Gurina Bay**, the next bay northeastward of Bira Bira Bay, is 5 miles wide, with depths of 12 to 13 fathoms near its center. The shores of the bay are fringed with coral in places, and on its western side rises Mount Bramble, 1,300 feet high. There is no shelter in this bay from the southeast monsoon. The approach to the bay lies between Jones Patch and Bonarua tau tau pusuri.

Kemtai, a rocky islet 20 feet high, lies 670 yards southward of a point extending from

the northern shore, and about $1\frac{1}{4}$ miles westward of the eastern entrance point to the bay.

Shoals.—Forbes Shoal, with depths of from 2 to 4 fathoms, sand and coral, lies parallel to the northern shore for nearly 2 miles. Its western extremity lies 1,200 yards 170° from Kemtai.

Jones Patch, with a least depth of $2\frac{3}{4}$ fathoms, lies about 2 miles east of Bonaurua tau tau pusuri.

Quilty Patch, with a depth of $6\frac{1}{3}$ fathoms, lies about $2\frac{1}{4}$ miles southeastward of Jones Patch. Shoals with depths of $9\frac{1}{2}$ and 8 fathoms were charted (1961) about $3\frac{3}{4}$ miles southeastward and $3\frac{1}{3}$ miles south-southeastward, respectively, of Jones Patch.

A 5-fathom patch lies about 1 mile east-southeastward of the east entrance point of the bay. Five shoals with depths of 3, $3\frac{1}{4}$, $4\frac{1}{4}$, $4\frac{3}{4}$ and $6\frac{2}{3}$ fathoms were charted (1961) within a radius of $1\frac{1}{4}$ miles, east-southeastward to south by eastward, of the same point.

8-19 Coast.—Gadogadua Island ($10^\circ 38' S.$, $150^\circ 34' E.$), 315 feet high and thickly wooded, is situated on the reef which extends about three-fourths of a mile southeastward of the point forming the eastern extremity of Guau Gurina Bay.

Aspect.—The land on the northwestern side of West Channel and China Strait rises steeply to a considerable elevation with deep ravines, which become more marked as Saraoni Island, beyond the northern entrance of the strait, is approached, both summits and mountain sides being covered with thick forest.

Mount Kunuri, 900 feet high, is situated one-half of a mile inland and $2\frac{1}{2}$ miles north-northeastward of Gadogadua Island.

Mount Gaburu Paipai, $3\frac{1}{2}$ miles north-

ward of Mount Kunuri, is 1,735 feet high, with several peaks between them, one of which, a conical, wooded summit named Huihui, is 425 feet high.

From Mount Gaburu Paipai, the range, with one branch to the northwestward, trends northeastward for about 3 miles, culminating in Mount Dohu, 2,180 feet high.

Separated from this higher range, and joined to it only by a neck, is a range nearer the coast. On this latter range the most prominent peaks are Mount Weiadubi, 1,050 feet high, Mount Iari Hau, 1,060 feet high, and Mount Gulubia, 1,540 feet high.

Water may be obtained along the northwestern shore of China Strait.

8-20 Suahia Bay, $1\frac{1}{2}$ miles in width, with depths of from 4 to 7 fathoms, lies northeastward of Gadogadua Island. The coves at its head are apparently free from reefs, but the points separating them are foul to the distance of from 200 to 600 yards.

Heath Patches, over which there is a least depth of 4 fathoms lie in the fairway at the entrance to West Channel, southeastward of Gadogadua Island. The 4-fathom spot lies 1 mile 103° from the southeastern extremity of the island. Shoals of 8, $6\frac{1}{4}$, and $5\frac{1}{2}$ fathoms were charted (1961) about $1\frac{2}{5}$ miles eastward, $1\frac{1}{3}$ miles east-southeastward, and $1\frac{1}{4}$ miles southeastward, respectively, of the same point. These shoals lie, in the order listed, about 600, 300, and 200 yards north-westward of the track.

8-21 Weku Una ($10^\circ 36' S.$, $150^\circ 37' E.$), a rock, steep-to and awash at high water, lies about 3 miles northeastward of Gadogadua Island. A light is shown from Weku Una rock. A 5-fathom patch lies about $\frac{1}{2}$ mile west-southwestward and a $6\frac{1}{3}$ -fathom shoal was charted (1961) about a $\frac{1}{4}$ mile southwestward, respectively, of Weku Una, well out of the fairway.

Gesira (Gesila) Island, lying about 2 miles northeastward of Weku Una, is located 800 yards off the north shore and nearly parallel with the coast eastward of it. The island is thickly wooded at its northwestern end, 220 feet high, and steep-to on its southern side. A reef extends about 100 yards eastward from its southeastern extremity, and about 400 yards 029° from the same point is a 4-fathom patch.

The island is used as a quarantine station.

Kuyaro River flows into the mangrove swamp northeastward of Gesira Island. The bottom at the entrance is soft mud, and, should the necessity arise, this would probably be the most protected and safest place to beach a small craft. Waga Tutuna Bay lies about $1\frac{3}{4}$ miles westward of Gesira Island.

Sugutusi Rock, having a depth of 1 fathom and located in the middle of Hiliwa Dara (Bolibolie) Bay, lies about 1 mile southwest of Isu Matuma Taiara. There are depths of 9 to 10 fathoms off the south side of this rock, and 6 to 8 fathoms between the rock and the shore. This danger lies in the way of a vessel passing along the shore to avoid the tidal currents and only shows well under favorable circumstances, the water being discolored by a stream which discharges into the bay.

8-22 Isu Matuma Taiara (Isulailai) ($10^{\circ}34'$ S., $150^{\circ}42'$ E.) is the southeasternmost point of New Guinea. A reef extends about 300 yards southeastward from the point.

A light is shown from Isu Matuma Taiara.

Gull (Cull) Patch, a coral patch with a depth of 4 fathoms, lies 500 yards offshore and about one-half of a mile northward of Isu Matuma Taiara. A 5-fathom patch lies 250 yards northward of Gull Patch. These two patches are not generally visible from aloft. Shoal soundings of $3\frac{3}{4}$ and $2\frac{3}{4}$ fathoms were charted (1961) about 200 yards south-southeastward and 300 yards north-northwestward, respectively, of Gull Patch.

North Foreland (Babakauna Point) lies about $1\frac{1}{2}$ miles northward of Mount Dohu, at the foot of the mountain range.

8-23 Saraoni Island ($10^{\circ}29'$ S., $150^{\circ}40'$ E.), 60 feet high to the top of the trees, lies about $1\frac{1}{2}$ miles north-northeast of Mount Dohu. The island is fringed by a reef to a short distance only, with deep water beyond. There is a boat channel between the island and the shore.

A shoal having a least depth of 10 feet lies about 600 yards eastward of the south end of Saraoni Island. A 21-foot shoal extends about 200 yards, northeastward and northwestward, respectively, from the above-described shoal.

A 6-fathom shoal lies about 650 yards east-northeastward of the northern extremity of Saraoni Island.

Kana Kopi Bay lies immediately westward of Saraoni Island. It is described with Milne Bay in section 8-84.

8-24 Off-lying shoal.—Dorasi Shoal is located about 3 miles north of Isu Matuma Taiara in the north approach to China Strait. It is a narrow ridge of sand $1\frac{1}{4}$ miles in length with a least depth of $1\frac{3}{4}$ fathoms near its center, which lies $2\frac{2}{3}$ miles southeastward of Saraoni Island and about $1\frac{3}{4}$ miles offshore. It is steep-to on its northern and southern sides but only shows when the light is favorable. There is a good channel on either side of it.

Shoal soundings of $2\frac{3}{4}$ and $7\frac{1}{2}$ fathoms were charted (1961) about $3\frac{2}{3}$ miles 002° and $3\frac{1}{2}$ miles 006.5°, respectively, from Kabaeru Light. (See sec. 8-54.)

A 3 fathom depth was reported (1963) to lie about 200 yards south-southeast of the south extremity of Dorasi Shoal. A depth of $5\frac{1}{4}$ fathoms was reported (1963) to lie a little more than $\frac{3}{5}$ mile west of the north end of Dorasi Shoal.

8-25 ISLANDS AND REEFS SOUTH-EASTWARD OF CHINA STRAIT.—The sunken barrier reef, southward of the islands

off the southeastern end of New Guinea, continues in an east-southeast direction as far as the Stuers Islets, with the shoalest parts on narrow ridges, with depths of about 7 to 10 fathoms, broken in places by deeper channels.

The outer edge of the barrier reef is steep-to, and its line is distinctly marked by a strong ripple, with smooth water on either side. With a southeasterly wind there is a heavy swell.

Description of the barrier reef continues in section 9-2.

8-26 Stuers Islets ($11^{\circ}06'S.$, $151^{\circ}08'E.$), consisting of Marai and Taliwewai Islets, are of coral, low, and wooded, lying in an east-northeast and west-southwest direction from each other, about 1 mile apart. Marai, the southwestern one, is fringed with coral.

A reef, which dries 1 foot, lies $\frac{1}{2}$ mile westward of Marai.

A vessel passing through the opening eastward of Marai Island Reef found it to be about one-fourth of a mile broad, with deep water on the eastern side, close to the edge of the large, detached reef lying southeastward of the Stuers Islets.

Shoal water extends about one-fourth of a mile northwestward from Taliwewai, the northern islet of the Stuers Islets. The islet, or rock, southeastward of Taliwewai is nearly joined to the large reef lying southward of it. The western edge of this large detached reef, lying southeastward of Stuers Islets, is steep-to, but from the southern edge of this reef and also of that lying westward of the group, shoal water extends some distance. If the sea is not too heavy, vessels may find temporary anchorage there.

Directions.—The passage through the barrier reef between the drying reef and Blight Patch is not recommended for deep-draft vessels because of the irregularity of depth, strong

currents, tide rips, and frequent heavy swells. A vessel in the passage will have difficulty in obtaining cross bearings except when the visibility permits the use of islands more distant than Wari Island and Stuers Islets. It will be noted that Wari and Stuers lie almost in line with a ship in the pass.

The passages through the barrier reef lying within 25 miles eastward of the Stuers Islets are not recommended.

8-27 Uluma (Suckling) Reef, situated about 8 miles westward of Stuers Islets and about 3 miles seaward of the sunken barrier, is about 3 miles in length, in an east and west direction, and dries 1 foot. Shoals extend out about $\frac{1}{2}$ mile from its northern and southern sides.

During a month-long survey surf broke continuously on Uluma Reef, but it has been reported that in calm weather the reef is not indicated by surf.

A 2-fathom shoal has been reported off the northern side of Uluma Reef at a position $8\frac{1}{2}$ miles 196° from Mamaramama Weino Rock (sec. 8-30). An unexamined 8-fathom shoal is also reported $13\frac{3}{4}$ miles 208° from that rock. The position of the latter shoal is approximate.

Wreck.—A stranded wreck is located on Uluma Reef.

Northward of Uluma Reef the sunken barrier within the 10-fathom limit is considerably wider than it is to the westward, interspersed with isolated patches of 6 to 9 fathoms.

Blight Patch, of coral, with 8 fathoms water over it, lies on the barrier reef westward of an opening, $4\frac{1}{2}$ miles 166° from the summit of Wari Island. There may be less water on it.

Foul area.—A foul area containing detached shoals of 15 feet and 31 feet, lies between 2 and $3\frac{1}{2}$ miles south-southeastward of Wari Island.

8-28 **Wari (Teste) Island** (*eastern extremity, 10°57' S., 151°05' E.* [redacted]), lying about 8½ miles north-northeastward of Uluma Reef, has a narrow range of hills traversing its entire length, terminated by a well-defined peak at each extremity; the western peak is 385 feet high. In the center the hills dip considerably. Their sides are well cultivated on the lower slopes, and on the summit of the ridge there are a few trees. A well populated village is situated on the southern side of the island.

8-29 **Islets, reefs, and rocks.**—Kera kera (West) Islet, 60 feet high and with a grass-covered summit, is situated on the western extremity of a large reef that lies southward of and parallel to Wari Island. The sea always breaks on this reef. In the passage, which is narrow and about 2 miles long, between the southern side of Wari Island and the reef, there are numerous shoals. The eastern entrance, with depths of from 4 to 9 fathoms, is one-fourth of a mile in width, and has a rock in the middle, which may be passed on either side. The western entrance is narrow and is available only for small craft.

East Islet, 100 feet high, lies on the reef extending 1,200 yards southward from the eastern end of Wari Island. It has a level summit covered with grass.

Ikaika Keino Islet, 264 feet high, is situated about 1,400 yards northwestward of the western point of Wari Island, and is steep-to all round. The islet is formed of steep gray cliffs and has a flat top covered with small scrub.

Potobagao (Boat) Rock, small, black, steep-to, and 12 feet high, lies one-half of a mile northward of the western extremity of Wari Island.

Anchorage.—Good anchorage, sheltered from all winds, may be obtained near the eastern entrance to the passage between Wari Island and the reef southward of it.

There is convenient anchorage on a ridge of sand and coral, in a depth of 8 fathoms,

between Potobagao Rock and the reef off the northern side of Wari Island, with the rock bearing 333° and Kera kera Islet, 237°, but during northerly winds it is exposed and unsafe.

Tidal current.—The tidal current runs with great strength between Ikaika Islet and Wari Island.

8-30 **Mamaramama Weino (Bell) Rock**, 435 feet high, is situated about 2¼ miles 303° from the western extremity of Wari Island and is steep-to on all sides. It is composed of grey rock, and the summit and northwestern side have a scattered growth of trees. Depths of from 23 to 27 fathoms exist off the rock, except on its southwestern side, off which a bank, with depths of from 9 to 13, fathoms, extends for 1,200 yards in a southwesterly direction.

This rock affords an excellent mark from all directions, its shape and isolated position making it appear larger and loftier than it really is, and from the dark color of its foliage it frequently shows out when Wari Island can not be discerned.

8-31 **Siga Islet (Foolscap Rock)** (10°51' S., 151°09' E. [redacted]), lying 7¼ miles north-northeastward from the eastern point of Wari Island, is 95 feet high and is accessible only on the southern side, where it is nearly steep-to. It is an excellent landmark easily identified by its shape. A bank, having depths of from 4 to 8 fathoms over it, extends 2½ miles in a northwesterly direction and is generally marked by tide rips.

Anchorage.—Temporary anchorage can be taken on the bank northwestward of Siga Islet.

Tidal current.—Close eastward of Siga Islet the current sets north-northwesterly up to 1¼ knots.

8-32 **Lebrun Islets**, consisting of Rikarika and Dogigi, 356 and 165 feet high, respectively, lie about 6½ miles northwestward of Wari Island. Both Islets, lying east and

west of each other, about 100 yards apart, appear conical from all directions and are thickly wooded. A rock, which constantly breaks, lies near the center of the channel between them. There are depths of 20 fathoms all around them, except to the southwestward, in which direction, a narrow bank with depths of from 6 to 10 fathoms extends for over a mile.

8-33 Siriki Shoals, occupying the greater portion of the area between Wari Island, Lebrun Islets, Dumoulin Islets, and Doini Island, are composed of narrow ridges of bright colored sand. General depths of from 6 to 9 fathoms exist over the shoals, but owing to tidal rips and the light color of the bottom there appears to be much less. There are, however, patches with depths of 3 fathoms, situated 2 and $2\frac{1}{2}$ miles northward of the eastern Dumoulin Islets, and patches with depths of from 4 to 6 fathoms extend $5\frac{1}{2}$ miles eastward of them.

Shellard Ridge, the southeastern extremity of Siriki Shoals, lies about 3 miles westward of Wari Island and has depths of from 7 to 10 fathoms. The ridge, composed of coral, is narrow and extends in a north and south direction for about 2 miles.

Caution.—Mariners are advised not to cross these shoals, as other shoal patches may exist.

8-34 Dumoulin Islets [redacted] comprise a group of four islets and two rocks. From the southward their white cliffs show out at times with great distinctness, forming a good landmark for vessels approaching the China Strait from the southward. The northern sides of these islets appear to be clear of danger, but off their southern sides the depths are irregular. Vessels should not pass between the islets. Less water than charted was reported in 1953 on the barrier reef about $2\frac{3}{4}$ miles south-southwestward of Baiiri Island.

Baiiri Islet ($10^{\circ}54'$ S., $150^{\circ}45'$ E.), the largest and most western of the group, rises to a conical peak, 368 feet high. The coast of this islet is bold, except on its northwestern side, where there is a sandy cove. Land-

ing is difficult on account of the heavy swell breaking on the fringing reef. The islet was inhabited.

Ana badi badila, located one-half of a mile eastward of Baiiri, is 175 feet high and flat on top, and is covered with scrub.

Warama kiu kiu, lying 2 miles eastward of Baiiri, is 180 feet high and is covered with scrub. An islet, 95 feet high, lies 400 yards northwestward of it.

Ana Karukarua, the easternmost of the group, is next in size to Baiiri. It is covered with grass and has a flat top, 225 feet high.

8-35 Castori Islets (*southern islet*, $10^{\circ}46'$ S., $150^{\circ}41'$ E. [redacted]), lying from $8\frac{1}{2}$ to $10\frac{1}{2}$ miles northwestward of Baiiri Island, consist of the three following islets: Ilei, Guara Kaba Omana, and Koia Reibareiba.

Ilei Islet, the southernmost of the group, is 270 feet high and 670 yards in length. The islet is fairly steep-to and is covered with scrub. On its northeastern side shoal water extends for about 200 yards. Baiabaia Karona, about 200 yards in length and 150 feet high, is connected with the northwestern end of Ilei with a reef.

Guara Kaba Omana, two flat-topped rocks connected by a reef, are 400 yards apart, the northern being 30 feet high. These rocks are separated from Baiabaia Karona to the southward by a channel one-half of a mile wide.

A bank with depths of from 6 to 9 fathoms extends over 1 mile to the eastward of these rocks. A 5-fathom patch lies near the center of the bank.

Koia Reibareiba, lying 1 mile northward of the last-mentioned, is a steep, rocky, dome-shaped islet, 155 feet high, covered with scrub. A shoal with a depth of 5 fathoms extends about $\frac{1}{2}$ mile from its south side.

8-36 Arch Islets, consisting of Nasa Pei, 360 feet high, and Nasa Ruarua, 345 feet

high, lies about $2\frac{3}{4}$ miles west-northwestward of Koia Reibareiba. The islets lie close together, and both are wooded. Nasa Peipei, the northwestern islet, has a perforation through its northern point from which it derives its name. Both islets are surrounded by a reef, which extends to a distance of about 200 yards.

Sapi Kunuri (Coconut Rock) is a rocky islet, 25 feet high, lying 2 miles northwestward of Nasa Peipei. Shallow water extends all around the islet, and a 5-fathom patch lies about 1,100 yards northeastward of it.

A depth of 10 fathoms lies about 2 miles west-northwestward of Sapi Kamuri.

8-37 **Nasa Riri** ($10^{\circ}44'S.$, $150^{\circ}45'E.$), also named Beehive Islet on account of its shape, is a wooded, rocky islet, 230 feet high. Shallow water extends 200 yards from its northern and western sides.

8-38 **Doini (Blanchard) Island**, the southern extremity of which lies about $2\frac{5}{8}$ miles west-northwestward of Nasa Riri, is about 2 miles in length by about 1 mile in breadth. Its two most prominent peaks are situated near the northeastern and southwestern extremities, the former, which is the summit of the island, being 510 feet high, and the latter 470 feet high. Except on the southwestern side, the island is fringed with a reef. The island is cultivated and vegetables may be obtained. There are several villages on the island.

Bonarua Daidaiwa, 670 yards southward of the southern extremity of the island, is a rocky islet with a few trees on it. A ridge with shallow water connects it with the southern extremity.

Tuyam, a grassy islet, 160 feet high, lies on the outer extremity of the reef extending 1,100 yards eastward of the eastern point of Doini Island.

Anchorage.—Sheltered anchorage in a depth of 12 fathoms may be obtained one-fourth of a mile northwestward of Baibai, a village near the northern extremity of

Doini Island. The shore abreast the village is free from reefs, and landing may be easily effected.

8-39 **Gona Barabara**, 245 feet high, is a partially cultivated islet, lying about $1\frac{1}{4}$ miles northwestward of the western extremity of Doini Island. Except on its southwestern side, the islet is fringed by a reef. A rock with a depth of 6 feet lies about 200 yards southeastward of the southeastern extremity of the islet.

Tobu, lying about 600 yards southeastward of Gona Barabara, is an islet 140 feet high, covered with bush.

Guara Kaba Omana Islet, in range with the western extremity of Koia Reibareiba Islet, bearing 195° , leads in midchannel between Tobu and Doini Islands.

Bilobilolo Shoals, consisting of two 3-fathom patches, lie about $1\frac{1}{4}$ miles westward of Gona Barabara. The two patches are about 300 yards apart and lie on a bank, which, as defined by the 5-fathom curve, is 800 yards in length.

The northern extremity of Doini Island, well open northward of Gona Barabara, bearing 097° , leading northward of Bilobilolo Shoals and the 5-fathom patch northeastward of Sapi Kunuri Islet.

Hatuno, a reef 200 yards in extent, with a rock 10 feet high on it, is situated on a bank with less than 4 fathoms of water over it, about 1 mile northward of Gona Barabara.

8-40 **Rogeia (Heath) Island** (*center*, $10^{\circ}38'S.$, $150^{\circ}39'E.$), is situated on the southern side of the entrance to China Strait from the southwestward, and is 4 miles in length, in a northwest and southeast direction, and from 400 yards to about $1\frac{1}{4}$ miles in breadth. Near the middle of its length, where it contracts, Banaria Bay on the southwest side and Rogeia Pata Bay on the northeast side are formed; southward of Rogeia Pata is Naraka Bay. Two peaks on the highest part of the island, of which the southeastern,

1,215 feet high, is the higher, appear in the shape of a saddle from the eastward or westward; they are well-defined and thickly wooded and form a conspicuous mark for navigating in China Strait and its approaches. There are patches of well-cultivated land on the island, and on its northeastern side there are several villages. From Kopukopu Stream, which flows into Rogeia Pata Bay, good water may be obtained.

The southwestern side of the island is clear of off-lying dangers, but on the northeastern side there are several dangers.

A reef having on it three prominent rocks, the southeasternmost of which, named Kawado, is 20 feet high, extends 650 yards south-eastward from the southeastern point of Rogeia Island.

Yama Reef, which dries 4 feet, lies 1,700 yards northeastward of the southeastern point of Rogeia Island.

Deikadeika, a wooded islet, 160 feet high, is situated 1,300 yards northwestward of Yama Reef, with foul ground between them.

A 2 $\frac{3}{4}$ -fathom shoal was charted (1961) about 1 mile southeastward of the southeastern end of Kwato Island, and lies about 400 yards off the northeast side of Rogeia Island.

Anchorage.—In Rogeia Pata Bay, situated on the northeastern side of Rogeia Island, anchorage may be obtained in depths of from 10 to 12 fathoms. This bay, which has a white sandy beach, affords good shelter from southeasterly winds.

8-41 Bonarua Hilihili is a wooded islet, 152 feet high, lying off the northwestern extremity of Rogeia Island, and separated from it by a shallow channel 150 yards wide. A coral reef, with shallow water beyond, extends one-fourth of a mile northward of the islet.

8-42 Kwato Island, crescent-shaped, three-fourths of a mile in length and 170 feet high, lies northward of Rogeia Island, and is separated from it by a channel, 200 yards wide, which is shallow at its western end. Isu Hina, its northwestern point, is a steep wooded knoll, with a red cliff, 80 feet high, facing the West Channel.

A narrow rocky bank, with depths of from 4 to 8 fathoms over it, extends one-half of a mile northwestward from Isu Hina, over which the tidal current swirls and eddies. When the wind is in a contrary direction there are heavy overfalls.

Doolan Patch, with a depth of 6 $\frac{1}{2}$ fathoms, lies nearly a $\frac{1}{2}$ mile east-northeastward of Isu Hina.

There is a mission station on the island.

Kwato Eina Kaba Kwasi (Kwato eina), a rock having a depth of 1 fathom, lies between Kwato and Ebuma Islands, one-third of the distance from the former. It has depths of from 5 to 6 fathoms northward and southward of it but shoaler water off the northwestern end. The rock is easily seen from aloft and occasionally breaks.

Mount Bossim, open northward of Isu Hina, bearing about 268°, leads northward of the rock.

A pole beacon with triangular top mark stands on the rock.

8-43 West Channel, the southwestern approach to China Strait, lies between Rogeia Island and the mainland of New Guinea. It is free from dangers except for Heath Patches and Weku Una Rock.

8-44 East Channel, the southeastern approach to China Strait, lies between Rogeia and Sariba Islands. Samarai and Ebuma Islands lie in the middle of the channel at its northwestern end. Vessels entering the barrier reef eastward of Uluma Reef might use this channel with advantage.

8-45 Samarai (Dinner) Island ($10^{\circ}37'S.$, $150^{\circ}40'E.$), having a deep-water channel on either side of it, is fringed by a reef except for about 300 yards on its northwestern side. The reef, which fringes the southwestern side of the island, extends for a distance of about 300 yards offshore. A channel leads through the reef to the sandy beach at the mission station. On the eastern side of the island there are three hills, the highest having an elevation of 155 feet. There are large groves of coconuts on the flat parts of the island.

Shoals.—Depths of 22 to 36 feet are found within an area extending about 500 yards westward from the north extremity of the island. A circular shoal with a diameter of about 180 feet and a least depth of 13 feet lies about 180 yards northward of the north corner of main wharf. A light is shown from a steel pile structure located approximately in the center of this shoal. A 3-fathom patch is located about 125 feet southwest of the light structure.

Dolphin.—A dolphin is placed close off the northeastern extremity of the wharf.

Tidal signals.—The International flag "N" is placed on that end of the wharf from which the tidal streams flow. Slack water is indicated by placing the flag at the center of the wharf.

Beacons.—Two beacons about 70 yards apart lie about 100 yards northwest of the west extremity of the island.

Landmark.—A water tower, 70 feet high, is located about 205 feet south of the north extremity of main wharf.

8-46 Anchorage.—The anchorage is on the western side of the bank just described, a convenient berth being in a depth of 8 fathoms, with the southeastern extremity of Rogeia Island bearing 164° , open westward of the west extremity of Samarai Island, and Deirena Point bearing 096° . It is not advisable to anchor so close to the island as to lose the breeze, but it should be borne in

mind that the southwestern edge of the bank is steep-to, and that in a strong tideway a vessel may easily drag off it. The bottom is of sand and coral and so uneven that there is frequently some difficulty in weighing the anchor.

Tides.—It is high water, full and change, at Samarai Island at 8h. 40m.; springs rise 6 feet, neaps $3\frac{3}{4}$ feet.

Tidal currents.—Tidal currents between Samarai and Ebuma Islands are reported to be irregular and often to attain a velocity of 6 knots; there is hardly any slack water, but the full strength of the current only lasts about an hour. A strong tide rip extends about 400 yards from the north end of Samarai.

8-47 **THE SETTLEMENT** on the northwestern side of Samarai Island is, next to Port Moresby, the most important settlement in the Territory of Papua. In addition to the trading houses and hotels, it includes several private houses, a church, and a public library. The settlement is a port of entry, and there is a government station, with a resident magistrate who has charge of the eastern district and islands. Exports consist mainly of copra, cocoa and shells.

Wharves.—Main Wharf, 300 feet in length and a depth of 23 feet alongside is situated on the north-west side of the island. An Australian survey (1961) indicates a least depth alongside of 29 feet. Starboard landing must be made at the wharf during the ebb tide, because of coral reefs extending about 100 feet astern after a vessel is alongside. Government Wharf, located southwestward of Main Wharf, has a T-head and a depth of 10 feet alongside. There is a jetty with a depth of 5 feet alongside for the use of boats at Klapara Point, the western extremity of the island.

Supplies.—Food supplies and drinking water in small quantities may be obtained. A small quantity of fuel oil is kept in stock.

Repairs.—Minor engine repairs can be made. A marine railway can accommodate vessels up to 85 feet long and 300 tons.

Communication.—There is a steamer communication between the settlement and other New Guinea ports, and monthly communication with Australian ports. There is communication by telephone.

Radio.—There is a radio station, which also sends out weather bulletins and storm warnings.

Hospital.—The public hospital will receive seamen.

Climate.—Owing to its open position, Samarai experiences the full benefit of the prevailing winds, and from June to December is not unhealthy.

8-48 **Ebuma (Eboma) (Middle) Island**, lying about 1,100 yards northwestward of Samarai Island, is thickly wooded and 90 feet high. The island is fringed by a reef, with shallow

water extending 150 yards from the western side of the island, and 250 yards northwestward from the northern side.

A conspicuous tree stands near the east point of the island.

Manu Pisina Rocks lie 200 yards north-northwestward of Ebuma Island. The rocks, which dry at high water, are fairly steep-to, except on the southwestern side.

8-49 **Sariba (Hayter) Island** is separated from the southeastern extremity of New Guinea by China Strait. The island is irregular in shape, about 5 miles in length, by from $\frac{1}{3}$ to $2\frac{1}{2}$ miles in breadth; its northern shores are deeply indented. The northwest-ern side forms the eastern shore of China Strait, and the southwestern side forms the northern shore of East Channel.

Mount Bilobilolo, 970 feet high, a conical peak near the northwestern end of the island, is the highest point. Its slopes are cultivated almost to the summit, and from it the other ridges radiate.

Beika (Bead) Islet ($10^{\circ}39' S.$, $150^{\circ}45' E.$), lying three-fourth of a mile southeastward of Kwalosai (Woro) village located on the south point of Sariba Island, is thickly wooded and 130 feet high. A shoal extends about 300 yards off its northwestern extremity.

A rock, about 2 feet high lies on a 2-fathom shoal located about 600 yards north-westward of the north extremity of the islet.

8-50 **Magaikarona (Maga Ikarona) (Stanley) Bay** lies between Kwaiama (Peninsula) Point, situated $1\frac{1}{2}$ miles west-northwestward of the southern point of Sariba Island, and Tau Hanagana Point, $1\frac{1}{5}$ miles farther northwestward. Kwaiama Point, 140 feet high, is connected by a narrow isthmus with the main island. Rocky projections divide the head of the bay into

three coves, on the shores of which there are villages. Water may be obtained from the eastern cove.

Weku Sinibu, lying one-half of a mile north-northwestward of Kwaiama Point and about 300 yards offshore, is shaped like a turtle's back and is 10 feet high.

Halu Bairawa Rock, about 1 foot high, lies on the shore reef, about 200 yards offshore, one-half of a mile northwestward of Tau Hanagana. Northward from this rock to Dagadaga Bonarua the coast is steep-to.

Anchorage.—The best anchorage can be taken in 12 fathoms, mud, with Tau Hanagana Point in range 281° with the north extremity of Samarai Island.

Dagadagabonalua (Dagadaga Bonarua) is a narrow, thickly wooded islet, 80 feet high, lying off the western end of Sariba Island, to which it is connected by a reef.

A 15-foot shoal, steep-to, with depths of 11 to 15 fathoms around it is located about $\frac{1}{3}$ mile north-northeast of Isu Bobo Point, the northern extremity.

8-51 **Possessive (Nawaripa) Bay**, on the northwestern side of Sariba Island, affords safe anchorage in 7 to 9 fathoms, mud, out of the influence of the tidal currents of China Strait, with the summit of West Iguari Island, just open westward of Tobai Point, bearing 026° , and Ebuma Island, just open northward of Isu Bobo Point, bearing 243° .

A shoal with a least depth of 4 fathoms lies in the northern part of the bay about 600 yards south-southwestward of Tobai Point. The general depths in the bay are from 7 to 8 fathoms.

8-52 **Sawa Sawaga (Rocky Pass)** ($10^{\circ}38' S.$, $150^{\circ}46' E.$), is the channel, 100 yards wide, with a depth of 5 fathoms in the fairway, between Sariba and Sideia Islands,

connecting Sukuri Bay in Sideia (sec. 8-59) with Wanatonoli Bay to the northward of it. The tidal current runs up to 7 knots through the channel with dangerous overfalls and eddies. Navigation, within the waterway, is hazardous except at dead slack water.

Kai Raurau Uai Islet, 40 feet high, lies in Wanatonoli Bay, $\frac{1}{2}$ mile northward of Sawa Sawaga.

Gadaku, a conspicuous double-topped hill, 630 feet high, is situated on the northeastern end of the promontory separating Wanatonoli and Labu Labu Bays.

8-53 Wanatonoli (Namoai) Bay—Buoys.—Wanatonoli Bay is entered from northward by a passage about 600 yards wide between the reefs extending off Gabutau Point and Lolo Siwasiwoi. A red can buoy marks the northern edge of the reefs on either side of the entrance. About 600 yards northward of Gabutau Point, the northwestern extremity of Sideia Island, is a 3-foot shoal. A buoy marks its east edge.

From the entrance, Wanatonoli Bay extends over 1 mile southward and southwestward, with general depths of 10 to over 20 fathoms. In the inlet in the southwestern part are several aircraft moorings, and a buoy marks the northern edge of the reef extending over 200 yards northward from Kai Raurau Uai Islet.

8-54 Garahi (Head) Island, 355 feet high, with a rounded summit, lies northwestward of Gadaku and is separated from Sariba Island by a channel 300 yards wide.

Caution.—Northeastward and eastward of Sariba Island the waters have not been examined.

Kabaerueru is the northwestern point of Sariba Island; it is dominated by a hill 300 feet in height.

A light stands on Kabaerueru.

8-55 Lessamanu (Brewer) Island, 120 feet high, lies about $\frac{1}{2}$ mile eastward of Kabaerueru.

Tano Buibuina is the bay between Lessamanu and Kabaerueru, in which, owing to the strong tidal stream eddying around the island, it is not advisable to anchor. There is a shoal with depths of from 4 to 6 fathoms over it in the entrance to Tano Buibuina. The western extremity of the shoal lies about 800 yards westward of Lessamanu Island. A rock with 1 foot over it lies about 600 yards eastward of Kabaerueru, on the edge of the shoal.

8-56 West Iguari (Mekinley) Island, on the eastern side of the narrowest part of China Strait, is 200 feet high, cultivated and thinly wooded, and affords a good mark for the strait when approaching from the northward. A mangrove islet stands on a reef to the southward of it, and on its western point is a village. The reef fringing the western side of this island has been reported to be extending westward. A 17-foot shoal sounding was charted (1961) off the southwest extremity of the island, about $\frac{3}{4}$ mile north-northeastward of Kabaerueru light.

8-57 East Iguari (Paples) Island lies about 600 yards eastward of West Iguari Island, from which it is separated by a channel having a least depth of 5 fathoms. The island is thickly wooded and 400 feet high. A coral reef fringes the coast, except on the southwestern side, where there is a sandy beach. A 16-foot patch lies about 400 yards southwestward of the southwest point of the island. A $3\frac{1}{2}$ -fathom shoal sounding was charted (1961) about 150 yards south-southwestward of the 16-foot patch. A bank with depths of 4 to $5\frac{1}{4}$ fathoms extends about $\frac{3}{4}$ mile southeastward from the east side of the island. The southern part of the island is slightly cultivated.

Kwaui (Button) Islet, 40 feet high, lies about 800 yards westward of the southern extremity of East Iguari Island. There are depths of $2\frac{1}{2}$ fathoms close to the islet.

Shoals.—Kana Waneipa, consisting of two patches with depths of less than 6 feet, lie

about $1\frac{3}{4}$ miles northeastward of East Iguari Island. Both patches show distinctly, but rarely break. A $3\frac{3}{4}$ -fathom shoal sounding was charted (1961) about 350 yards southeastward of the northern patch.

Waga Tari or China Rock, lying about three-fourths of a mile southeastward of the southeastern extremity of Kana Waneipa, is a triangular reef, which partially dries. About 600 yards north-northeastward of Waga Tari is a 2-fathom shoal, which is easily seen from aloft but seldom breaks. A 10-foot shoal sounding was charted (1961) about 200 yards southwestward of the west end of the 2-fathom shoal.

Shoal ground with depths of 2 fathoms extends $\frac{1}{2}$ mile to the eastward of Waga Tari. Five drying reefs were charted (1961) within a $\frac{1}{2}$ mile radius, northward to eastward, of the northeast point of Waga Tari.

Whitmore Shoal, with a depth of $2\frac{1}{2}$ fathoms, lies about 1 mile eastward of the south end of Waga Tari.

Mount Bilobilolo, open westward of the summit of East Iguari Island, bearing 209° , leads westward of all these dangers.

8-58 Ito (Didymus) Island (*center, $10^\circ 34'$ S., $150^\circ 46'$ E.*), about $1\frac{1}{2}$ miles in length by one-half of a mile in breadth, lies $1\frac{1}{2}$ miles eastward of East Iguari Island. It is indented on its northwestern and southern sides, and rises to a rounded peak, 500 feet high. Its shores are for the most part composed of mangrove swamp, but a small sand beach affords difficult landing on the northeastern side. A belt of coral fringes the island. There are no coconut trees, and the underbrush is so thick as to be almost impenetrable.

8-59 **SIDEIA (BASILISK) ISLAND**, lying to the eastward of Ito Island and Sariba Island, is a U-shaped island, open to the westward. The northern side is higher, broader, and more irregular in outline than the other two. The island is about $8\frac{1}{4}$ miles in length in an east and west direction and $7\frac{1}{2}$ miles in a north and south direction, and varies in breadth from $\frac{1}{2}$ mile to $3\frac{1}{2}$

miles.

The land rises to a narrow thickly wooded ridge of hills throughout its entire length and breadth, averaging from 300 to 1,288 feet in height. In the southern portion this ridge narrows and dips in one or two places to about 100 feet; as it extends northward along the eastern part of the island it gradually increases until it attains a height of 1280 feet.

When seen from the northeastward, the summit of the island, located southwestward of the 1280 foot height, appears sharp with a round shoulder on its western side, but from the southward it is difficult to distinguish from the surrounding peaks, by which it is sometimes hidden. It is thickly wooded from the summit to the water's edge with trees of dark-green foliage, as is the whole of Sideia Island.

There are several villages on the island.

8-60 Niuniu Ridikwa (Liliki) (Jenkins) Bay, is formed by the three sides of the island and is open toward China Strait. No soundings are shown on the chart. A certain amount of protection may be obtained in the eastern end of the bay, but the anchorage is not recommended. The shores are said to be free from dangers, the water shoaling gradually from 18 fathoms in the middle to 9 and 10 fathoms one-fourth of a mile from the beach at the head of the bay. There are, however, some shoal patches known to exist, the position of which are not charted.

Didigili (West) (Didigilo) Islet, situated between Sideia Island and Ito Island, is 85 feet high and thickly wooded. The islet is fringed by a coral reef.

Sawa Sawaga, is a pass between Sariba and Sideia Islands. See section 8-52.

Sukuri Oba Bay, on the southwestern side of Sideia Island, has depths of 16 to 17 fathoms near its center, and a steep rocky shore.

Iso Bobo and Baga Moti, southeastward of Sukuri Bay, are two islets covered with scrub, each 115 feet high, situated on a reef separated from the southern point of Sideia Island by a narrow channel.

8-61 **Southern side.**—Eastward of the peninsula northward of Isu Bobo most of the southern side is said to be bold and to have a depth of 17 fathoms at one-third of a mile from it. A ledge of rocks, which dries at low water and continually breaks, extends about 200 yards to the southward of a point $2\frac{1}{2}$ miles eastward of Isu Bobo Islet. About a mile westward of the southeastern point of Sideia Island the steep nature of the shore ceases, and a ledge of coral reef with boulders that dry at low water, extends more than 200 yards to the southward.

8-62 **Margaret (Popwai) Island** ($10^{\circ}40'$ S., $150^{\circ}53'$ E., *H. O. Chart 2950*), situated one-half of a mile southward of the southeastern point of Sideia Island, has a fairly level, thickly wooded summit, 500 feet high. There is a village on the southern side of the island.

The channel between Margaret and Sideia Islands is narrowed by the shore reef extending from the latter and has depths of from 7 to 20 fathoms, coral and sand. At spring tides the current runs strongly through this channel; it is advisable to close the Margaret Island shore in passing through.

8-63 **Eastern side.**—For a mile northward of the southeastern point of Sideia Island the coast is fringed by a coral reef extending offshore for a distance of 200 yards, after which there is a bight 2 miles wide at its entrance. The shores of this bight are lined with a mangrove swamp, backed by a ridge of hills about 600 feet high.

Thence for 3 miles to Goodman (Kaura) Point, off which are several shoals extending to the eastward and northeastward, the coast continues its northerly trend, having two small bays with an intervening point, off which is Carry (Dinana) Island.

It is dangerous to enter either of these two bays.

From Goodman Point to Negro Head the coast extends northwestward for $2\frac{1}{2}$ miles

and has two shallow bays separated by a rocky point. Depths of from 7 to 9 fathoms were found at 400 yards from the shore, but about $1\frac{1}{2}$ miles to the northward breakers could be distinctly seen upon the reef, which stretches eastward for $3\frac{1}{2}$ miles from Negro Head.

8-64 **Northern side.**—Negro Head, the thickly wooded northern point of Sideia Island, is well defined and surrounded by a coral reef. This coral reef extends about 400 yards to the northward, one-half of a mile to the westward and $3\frac{1}{2}$ miles to the eastward, and forms a natural breakwater to the northeastern part of Sideia Island. The reef has numerous boulders above water and dry coral patches eastward of this reef, in the approach of Fortescue Strait, as far as Shortland Islet, the bottom is foul and broken.

Caution.—The northern side of Sideia Island is not closely surveyed, and caution must be used when navigating in this area.

8-65 **Magai Deibana (Challis Head)** ($10^{\circ}32'$ S., $150^{\circ}49'$ E., *H. O. Chart 2950*) lies $3\frac{1}{4}$ miles westward of Negro Head and, like the former, has a coral reef which extends about one-fourth of a mile from it in an easterly direction. Westward of Magai Deibana the reef is prolonged for one-half of a mile by a prong of shoal water and rocks awash.

Foul Bay, which lies between Negro Head and Magai Deibana, was not closely examined, but had the appearance of containing shoal water.

Waga Tari and the shoals westward of Magai Deibana have been described in section 8-57.

8-66 **Fortescue Strait (Kawana Madowa)**, separating Sideia Island from Basilaki Island, is about 400 yards wide at its southern end, opening to a width of $1\frac{1}{2}$ miles at the northern. The southern entrance is deep and narrow, but the shoal water extending

eastward of Goodman Point in the northern entrance appears at first sight to effectually block the approaches from the northward.

In midchannel between the southeastern point of Sideia Island and the southwestern point of Basilaki Island the depth is 18 fathoms, continuing for about a mile to the northward; at one-fourth of a mile eastward of Rat and Mouse Islets, the depth is 16 fathoms, over sand; at three-fourths of a mile eastward of Carry Island, and nearly in midchannel, there is a depth of 22 fathoms, with the same bottom.

A sandbank, which dries about 4 feet, is situated about $1\frac{1}{2}$ miles 088° from Goodman Point. Patches of coral with depths of 3 and 4 fathoms lie scattered in the space between this sandbank and the northern shore of Basilaki Island, for the positions of which the chart is the best guide.

The eastern point of the southern entrance to Fortescue Strait is moderately high, and steep-to on its western side, but a reef extends from it to Pigeon Islet.

The eastern side of the narrows of the strait is bold, steep-to, and thickly wooded to the water's edge. The western coast of Basilaki Island, from the narrows to White Point, is bordered by mangrove swamps. A bight about one-half of a mile in extent lies southward of White Point, and is divided from a similar bight by a point from which a small coral reef projects.

Rat and Mouse Islets, situated about 3 miles northward of the southern entrance to the strait, lie 300 yards apart in a north-easterly and southwesterly direction. The islets are thickly wooded and have small sand beaches. Coral reefs extend 200 yards from their southwestern sides, but the channel between the islets appears to be deep.

8-67 Carry Island ($10^{\circ}35' S.$, $150^{\circ}54' E.$, *H. O. Chart 2950*), also on the western side of the strait, lies about $1\frac{3}{4}$ miles northward of Rat Islet. A narrow strip of coral sand

beach surrounds this crescent-shaped island, and a reef, awash at low water, borders the shore.

Anchorage may be obtained southward of Carry Island in a depth of 13 fathoms.

Tides.—The high-water interval at full and change in Fortescue Strait is 8h. 00m. springs rise 4.5 feet. The flood current sets to the north, and the ebb to the south. At springs the tidal current has drift of 4 to 5 knots.

8-68 BASILAKI (MORESBY) ISLAND.

—The western coast of this island forms the eastern boundary of Fortescue Strait. The island is 10 miles in length in an east and west direction and has an average breadth of $3\frac{1}{2}$ miles. The higher grounds, including Fairfax Ridge, are covered with a thick forest of tropical trees. This ridge forms the backbone of the island, its highest part culminating in three well-defined peaks, of which Mount Fairfax, the highest, has a knob-shaped summit by which it may be recognized. It is 1,740 feet high and conspicuous from all directions.

The island is inhabited and extensively cultivated, the sides of the highest peaks being covered with yam and taro plantations; the valleys produce sago, betel nuts, sugar-cane, Indian corn, and bananas, oranges, and other tropical fruits.

Although abundance of water exists on the island, yet no place was found where a vessel could obtain water, the shores being fringed with mangrove swamps, in which the streams are absorbed before they reach the sea.

There are many deep bights and indentations, two of which, Hoop Iron and Pitt Bays, afford secure anchorage.

8-69 South coast.—Pigeon Islet lies one-fourth of a mile southward of the southwestern point of Basilaki Island, to which it is connected by a sunken reef. A small

bank which dries at low water lies on this reef. This conical islet is about 60 feet high and is covered with grass and trees. Boulders surround the islet and extend 200 yards from its southeastern side; landing is difficult.

Weitoa (O'Neill) Island, situated a little to the eastward of Pigeon Islet, is separated from the southwestern peninsula of Basilaki Island by a channel 400 yards wide, through which the tidal current sets with considerable strength. The northern shore of this channel is fringed by a coral reef extending 200 yards from the shore. The island is hilly, the summit being about 580 feet high, with a conspicuous tree. A village is situated on the western shore of the bay lying on the northeastern side of the island.

A shoal, unexamined, with a depth of 6 fathoms, coral and sand, was reported to lie about $2\frac{1}{2}$ miles 224° from the conspicuous tree on Weitoa Island.

8-70 Hoop Iron (Haraharau) Bay ($10^\circ 39'$ S., $150^\circ 59'$ E.), lies on the southern side of Basilaki Island, northward of Weitoa Island. The ridge surrounding the bay varies in height from 400 feet to 1,370 feet. Northward of the center of the bay there is a pronounced gap in the ridge. There are several villages on the shores of this bay.

Anchorage.—Good anchorage, protected from winds except those from the east and southeast, may be found in a depth of about 13 fathoms, over stiff, dark mud, in the small bay on the northeastern side of Weitoa Island, with the northern entrance point of the bay bearing 313° , and out of the influence of the tidal current.

There is also anchorage in the same depth in the northwestern part of Hoop Iron Bay as shown on the plan.

Tides.—The high-water interval at full and change at Hoop Iron Bay is 8h. 30m.; springs rise 5 feet.

Tidal currents.—In the channel between Weitoa and Basilaki Islands, the flood cur-

rent sets to the westward, and the ebb to the eastward. Many tide rips and eddies occur in this vicinity at springs when the tidal currents attain a velocity of more than 4 knots.

8-71 Coast.—Between Green (Black Rock) Point, the eastern entrance point to Hoop Iron Bay, and Rocky Point, lying 4 miles east-southeastward, there are five sandy coves, separated by rocky points. A rock awash, over which the sea generally breaks, lies about one-half of a mile off the coast, $1\frac{1}{2}$ miles southeastward of Green Point. Between Rocky Point and South Point, $2\frac{3}{4}$ miles eastward, the coast forms a bight containing three small sandy beaches, separated by rocky heads. From South Point, a well-defined bluff which terminates the southeastern ridge of the high land of Basilaki Island, the rocky and steep coast trends northeastward for 1 mile to the southern point of James Bay.

Rocky Islet, lying about 1 mile westward of Rocky Point, is a dark-colored rock with a thin covering of grass upon its summit and appears to be steep-to on all sides. There is a good channel between the islet and Basilaki Island.

8-72 East coast.—James Bay, the approaches to which are obstructed by shoals, affords fairly good anchorage. A coral reef extends 300 yards from the northern shore, and a reef, which dries, runs parallel to the northern shore and around the northeastern entrance point of the bay for a distance of $1\frac{1}{2}$ miles; foul ground continues thence to within 1 mile of Emerald Point, the southern entrance point of Pitt Bay.

8-73 Off-lying islands.—**Haines Island** ($10^\circ 41'$ S., $151^\circ 04'$ E.) has a saddle-shaped summit, the two peaks of which rise to a height of about 250 feet. They are steep and covered with trees on the western side, but show a grassy slope to the eastward. Foul ground extends 200 yards from its northern shore.

An islet with bushes upon it is connected by a coral reef with the northwestern point of Haines Island, and there is a narrow boat channel, through which the tidal current runs with great rapidity, between this islet and the southeastern point of James Bay.

Katai (Connor) Island, situated about 1 mile northeastward of Haines Island, has 3 peaks, about 460 to 560 feet high, near its center, and is wooded throughout. The northwestern side of the island is steep-to, and on the northeastern side is an extensive village with cultivation. The southeastern point of the island terminates in a small pyramid-shaped rock, almost detached.

The channel between Katai and Haines Islands leads into Pitt Bay. It is about 1 mile in width and has depths of more than 20 fathoms. A black-headed rock, which is 3 feet high and is steep-to on its eastern side, is situated in the channel 700 yards 125° from Emerald Point. The channel eastward of this rock is recommended. The velocity of the current in the channel was estimated at 3½ knots by a vessel which passed through at spring tide.

Katokatoa (Glenton) Island, lying about one-half of a mile eastward of the southeastern point of Katai Island, rises to a thickly wooded and well-defined peak, 330 feet high. The northern part of the island is flat and of coral formation, having a small sandy beach and a few coconut trees. Ledges of rock extend from all its sides except the southern. A depth of 18 to 23 fathoms over a bottom of coarse sand exists between the western rocks and Katai Island.

Babagarai (Nasakuba) Islet, connected by a reef with the eastern side of Katokatoa Island, from which it is about 400 yards distant, is 80 feet high and thickly wooded. A ledge

of rocks extends 200 yards from the southern extremity of the islet.

The route to Goschen Strait, when approaching from the southward, leads about 1 mile eastward of Babagarai Islet; but Katokatoa Island, being high, with a well-defined peak, will be seen and recognized before Babagarai becomes visible from the deck.

Kitai Bonabona Islet, about 1 mile northeastward of the northern point of Katai Island, is oval in shape, and one-half of a mile in length. It is 90 feet high, thickly wooded, and surrounded by a strip of sandy beach, within which is a salt-water lagoon. The northern side of the island is steep-to, but a coral ledge extends 600 yards off its southern point.

In the channel between Kitai Bonabona Islet and the northern point of Katai Island is a sunken coral patch, with 2 fathoms of water over it and apparently steep-to. To the northward and southward of this position the water is deep, but this channel is not recommended.

8-74 Pitt (Sawateira) Bay (10°38' S., 151°04' E.) the largest indentation on the eastern coast of Basilaki Island, is entered between Emerald (Sinasina) Point and Can Buoy (Gayowa) Point. The depths in the center of the bay vary from 14 to 18 fathoms, sand and coral, but detached shoal areas with depths of ¼ to 5 fathoms lie within three-fourths of a mile of the northwestern side and head of the bay. The shore of the bay is mostly fringed by coral reef, extending 150 yards from the southern side.

A shoal with a least depth of 3½ fathoms lies about ¼ miles 110° from Can Buoy Rock.

Can Buoy Point, the northern entrance point to Pitt Bay, is well marked by a conical brown rock situated on the fringing reef. This rock, 25 feet high, resembles a can buoy in appearance.

Beacons.—A white beacon is located on Innergreen Bluff, located about 1,800 yards westward of Emerald Point. Another white beacon is located close southward of Vela Point, about $1\frac{1}{4}$ miles northward of Innergreen Bluff.

Fairfax Ridge, at the head of the bay, rises to a height of 1,650 feet, and thence forking, extends northeastward in a ridge of from 900 to 500 feet high, to Can Buoy Point, and southwestward in a more gradual slope, with a solitary peak, toward Emerald Point. Three bright green bluffs, about 60 feet high, are remarkable features of the bay, their peculiar appearance being caused by the absence of trees, leaving the rich green grass exposed in such a manner as to make it look artificial.

Water may be found in a small bight in the northwestern part of the bay and also in the southwestern bight, but it is so far from the beach that it must be conveyed to the boats in casks.

Anchorage.—Pitt Bay affords good anchorage except during strong northeast to east winds. The holding-ground over a bottom of coral and sand, is good. It is recommended that anchorage be taken, in 12 fathoms, when Innergreen Bluff bears 175° , distant about 600 yards and Can Buoy Rock bears 040° .

In the southeast monsoon it is probable that considerable sea enters this bay. Sandfly Bay, in Skelton Island, $10\frac{1}{2}$ miles to the eastward, or Sineigaro Kipakipa Bay, on the northern coast of Basilaki Island, will at this season be preferable.

Tidal currents.—In the channels between Babagarai Islet and Basilaki Island the currents run at the rate of 4 or 5 knots.

Directions.—In entering Pitt Bay the southern shore should be kept at the distance of about 600 yards until the Innergreen Bluff bears 141° , which is as far in as a vessel should go. Vessels approaching Pitt Bay from the northeastward should take care to avoid the $3\frac{1}{2}$ -fathom shoal lying about $1\frac{1}{4}$ miles 110° from Can Buoy Rock.

8-75 Coast.—The coast of Basilaki Island from Can Buoy Point trends north-northwestward, for a distance of $1\frac{3}{4}$ miles, to Cape Lookout. Between Can Buoy Point and Cape Lookout are two small bights; the southern is blocked with a reef, but the northern affords a good boat harbor. From Cape Lookout the coast trends westward for three-fourths of a mile, with a small bight, beyond which is Sineigaro Kipakipa Bay. The northeastern arm of Fairfax Ridge has a succession of regular conical peaks, gradually decreasing in height as Cape Lookout is approached, and remarkable when viewed from the northwestward or southeastward.

8-76 Sineigaro Kipakipa (Flinn) Bay, about $1\frac{3}{4}$ miles wide at its entrance, is divided into two arms by a tongue of land. A steep-to coral ledge, which is difficult to detect, extends over 100 yards northward from the eastern entrance point of the bay. North Point, the western entrance point of the bay, is covered with long grass, and has a coral reef extending a short distance from it. Another coral reef extends 200 yards from the projecting point situated about one-half of a mile southward of North Point; this appeared to be the only danger in the western arm of the bay.

Pitt Islet, lying in the entrance of the bay, is low and wooded. The islet is almost joined to the tongue of land which divides the bay into two arms. It is encircled by a coral reef, and has two bushy sandbanks