

oms may be obtained off the mouths of the river.

Ketakerua Bay, 17½ miles westward of Musa River, is the head of Dyke Acland Bay. Several creeks flow into the bay.

Anchorage probably in depths of from 4 to 6 fathoms may be obtained off Umunda Creek, which discharges into the head of the bay.

10-94 Port Harvey (8°55'S., 148°30'E.), entered about 10 miles northward of Ketakerua Bay, is an inlet indenting the coast 1 mile in a southwesterly direction. The depths shoal gradually from 10 fathoms in the entrance to the head of the bay, where it divides into branches, where coasting craft find good anchorage. Good water may be obtained from several small streams at the head of the bay.

A 5-foot shoal spot lies about one-eighth of a mile northeastward of the point, which divides the head of Port Harvey into two inlets. Good shelter, within the inlets, for small craft is available. A slipway with about 12 feet at its head is located on the north side of the northern inlet. Drying reefs extend about 550 yards off the northwestern entrance point, and about 300 yards off the southeastern entrance point. Two small mangrove islets lie on the reef at the northwestern entrance point.

Anchorage in a depth of 10 fathoms may be found in the middle of the inlet.

Tides.—The high-water interval at full and change at Port Harvey is 6h., 00m.; springs rise 3 feet.

10-95 Oro Bay (8°53'S., 148°29'E.) a small inlet lying close northwestward of Port Harvey, is shallower and less sheltered than Port Harvey. There is a village at the head of the bay.

The general contour of the land in the vicinity of Oro Bay is rugged, with high mountains in the background. Brush and trees can be seen along the shore line. Breakers are not seen before the land, nor does the land blend into the horizon.

There is deep water right into the bay, and navigation is reported not difficult.

Anchorage may be obtained in the middle of the bay, in depths of 6 to 7 fathoms. There is reported to be room for several vessels at the anchorage, mud bottom.

Tides.—Tides in Oro Bay are very irregular. During the southeast monsoon season, high water occurs at 0400 and 1600 daily, the range being 2½ to 3 feet.

Note.—The facilities of the bay were of particular use in war operations in this area. The wharves are reported in a state of disrepair, and there are indications that other facilities are no longer in existence.

10-96 Port facilities.—On the south side of Oro Bay there is a quay-type pier approximately 500 yards long, with depths of 13 to 24 feet alongside. There is a wooden jetty, 250 feet long with a depth of 10 feet at its head, located at the head of the bay.

Two stone piers about 150 feet long project at right angles from the beach on the north shore.

Fresh water can be obtained in limited amounts; it must be purified before drinking.

The facilities of the bay were of particular use during the war. However, the wharves are reported to be in a state of deterioration. It is indicated that other facilities no longer exist.

10-97 Oro Bay to Cape Endaiadere.—From Oro Bay the coast trends in a general northerly direction for about 9 miles to Cape Sudest, then for about 4 miles to Cape Endaiadere. At the village of Soena, southward of Cape Sudest, three jetties project out from the shore. With this exception there is apparently no other place of importance along this section of coast.

Submerged rocks and shoals front the coast, lying as far as 8 miles offshore in places. On the northern side of the approach to Oro Bay, there is a submerged patch lying about 3 miles northward of Cape Sinclair. Shoal flats front the coast near

(302) EAST INDIES—New Guinea—Northeast coast—Cape Killerton—
Chart amendment.—1. The white beacon charted in (approximately) $8^{\circ}35.3'S.$,
 $148^{\circ}17.0'E.$ does not exist and will be expunged.

2. A dangerous wreck "*(Mast 20 ft.)*" will be substituted for the conspicuous
stranded wreck charted in $8^{\circ}35'27"S.$, $148^{\circ}18'45"E.$

(Navy N.M. 37/65.)

(N.M. 20(177), Sydney, 1965.)

H.O. Chart 9575-32.

H.O. Pub. 73, 1952, pages 393, 394.

Soena and Cape Sudest, and farther offshore are several detached patches.

10-98 Off-lying shoals.—Numerous shoals lie off the coast within the 20-fathom curve between Oro Bay and Cape Endaiadere. An unexamined 25-foot shoal lies about 15 miles east-northeastward of Cape Endaiadere.

10-99 COAST BETWEEN CAPE ENDAIADERE AND CAPE WARD HUNT.—From Cape Endaiadere the coast trends west-northwestward for about 10 miles, whence it runs in a northerly direction for 34 miles, to Cape Ward Hunt, Holnicote Bay being formed at the bend. The shores of Holnicote Bay are low, a plain extending some miles back to the foot of the mountains.

10-100 Buna ($8^{\circ}40'S.$, $148^{\circ}24'E.$) lies about $2\frac{1}{2}$ miles west-northwestward of Cape Endaiadere. Considerable foul ground extends up to 2 miles off the cape, and as far as 4 miles off the coast to the west-northwestward.

The Basari River (Baggo Siwori Creek) discharges into the sea westward of the roadstead, and the water is reported to be fresh.

The little settlement at Buna has a government station, and is the starting place for the Yoddo goldfields.

The general contour of the land in the vicinity of Buna is flat, low-lying, and covered with mangroves. The Owen Stanley Range is the first high land picked up. The foothills of this range blend into the horizon.

It is reported that the best time to make arrival at the port is about noon, when the morning haze clears the mountains. Prevailing winds are northwest during the monsoon season (the best part of the year), otherwise southeast. During the southeast trade season the sea breeze is northeasterly. A weak southerly land breeze blows from about 1900 to 0900. Winds do not effect the current.

10-101 Dangers in the approach to Buna.—The outermost danger is a shoal, with a least depth of 13 feet, lying about 4 miles northeastward of Buna. Nearly one-half of a mile northwestward of the patch is a $5\frac{1}{2}$ -fathom shoal; and about one-half of a mile south-southeastward of the patch is a coral reef, with a least depth of 18 feet. Within 2 miles farther south-southeastward are several extensive shoal patches with depths of 7 to 12 feet.

Numerous other coral reefs, which are unmarked, exist between the above-mentioned reefs and the harbor of Buna.

10-102 Buna—Facilities.—On the shore westward of Buna Point are Navy Wharf and Liberty Wharf. Navy Wharf is 330 feet long and has a depth of 28 feet alongside. Liberty Wharf, the western of the two, is 350 feet long and has a depth of 24 feet alongside. About 600 yards westward of Strip Point is the Oil Wharf, which extends 90 feet from the shore and has a depth of 30 feet alongside. All of these wharves are no longer in use (1955).

10-103 Holnicote (Gona) Bay lies between Cape Killerton, $6\frac{1}{2}$ miles northwestward of Cape Endaiadere, and Kumusi Point, 12 miles farther northwestward.

Cape Killerton is low, wooded, and fringed by a reef. Mangrove Islets lie about 1 mile westward of the point. Small vessels might find anchorage in the bight between the islets and the point. Anchorage depths of 12 to 14 fathoms can be taken about 4 miles northward of Cape Killerton.

A small wharf extends in an easterly direction from the east side of the cape. There is about 16 feet of water off its head.

Beacons.—White beacons mark the edges on reefs on either side of the channel, about 400 yards northeast of the small wharf. This channel has a least charted depth of 21 feet.

A drying reef lies about 4 miles west-northwestward of Cape Killerton, about 1 mile offshore. It is marked by a white beacon.

Basabua village lies along the shore close

southward of these islands; Gona and Arosse villages lie near the head of the bay.

Reefs—Wreck.—A conspicuous stranded wreck lies in Holnicote Bay, about $2\frac{1}{2}$ miles northwestward of Cape Killerton. Several detached reefs, with less than 3 fathoms over them, lie within $3\frac{1}{4}$ miles northward and $3\frac{1}{4}$ miles eastward of Cape Killerton. The outer reef to the north is an 8-foot patch and a 20-foot patch located about 3 miles and $3\frac{1}{2}$ miles, respectively, northward of Cape Killerton. A 25-foot shoal lies 4 miles northeastward of Cape Killerton. An unexamined area lies about 3 miles northeastward of the same cape.

The area westward of Cape Killerton is shoal up to about $2\frac{1}{4}$ miles offshore.

Unsurveyed waters lie in the northwest part of Holnicote Bay and off the mouth of the Kumusi River.

Margaret Shoal, with a depth of 15 feet, lies about 7 miles northeastward of Cape Killerton.

Eve Shoal, with a least depth of 21 feet, lies about 1,400 yards northward of Margaret Shoal.

Claire Shoal, a $3\frac{1}{2}$ -fathom patch, lies about $11\frac{3}{4}$ miles north-northeastward of Cape Killerton. About 1 mile eastward of Claire Shoal are two unexamined shoal areas.

A shoal patch, the position of which is approximate, was reported (1945) to lie about 4 miles east of Claire Shoal. A 2-fathom shoal was reported (1945) to lie about $3\frac{1}{4}$ miles east of these shoals in $8^{\circ}26'S.$, $148^{\circ}32'E.$

Eleanor Shoal, with a least depth of 16 feet, lies about 14 miles northward of Cape Killerton. About $1\frac{1}{4}$ miles southward of Eleanor Shoal there is a 3-fathom patch.

Raymonde Shoal, a $4\frac{1}{2}$ -fathom patch, lies about 6 miles northeastward of the mouth of the Ope River. Shoal water has been reported eastward of Raymonde Shoal.

10-104 Kumusi River, which discharges at the northwestern entrance point of Holnicote Bay, has an islet in its mouth. This islet divides the mouth into two channels. The depth over the bar varies, and the river has been ascended only by boats.

Kumusi Point is located at the mouth of the south channel of the Kumusi River. Large casuarinas trees are located at the south entrance of the river.

Ope (Opi) River, $8\frac{1}{2}$ miles northward of Kumusi River, is a sluggish stream of swamp water, about 50 yards wide and 2 fathoms deep. A sandbank with a depth of 5 fathoms lies 1 mile eastward of the mouth of the river. There are 2 or 3 villages on the river before Gumboro Hill, 680 feet high, is reached, and there are many more farther up. Gumboro Hill is a good landmark.

10-105 Caution Point ($8^{\circ}17'S.$, $148^{\circ}12'E.$) situated $2\frac{1}{4}$ miles northward of the mouth of the Opi River, is bold and marked by coconut trees. The southern part of the point terminates in a bluff.

Anchorage may be found three-fourths of mile southeastward of the point in a depth of 15 fathoms, sand.

Black Rocky Point, $6\frac{1}{4}$ miles north of Caution Point, is the south entrance point of Robinson Bay. Black rocks stand on the reef extending northward from the point.

Robinson Bay, located about $1\frac{1}{2}$ miles north-northwestward of Black Rocky Point, has depths of from 10 to 13 fathoms, mud. The coast in this vicinity is backed by a range of hills, about 1,000 feet high.

Douglas Harbor, entered 4 miles northward of the northern entrance point of Robinson Bay, is an inlet indenting the coast to a distance of 1 mile. From 13 fathoms in the entrance the depth shoals gradually to 3 fathoms at the head. This inlet is a fine harbor, affording shelter in almost any weather.

10-106 Cape Ward Hunt ($8^{\circ}03'S.$, $148^{\circ}08'E.$) lying about one-half of a mile northward of Douglas Harbor, is a well wooded, bold, and prominent point, 150 feet high, rising to an elevation of 800 feet inland. Craigs' Pillar is a conspicuous rock at the eastern extremity of the cape.

Mitre Rock, 40 feet high and shaped like a bishop's mitre, lies about two-thirds of a mile northward of Cape Ward Hunt. It appears to be composed of a gray stone, resembling decomposed granite, and is probably steep-to.

Light.—A light is shown from a red structure standing on Mitre Rock.

Caution.—It is reported that Mitre Rock blends in with the background when approached from the northward, and cannot be seen until abeam.

10-107 Off-lying dangers.—Reefs which break are reported to lie 19 miles eastward of Cape Ward Hunt.

A reef was reported to lie about $17\frac{1}{2}$ miles eastward of Cape Ward Hunt, in approximate position $8^{\circ}03'S.$, $148^{\circ}25'E.$

Detached reefs lie approximately $7\frac{1}{2}$ and $11\frac{1}{2}$ miles southeastward, respectively, of the latter position.

A 2-fathom shoal was reported to lie about $7\frac{1}{2}$ miles east-southeastward of Cape Ward Hunt, in approximate position $8^{\circ}06'S.$, $148^{\circ}15'E.$

Breakers were reported in heavy weather about $4\frac{3}{4}$ miles eastward of Cape Ward Hunt.

Lila Rose Shoal, with a depth of 4 fathoms, is located 5 miles 009° from Mitre Rock.

Mambare Patches, a narrow shoal with depths of 2 to 9 fathoms, extends nearly 5 miles in a northwesterly direction, from a position 7 miles north-northwestward of Mitre Rock Light.

An obstruction has been reported about 11 miles 314° from Mitre Rock Light.

A submerged rock was reported about $25\frac{3}{4}$ miles southeastward of Mitre Rock.

10-108 Mambare (Duvira) Bay ($8^{\circ}03'S.$, $148^{\circ}00'E.$).—At Ambush Point, $5\frac{1}{2}$ miles westward of Cape Ward Hunt, the eastern

mouth of the Mambare River discharges into the sea. Mambare Bay lies with its entrance between Dead Mangrove Point, $2\frac{1}{4}$ miles southwestward of Ambush Point, and Warsong Point, $4\frac{1}{2}$ miles northwestward of Dead Mangrove Point. The delta of the river forms the eastern shore of the bay, which is low and flat. In the western part of the bay the depths are irregular; they shoal gradually in the southeastern part from 10 fathoms to about 5 fathoms, one-half of a mile from the shore.

Shoals.—Several shoal spots, with the least depth of 8 feet, lie 1 mile west-southwestward of Dead Mangrove Point.

Anchorage in depths of from 5 to 6 fathoms may be found 1 mile southwestward of Dead Mangrove Point.

10-109 Mambare (Clyde) River flows out by three mouths, the western mouth discharging into the southeastern corner of Mambare Bay. A bank, which dries 4 feet, fronts this western mouth.

The delta of the river is low and swampy, then the river passes between the coastal ranges of hills, which are from 750 to 1,070 feet high, above these hills the land is low, with many villages, sago fields, gardens, forest, etc., to Tamata Junction, where the ground begins to rise; near the rapids the land rises quickly to the mountains.

The river is only available for light-draft steam launches and boats, which can go up to Tamata, about 40 miles from its mouth, at all seasons; but the river is very shallow at the end of the dry season (about August), just below Peu village. The river is in flood in December; boats can ascend 50 to 60 miles to the rapids, when the current is not too strong.

10-110 Government station.—The Government station is at Ioma on Tamata Creek. It is a clear and rapid stream, whereas at Tamata, $31\frac{1}{2}$ miles below, it is thick and sluggish. The station, standing on a plateau of curious geological formation, and commanding a bend of the river, consists of the resident magistrate's house, with jail, stores, barracks, and government offices, built of iron and native material and surrounded by rich garden land. It is on the direct road to the Gira gold fields, abandoned 1932; but as

launches and boats can not proceed up the creek, all supplies for the station have to be taken overland or in native canoes.

10-111 Gira (Ikori) River enters the sea at Warsong Point, the western entrance point of Mambare Bay. The mouth, which is about 80 yards wide, is barred at times and can only be entered when the usual southeast wind is blowing by very light-draft vessels, which must watch their opportunity. It runs parallel to the Mambare, and has been ascended about 40 miles by boats. At Mopi village, about 24 miles up, the rapids begin. Snags are plentiful in the river.

There are many villages on the river bank.

The mouth of the river is said to lie about three-fourths of a mile farther westward than charted, but $7^{\circ}59'07.2''$ S., $147^{\circ}58'12''$ E., is given as the exact position of the boundary pillar which stands at the entrance.

The uniform flat nature of the coast makes it difficult to discern the entrance to the Gira River.

10-112 Coast.—Between Warsong Point and Alligator (Krokodil) Point, $6\frac{1}{2}$ miles northwestward, the coast is low and wooded and is apparently free from danger.

Numerous shoal spots with depths of less than 10 fathoms lie northeastward and northwestward of Warsong Point.

Song Shoals, on which there is a least depth of $3\frac{1}{2}$ fathoms, lie about $3\frac{1}{4}$ miles northeastward of Warsong Point.

Starkey Patches, a chain of shoal spots with depths of 16 feet to about 6 fathoms, lies with its southern end about $3\frac{3}{4}$ miles north-northwestward of Warsong Point.

A $6\frac{1}{2}$ -fathom shoal lies about 4 miles northward of Alligator Point.

Hercules Bay lies with its entrance between Alligator Point and Cape Waria, about 15 miles northwestward. The southern shore of the bay is low and wooded, but the western is hilly, being backed by a range, from 340 to 1,360 feet high.

Tauwara and Bau Islands lie off the southwest and west shores of Hercules Bay and are $2\frac{1}{4}$ miles apart. Both islands are wooded; Bau, the northern one, is 70 feet high.

A reef, nearly awash, lies between Tauwara, the southern island, and the shore westward of it.

A shoal, with a least depth of 10 feet, lies $1\frac{1}{2}$ miles east-northeastward of Tauwara Island.

A reef which dries 1 foot lies about 1 mile southeastward of Tauwara Island.

A 6-fathom shoal lies $3\frac{1}{2}$ miles eastward of Bau Island.

A shoal with a depth of 40 feet lies $9\frac{3}{4}$ miles, and a 6-fathom shoal $3\frac{1}{2}$ miles eastward of Bau Island.

A reef on which there are depths of 19 feet and 4 fathoms, lies about 8 miles east-northeastward of Bau Island.

A 25-foot patch lies about 8 miles northeastward of Bau Island.

Waria River enters the bay about $3\frac{1}{2}$ miles northward of Bau Island. A bar lies across the mouth of the river, but the lower course is navigable by light-draft vessels.

Anchorage in depths of from 17 to 20 fathoms, mud, may be found 2 miles eastward of Tauwara Island. Anchorage also may be obtained $2\frac{3}{4}$ miles northward of Bau Island in depths of 6 to 8 fathoms.

10-113 Morobe Harbor ($7^{\circ}46'$ S., $147^{\circ}35'$ E.) is the southern arm of a bay entered between Stations Point, $4\frac{1}{2}$ miles northwestward of Cape Waria; and Morobe Point, about 1,400 yards farther northwestward. The harbor itself is about 800 yards wide between the western side of the peninsula and Moa Point. Stations Point is the northern extremity, and Moa Point the western entrance point. The harbor extends about 1 mile southward and has general depths of 11 to 14 fathoms. Sinogu, the northern arm of the bay, is about 1 mile wide between Moa Point and Morobe Point, and has general depths of 11 to 16 fathoms. Morobe Settlement, where there is a small pier, with about 14 feet alongside its head, and alongside which vessels cannot berth, lies on the western side of the peninsula close southward of Stations Point.

A report states that there are no dock facilities for large vessels. The anchorage is well protected from all except northerly winds, and has an average depth of about 13 fathoms.

Off-lying Shoal.—Waria Patches, with a least depth of 13 feet, lies about 12 miles eastward of Stations Point. This shoal is narrow, and about 2 miles long in a general northwesterly and southeasterly direction. About 2 miles farther southeastward there are patches with depths from 25 to 47 feet.

10-114 Luard Islands, 113 to 254 feet high, wooded, and surrounded by reefs, is a group lying in the northern approach to Morobe Harbor. Mindrugutu lies at the northern end of the group, 5 miles northward of Cape Waria, and Matebinagutu at the southern end, $1\frac{3}{4}$ miles southward of Mindrugutu. The Luard Islands blend in with the coast, and are inconspicuous when seen from the vicinity of Waria Patches. Due to hazy weather, other landmarks are indistinct from this vicinity.

10-115 Landmarks.—The principal landmarks are Adolf Mountain, 1,130 feet high and cone-shaped, situated about $2\frac{1}{4}$ miles westward of Stations Point, and Grasberg, 476 feet high and marked by two white houses on the summit, situated 1,300 yards southward of Stations Point. It was reported, 1944, that Mt. Adolf is not particularly conspicuous, there being other hills adjacent to it far more conspicuous. The largest island of the Hosken group and Mindrugutu Island afford accurate fixes. Jabi Hill, which is located about 12 miles northwestward of Morobe Harbor, is the only prominent landmark along this section of the coast. When viewed from eastward or northeastward, it appears as an isolated cone-shaped peak.

A steel framework tower stands on the east end of Matebinagutu Island.

10-116 Dangers.—Manila Reef, with a least depth of 8 feet, lies 1 mile southwest-

ward of Matebinagutu Island. Adolf Mountain kept open northward of Stations Point, bearing about 264° , leads northward of the reef.

A shoal, with a least depth of 19 feet, lies about one-half of a mile southeastward of Matebinagutu Island.

A 14-foot patch lies about 600 yards southeastward of the eastern side of Mindrugutu Island. A rock, 4 feet high, lies about 300 yards off the southeastern side; and Una Reef, with a least depth of 10 feet, lies about 1 mile southeastward of the eastern side of Mindrugutu Island.

10-117 Anchorages.—Anchorage in a depth of 16 fathoms may be obtained with Stations Point bearing 109° , and Morobe Point, 1,600 yards northwestward of Stations Point, 010° .

Vessels may also obtain anchorage in Morobe Harbor, in a depth of 14 fathoms, in midchannel on a line between Moa Point and Grasberg, or anywhere farther south.

10-118 Directions.—Vessels approaching Morobe Harbor from the southeastward should steer for Stations Point, bearing 274° , which leads about $\frac{1}{4}$ mile southward of the 19-foot shoal southeastward of Matebinagutu Island. When the east extremities of Matebinagutu and Mindrugutu Islands are in range 023° , steer for the south extremity of Morobe Point, bearing 286° , which leads 700 yards northward of Manila Reef. When Adolf Mountain bears 260° , steer for it on that bearing until Morobe Harbor opens. Course should then be altered for the anchorage. Caution is necessary to avoid the shoal extending about 400 yards from Morobe settlement.

Vessels approaching the harbor from the northward will see Jabi Hill, which is conspicuous, and which lies about 12 miles northwestward of Morobe and Mindrugutu Island. Steer for Cormoran Point, which lies about 2 miles west-northwestward of Cape Waria, until Stations Point bears 274° . The directions given above may then be followed.

10-119 **Hosken Islands**, situated 7 miles northwestward of Mindrugutu Island, consist of four islands connected by a reef.

Kayamagudu, 300 feet high and wooded, is the largest island, and lies about 1 mile northeastward of a rounded bluff on the mainland. The coast between this bluff and Luard Islands is steep and high. Northward from Kayamagudu, foul ground on which there is a 15-foot shoal extends about $\frac{1}{2}$ mile.

A rock, with a depth of 6 feet, lies approximately $1\frac{1}{2}$ miles south-southeastward of Kayamagudu Island.

10-120 **Layard (Jusabegud) Islets** ($7^{\circ}35'$ S., $147^{\circ}30'$ E.) lying $2\frac{3}{4}$ miles northwestward of Hosken Islands, consist of two low islets lying in an easterly and westerly direction on the same reef. The western and larger islet lies $1\frac{1}{4}$ miles from the mainland.

A $5\frac{1}{2}$ -fathom shoal lies about $1\frac{1}{4}$ miles south-southeastward of Layard.

A 4-fathom patch lies on a bank about $1\frac{1}{4}$ miles west-northwestward of Layard Islets.

10-121 **Mort Harbor** indents the coast westward of Layard Islets, and may be considered to consist of an outer harbor and inner harbor. The outer harbor is about 1 mile wide and at its entrance has general depths of 20 to 35 fathoms. About $1\frac{1}{4}$ miles within the entrance is a narrow passage leading into an inner harbor about $\frac{2}{3}$ of a mile wide by $2\frac{1}{2}$ miles long with general depths of 14 to 22 fathoms. The entrance to the inner harbor is about 200 yards wide with depths of 8 to 12 fathoms. At the head of the inner harbor a narrow inlet trends about $1\frac{1}{4}$ miles northward. The harbor is clear of dangers and protected from all winds. Anchorage can be taken anywhere in the harbor. The best berth lies about 400 yards south-southwestward of the south entrance point in 23 fathoms, mud.

Within the northern entrance point of the outer harbor is **Jabi Hill**, 1,060 feet high. Both sides of the inner part of Mort Harbor

rise to steep, heavily wooded hills, from 100 to 300 feet high, and at the head are steep wooded hills 400 to 500 feet high.

To enter the outer harbor the conspicuous headland forming the northern side of the narrow passage connecting the inner and outer harbors bearing 256° constitutes a good bearing.

10-122 **Bienen Islets and Weibu Islet**, low and wooded, are situated close off the mainland, the former lying 4 miles northwestward of the western Layard Islet, and the Weibu Islet lying $1\frac{3}{4}$ miles farther northwestward.

Shoal.—A rock with a depth of less than 6 feet is located on a shoal lying about $1\frac{1}{2}$ miles northeastward of the Bienen Islets.

10-123 **Natter (Deaf Adder) Bay** ($7^{\circ}30'$ S., $147^{\circ}22'$ E.), entered about $3\frac{1}{2}$ miles northwestward of Weibu Islet, extends westward for $1\frac{1}{2}$ miles. The southern entrance point is low, sandy, and wooded. The land at the head of the bay is hilly and steep. The bay is deep and clear of dangers.

A river, obstructed by a bar, flows into a lagoon. During the rainy season the lagoon causes considerable discoloration in the bay. Vessels with local knowledge find anchorage in a depth of 14 fathoms westward of the mouth of the river at 200 yards from the shore.

10-124 **Cape Kubumi** is the northern entrance point of Natter Bay. A reef extends about 250 yards eastward from the cape.

Straggling Islands, rocky and wooded, lie from $2\frac{1}{2}$ to 4 miles eastward and north-eastward of Cape Kubumi.

Soundings.—Between these islands and Natter Bay are depths of 50 fathoms, over mud; and along the coast between these islands and the Luard Islands, at a distance

of about 2 miles offshore, are depths of 55 fathoms, over a muddy bottom.

10-125 HUON GULF, formed between Cape Kubumi and Cape Cretin, about 58 miles northeastward, extends about 40 miles inland in a northwesterly direction. The western side of the gulf which has several bays and sheltered harbors is backed by the Kuper and Herzog Ranges, the latter attaining an elevation of 6,560 feet. On the northern side is the Rawlinson Range, 3,000 to 5,600 feet high.

At the head of the gulf and for nearly 2 miles inland the land is low. Near Parsee Point, on the southwestern side of the bay, about 34 miles northwestward of Cape Kubumi, the Kuper and Herzog Ranges are separated by a deep valley. Southward of this valley, the bold, stony, and wooded range descends steeply to the edge of the water.

The entrances of the small shallow rivers are fronted by mud bars. The currents within them are rapid. No villages were seen in the southwestern part of the gulf; northward of Parsee Point, however, they again became numerous.

10-126 Depths.—The depth near the shores is great, and the gulf in general appears to be clear of dangers, with the exception of a few shoals near the islands off the western side of the gulf.

Tides—Tidal currents.—The rise and fall of the tide has been reported to be very small.

The tidal currents are very irregular. In August 1910, a drift current of 2 knots was observed to run for a short time after the long continuance of strong winds. Close under the coast and in the harbors there is, as a rule, a tidal current, influenced greatly by the prevailing monsoon.

10-127 Western shore of Huon Gulf.—Fly Islands, with reefs extending from their southern sides, lie from 2 to $4\frac{1}{2}$ miles northward of Cape Kubumi and northwest of the Straggling Islands. The northeastern and

largest of the Fly Islands is 549 feet high.

Several shoal spots, with depths of 2 to $5\frac{1}{2}$ fathoms, lie within 3 miles northward of the 549-foot Fly Island. For further details of the several islets and shoals in this area see *H. O. Chart 5981*.

An isolated 16-fathom sounding, surrounded by depths in excess of 100 fathoms, is located about $3\frac{1}{2}$ miles east-northeastward of the 549-foot Fly Island.

10-128 Longuerue Islands lie from about 7 to about 14 miles northwestward of Cape Kubumi and from 2 to $4\frac{1}{2}$ miles offshore. With the exception of Lasanga, the islands are small, wooded, rocky, and similar in appearance.

Lasanga, the largest island of the group, is wooded and has a saddle-shaped summit, the peaks of which lie in an east and west direction near the middle of the island. In the western part of the island there is a 1,640-foot peak. Reefs extend from the eastern and southern points of the island, and there are several detached reefs and islets eastward and northward of it. A bay on the south side of the island affords well sheltered anchorage.

Surgurd Island lies on a sandbank $1\frac{1}{2}$ miles east-southeastward of Lasanga. Batteru and Jawani Islets lie on the northwestern end of the group, the latter being $4\frac{1}{4}$ miles north-northwestward of the western end of Lasanga. Both islets are thickly wooded and are 470 and 543 feet high, Batteru being the higher.

Several 3-fathom patches lie within $1\frac{1}{4}$ miles northward of Jawani Island. A $4\frac{1}{4}$ -fathom shoal lies about 1 mile eastward of the eastern extremity of Batteru Island and a 8-foot shoal lies about $1\frac{1}{4}$ miles southwestward of the same islet.

10-129 Depths.—From Cape Kubumi, thence northwestward inside the Longuerue Islands, to a point $3\frac{1}{2}$ miles southward of

Simolala Islet, located 11 miles north-northwestward of the western point of Lasanga Island, regular depths of 60 fathoms, ooze, were obtained at a distance of about 1 mile offshore and somewhere nearer to the projecting point. There were several detached reefs which will be described with the coast.

10-130 Coast.—From Cape Kubumi to abreast the Longuerue Islands the coast is bold and rocky, the spurs of the Kuber Range descending steeply to the sea. Inland, several mountain peaks rise to elevations of from 3,000 to over 8,000 feet.

Braunschweig Harbor, entered $4\frac{1}{2}$ miles northwestward of Cape Kubumi, is well sheltered, being surrounded by hills. The depths are from 13 to 23 fathoms, mostly mud. Reefs extend northward from both entrance points. A stream flows into the southeastern end of the harbor.

Anchorage in a depth of about 20 fathoms may be found by vessels with local knowledge off the village of Sipoma at the southwestern end of the harbor.

Bnoto Point, situated $11\frac{1}{2}$ miles northwestward of the western entrance point of Braunschweig Harbor, is steep and fringed by a reef.

Württemberg Bay, lying immediately westward of Bnoto Point, is entered between that point and Cape Goeben, about $2\frac{1}{2}$ miles westward. Boyen Islet lies in the middle of the entrance, so the bay is almost completely landlocked. A $11\frac{1}{4}$ -fathom patch lies about one-half of a mile northeastward of Boyen Islet and a reef lies between the islet and the coast.

The land at the head of the bay descends steeply to the sea, except at the southwestern corner where it is flat. A depth of 25 fathoms, mud, was obtained about 100 yards from the head of the bay.

Baden Bay, $1\frac{1}{4}$ miles westward of Cape Goeben, is sheltered by Lasanga Island. A reef extends about three-fourths of a mile northeastward of Sumboa Point, the northwest-

ern entrance point; a reef extends a short distance northward of the southeastern entrance point. Kia, a large village, lies at the head of the bay.

Anchorage.—Good anchorage in a depth of 15 fathoms may be obtained by vessels with local knowledge in the bay.

10-131 Cape Roon (Pakana Point) ($7^{\circ}20'S.$, $147^{\circ}10'E.$), situated 5 miles north-northwestward of Sumboa Point, is fringed by reef. Between Sumboa Point and Cape Roon the coast has three indentations, the largest of which is Hessen Bay.

Reefs.—Two sunken detached reefs lie about one-half and three-fourths of a mile eastward, respectively, of Cape Roon. Another reef lies $2\frac{3}{4}$ miles southeastward of the same cape.

10-132 Hessen Bay, lying immediately southward of Cape Roon, is divided into two parts by a flat point, near which the Sela River flows out. The mouth of the river is fronted by a bar. A reef extends eastward about $\frac{1}{2}$ mile from the southern entrance point and has a 2-fathom depth at its outer end.

Anchorage has been taken in a depth of 17 fathoms on the southern side of the mouth of the Sela River, about 200 yards offshore, with Cape Roon bearing 016° and Bamaba Point, the southern entrance point, 129° .

Sachsen Bay, entered between Cape Roon and Cape Dinga, about $2\frac{1}{4}$ miles northward, is divided into two parts by a tongue of land. In the northern part of the bay is a sandy beach, and in the southern part the trees grow close to the water's edge.

A river, fronted by a bar, flows into the northern part, and a sunken coral reef lies in the entrance of this part. No bottom, with a 11-fathom sounding, was obtained in the southern part.

Cape Dinga is fringed by a reef extending $\frac{1}{2}$ mile offshore to the southeast and northwest.

Off-lying reef.—A sunken reef lies about

three-fourths of a mile eastward of Cape Dinga. An 18-foot shoal lies $3/4$ mile north-eastward, and a 22-foot shoal lies about $3/4$ mile southeastward, of Cape Dinga.

ANCHORAGE may be found by vessels with local knowledge in the northern part of Sachsen Bay, about 300 yards from the head.

NASSAU BAY is situated between Cape Dinga and Gossler Point, about $3\frac{1}{2}$ miles northward. Tabali Creek, across the mouth of which is a bar with depths of from 1 foot to 2 feet, flows into the southwestern corner of the bay, and a river, inaccessible owing to the breakers, discharges into the northwestern corner.

10-133 SIMOLALA (LABABIA ISLAND) lies 1 mile eastward of Gossler Point, the northern entrance point of Nassau Bay, to which it is apparently connected by a sunken reef, which almost dries. Simolala Islet is conical, wooded, and 290 feet high and has a village on its southern end.

Reefs and foul ground extend northward from Simolala Islet, and between the islet and shore there is a submerged rock. A rock, with less than 6 feet over it, lies about one-half of a mile westward of the southwestern end of Simolala Islet.

DOT (KNIRPS) ISLET, wooded and 100 feet high, lies $8\frac{1}{2}$ miles north-northwestward of Simolala Islet and close to the mainland, with which it is connected by a reef. Two bare rocks lie close off its southwestern end.

A $3\frac{1}{2}$ fathom shoal lies $1\frac{1}{2}$ miles eastward of Dot Islet. A 2-fathom shoal was reported (1956) to lie about $2\frac{1}{2}$ miles south-eastward of the islet.

10-134 LAUPUI POINT (Cape Rawlings), $2\frac{1}{2}$ miles northward of Dot Islet, is the northern spur of the Kuper Range and forms the southern entrance point of Bayern Bay. The mountain ranges in this district southward of Laupui Point have a different character to those to the northward; to the southward they consist of short ridges running nearly parallel to the coast, while to the northward the spurs are directed toward the coast.

BAYERN BAY lies immediately northward

of Laupui Point. The Francisco River, flowing through a picturesque valley, empties into the southern side of the bay. The mouth of the river is 170 yards wide but is obstructed by a bar.

ANCHORAGE in a depth of 18 fathoms has been taken in the southeastern part of the bay, with Laupui Point bearing 112° . This anchorage is sheltered, but close to the shore.

10-135 SALAMOA (SALAMAU) PENINSULA.—BURNUNG (PARSEE) POINT ($7^\circ 00'$ S., $147^\circ 04'$ E.), situated 4 miles northward of the southern entrance point of Bayern Bay, is the northern extremity of Salamo Peninsula. This densely wooded peninsula is $2\frac{1}{2}$ miles in length in a north-northeasterly and south-southwesterly direction. At its southern end the peninsula is joined to the mainland by a low isthmus, about 100 yards wide at its narrowest part. There is also a small village within the northwest end of the peninsula.

10-136 OFF-LYING DANGERS.—Benalla Banks, with a least depth of 9 fathoms, lies about $4\frac{1}{2}$ miles northeastward of Burnung Point.

Rothery's Reef and O'Dea's Reef, with depths of 5 feet and 14 feet respectively, lie close together about $4\frac{1}{2}$ miles north-westward of Burnung Point.

Shepparton Shoal, with a least depth of $2\frac{1}{2}$ fathoms, lies about $4\frac{1}{2}$ miles south-eastward of Burnung Point.

Several other reefs and shoals lie off the coast within the 100-fathom curve and within $1\frac{3}{4}$ miles southeastward, $3\frac{1}{2}$ miles westward, and $5\frac{1}{4}$ miles northwestward of Burnung Point.

BEACON.—A white cylindrical steel tower stands on the summit of the hill on Burnung Point.

10-137 SALAMOA HARBOR.—On the western side of Salamo Peninsula is an extensive bay, the southern part or head of which forms Salamo Harbor. The bay affords good and sheltered anchorage for vessels with local knowledge in almost any required

depth. The southwestern part of the harbor is shallow, being suitable only for small vessels. Large vessels entering the harbor should not attempt to go southwestward of a line joining Kela Point, the western entrance point, with the shore to the east-southeastward, as this is approximately the 3-fathom limit.

LIGHTED BEACON.—Centre Lighted Beacon stands on the eastern side of the harbor on the edge of the reef about 1 2/3 miles southwestward of Burnung Point.

WRECK.—A DANGEROUS wreck lies on the reef off Kela Point.

DIRECTIONS.—Steer to pass 1 mile off Burnung Point until Mission Point, situated on the western shore of the bay, bears 246°.

Steer 246° until abeam of the northwest spur of reef extending from Burnung Point. Kela Point will open wide bearing 211°. Bring this ahead and stand on until the beacon on Centre Reef bears 180°. Steer to pass this beacon about 400 yards on the port hand and proceed slowly to the anchorage.

10-138 The former settlement of Salamoia was situated on the low isthmus joining the peninsula to the mainland. It was completely destroyed during the war and facilities of any kind are apparently non-existent.

10-139 MARKHAM BAY, formerly known as Preussen Road, is the northwestern portion of Huon Gulf. The western shore is backed by the Herzog Range and the northern shore by the Rawlinson Range. Several rivers flow into the sea on the northern side of the bay.

COAST.—The coast trends northwestward from Salamoia Harbor for about 6 miles to Schneider Point. This stretch of coast has several indentations and the points are fringed with banks. A bank of less than 6-fathoms depth extends about 1/2 mile north-eastward from Schneider Point.

The coast trends northward between Schneider Point and the entrance of Markham River, about 17 miles north-northwestward of Burnung Point. Sugar Loaf Hill, 1,270 feet high, is the most northerly spur of the Herzog Range to approach the coast and is conspicuous behind a point about 8 miles northward of Schneider Point. Between Sugar

Loaf Hill and the Markham River entrance the land is low and swampy, back to the foothills. Herzog Lakes are an extensive shallow lagoon southward of the Markham River entrance. The water in the lakes is fresh, and the depth is about 6 feet.

The coast between Schneider Point and the point abreast Sugar Loaf Hill is fronted by a shorebank of less than 3 fathoms which extends in places up to 1/2 mile offshore. Northward of Sugar Loaf Hill, the coast is fronted by an extensive mudbank on which anchorage is found in 9 to 20 fathoms by vessels with local knowledge. Shoal water extending about 1/2 mile southeastward from Labu Point, about 1/2 mile south-southwestward of the Markham River entrance, lies on the northwestern side of the anchorage. A BEACON with a square topmark painted in black and white checkers and a BEACON with a square topmark painted white with a vertical stripe stand on the coast abreast the anchorage about 2 1/2 and 1 3/4 miles, respectively, northward of Sugar Loaf Hill.

10-140 MARKHAM (WUSSI) RIVER (6° 44' S., 146° 58' E.), a considerable mountain stream, discharges into the head of Markham Bay. The river is 300 yards wide at the entrance, which at times is closed by a bar. The depths in the river are continually changing; and numerous shoals and islands, which constantly alter in shape, size, and position, render navigation almost impossible, a rapid current adding to the difficulties. A bridge has been constructed (1955) across the Markham River and is located about 9 miles from its mouth. It is 1,660 feet long and will accommodate heavy truck traffic. It has not been determined whether the bridge is visible from seaward.

The river discharges large quantities of floating matter into the bay, and the water for several miles off the mouth is thick and muddy.

10-141 ANCHORAGES.—The anchorage off the mouth of the Markham River is deep, but the depths shoal suddenly to 6 and 12 feet to the southwestward.

Small vessels can anchor in a small bay just eastward of the mouth.

During the southeast trade season, at the mouth of the river the sea is often rough in the afternoon especially after much rain. It decreases as the sea breeze subsides in the evening and is usually calm in the early morning.

Labu Bay lies immediately westward of the mouth, and anchorage has been taken well in the bay in depths of from 14 to 18 fathoms. Little is known of the depth off Markham River, which has to be crossed to enter Labu Bay, but an 8-fathom sounding has been obtained 200 yards from the mouth. On the southern point of the bay is a village, and a mud bank nearly awash extends eastward from Labu Point.

None of the above anchorages are recommended, as they are all open to the southeast and very exposed, and to anchor anywhere it would be necessary, on account of the depth, to go very close in.

10-142 NORTHERN SHORE OF HUON GULF—Lae*.—About 2 miles eastward of the mouth of the Markham River is the settlement of Lae, where there is a government station. Half a mile westward of this settlement is a large cleared area, used as an airfield.

*“Anchorage was obtained in a depth of 41 fathoms, with the ‘large tree’ bearing 008° and ‘near point’ 079°. This position seems the best suited for large vessels, and we found it safer here than anticipated. The steep slope of the bottom prevented the anchor from dragging, even with a hard wind blowing toward the shore.

“Local people state that they never have experienced real bad weather at Lae. When the wind blows, it is never stronger than force 5 (Beaufort), and generally lasts only a few hours. There is, however, often a fairly heavy swell, which sometimes interferes with the discharging of cargo.

“The above-mentioned ‘large tree’ is an excellent landmark and could easily be distinguished from Salamoia, 18 miles away. The local shipping people are aware of its usefulness, and there is no reason to think that it will be cut down.” Reported by Mr. K. C. Frey, 2nd Off., Danish vessel Nordhavet, Master H. Hansen, June 15, 1934.

LANDMARK.—A very conspicuous landmark at Lae is Lunaman Hill, 490 feet high, on the summit of which is a solitary large tree. The disappearance of the tree should be anticipated because of a report (1965) that the tree is dead. The hill rises about 700 yards northward of Voco Point, the eastern entrance point of Lae Harbor. The tree on the hill has been seen as far as Salamoia. A conspicuous tank stands near the coast, close northwest of the pier, about 1 1/2 miles west of Voco Point.

LIGHTS.—An aviation light is located at the south end of Lae Airstrip, about 1,400 yards west-southwest of the conspicuous tree on Lunaman Hill. A light is shown from the top of Lunaman Hill. Two lights are shown from a pier about 1 1/2 miles westward of Voco Point.

Wrecks.—A dangerous wreck lies close inshore about 1 mile eastward of Voco Point. A stranded wreck lies about 1/2 mile west-southwestward of Voco Point.

10-143 ANCHORAGE.—The anchorage at Lae is an open roadstead. Anchorage for two vessels is reported about 700 feet from the beach near the dock southward of Lunaman Hill. No pilot is necessary, and no moorings are provided. Wind, currents, and tides are not strong, and do not make it necessary to use both anchors.

A report states that deep water exists close inshore. Anchorage is found in 45 fathoms with the summit of Lunaman Hill bearing 018°, and the ends of the first and second points of land on the starboard hand in range. Small vessels anchor farther inshore in depths of from 9 to 15 fathoms, eastward or westward of the wreck about 1/2 mile west-southwestward of Voco Point, but there is little swinging room.

Vessels are warned not to let go anchor outside of the 40-fathom curve shown on the plan of Lae. Many anchors and cables have been lost here. It is also well to have everything in readiness for immediate departure, as squalls from seaward frequently arise. Vessels sometimes drag their anchors off the bank into deep water when the wind blows strongly from the north.

CAUTION.—It is advised that local assistance should be obtained when attempting a

landing at the northern of the two wharves westward of Voco Point. This wharf lies parallel with the shore, and the coastal bank extends close westward from it. A dangerous shoal was reported (1963) to be extending from a position 200 yards eastward of the pier, located 1 1/2 miles westward of Voco Point.

10-144 LAE is the administrative headquarters for the Morobe District, and furnishes convenient access to the goldfields inland. It is a port of entry for foreign shipping. The chief export is timber. The population was about 5,000 in 1964.

BERTHS.—A wharf with a berthing length of 400 feet and a depth alongside of 32 feet is located about 1 1/2 miles west of Voco Point. A 10,000-ton vessel can be accommodated.

A jetty with a steel pontoon head with a depth of 8 feet alongside is located at Voco Point. The pontoon has a length of 40 feet and is only suitable for small craft.

The customs warehouse is located near the root of the wharf about 1 1/2 miles west of Voco Point. Water is obtainable by pipeline to the wharves. Water should be treated before use. There are stores, a hotel and a bank established at the settlement. There is frequent air passenger and mail service with Port Moresby and Australia. Scheduled shipping service is maintained with Australia by small motor vessels. A radio station is located here.

Limited supplies are obtainable and minor repairs can be effected.

There is a hospital in the port and it was reported (1955) that another hospital was under construction.

10-145 COAST.—Between Lae and Cape Arkona, about 22 1/2 miles eastward, a densely populated plain, several miles wide, with lagoons, lies below the spurs of the Rawlinson Range. The vegetation, with the exception of a few stretches, consists of mangroves, and many of the water-courses in the plain have the appearance of small creeks. Along the coast between Lae and Cape Arkona are the mouths of several rivers.

On Cape Arkona, a conspicuous bluff, the houses of the mission station are easily recognized. Eastward of the cape the spurs of the mountain range approach the coast closely.

ANCHORAGE has been taken near Cape Arkona in a depth of from 6 to 7 fathoms.

OFF-LYING SHOALS.—A shallow bank extending 1/2 mile offshore fronts the coast westward of Cape Arkona for a distance of 2 1/4 miles. A shoal with a depth of 16 feet lies about 3/4 mile southward of Cape Arkona.

A rock, the position of which is doubtful, lies about 5 miles east-southeast of Cape Arkona, about 1 1/2 miles offshore.

SOUNDINGS.—Between the head of Huon Gulf and Kaingana Islet, 4 miles southwestward of the northern entrance point of Huon Gulf, no bottom could be obtained with 100-fathom soundings at distances varying from 1/2 mile to 2 miles off the coast.

10-146 CAPE GERHARDS (6° 45' S., 147° 35' E.), situated about 12 miles eastward of Cape Arkona, is the termination of that part of the northern coast which trends fairly straight eastward from the head of Huon Gulf. The cape is fringed by a reef which extends 1 mile east-southeastward.

HANISCH HARBOR, entered between Cape Gerhards and Tigedu Point, 5 miles north-eastward, is apparently free from dangers. A large river and several smaller ones discharge into the harbor, and the shores are thickly populated.

ANCHORAGES.—Anchorage may be obtained by vessels with local knowledge, in a depth of 24 fathoms, in the northeastern part of the harbor.

Also there is anchorage in a depth of 11 fathoms, 400 yards offshore and close westward of Konigstuhl, 6 miles westward of Cape Gerhards.

10-147 COAST.—Schollenbruch Point is situated about 6 1/2 miles eastward of Tigedu Point, the eastern entrance point of Hanisch Harbor. Kaingana Islet, low and wooded, lies close inshore on a reef situated 3 miles eastward of Schollenbruch Point.

It is reported that schooners can obtain shelter behind Kaingana Islet. There is an entrance from both the east and west, but a reef extends about one-half of a mile off the eastern side of the islet.

In 1951 it was reported that the reefs lying up to 1 mile west-southwestward of Kaingana Islet are located about one-half of a mile southward of their charted position.

Reefs lie up to 1 mile off the coast between Schollenbruch Point and Malasigu Point, about $4\frac{1}{4}$ miles further northeastward. The village of Kasanga is located about $\frac{1}{2}$ mile northward of Malasigu Point at the head of a small cove. A narrow shoal spit extends 800 yards offshore to the eastward from the southern side of the cove. From abreast this spit the barrier reef fronts the coast about $\frac{1}{2}$ mile offshore as far as Cape Cretin, 3 miles to the northeastward, and forms a lagoon known as Megim Anchorage. Megim Islet, about 30 feet high, is situated about midway along this portion of the barrier reef.

10-148 Megim Anchorage.—This lagoon has general depths from 11 to over 20 fathoms. There are three openings through the barrier reef. The southernmost entrance, abreast Kasanga, is about 600 yards wide and has a least depth of 41 feet. A middle entrance is located close southwestward of Megim Islet and, about 300 yards wide between reefs on either side, has a least depth of 16 fathoms. The northern entrance is a narrow but deep passage leading between the shore reef close southward of Cape Cretin and the barrier reef. Several detached dangers are located in the northern part of the anchorage near Cape Cretin.

A vessel reports having anchored in Megim Anchorage and having discharged to lighters which took the cargo to a small dock northward of Buka Creek.

Beacon.—A white triangular beacon stands on the coast about 1.1 miles north-northeastward of Megim Islet. The beacon carries the letter "C" in red.

Caution.—The Coast between Schollen-

bruch Point and Cape Cretin should be approached with caution, as unknown reefs may exist, and the sea is usually rough.

10-149 Cape Cretin ($6^{\circ}40'S.$, $147^{\circ}52'E.$), the northeastern extremity of Huon Gulf, is a round and bold headland. At a distance of $2\frac{1}{2}$ miles northwestward of the cape is the Lugaueng, a flat wooded mountain ridge from 1,150 to 1,300 feet high, with grassy slopes on its southern side. A river flows into a bay on the western side of the cape.

10-150 Off-lying islands and dangers.—Tami (Cretin) Islands ($6^{\circ}46'S.$, $147^{\circ}55'E.$), situated about $6\frac{3}{4}$ miles south-southeastward of Cape Cretin, are a group of four low wooded inlets and two rocks, surrounded by extensive reefs.

A reef with depths of 2 fathoms lie 2 miles southeastward of Wonam Islet, the southeasternmost of the group. Rocks with a depth of 2 fathoms lie within 1 mile southward of the same islet, and are not easily seen except in a good light.

A shoal nearly awash, about $1\frac{1}{2}$ miles long in a north-northwesterly-south-southwesterly direction lies about $1\frac{1}{2}$ miles to the northward of the northwesternmost of the Tami Islands.

Current.—A strong current, setting southeastward towards Burnung Point, exists in Huon Gulf. This current is apparently caused by the discharge of the Markham River.

Caution.—In 1945 a coral reef was reported to lie about 25 miles east-northeastward of Cape Cretin in approximate position $6^{\circ}34'30"S.$, $148^{\circ}16'30"E.$ The position of this shoal was later reported to be doubtful.

10-151 COAST.—Gingala Islands, consisting of five wooded islands and two islets, front the coast northward of Cape Cretin for a distance of about $2\frac{1}{4}$ miles. They are divided into two groups by a point of the mainland and are mostly joined together and to the point of the mainland by a reef. At the southern end of each group is a passage to the space inclosed between the islands and the mainland, but that in the northern group is only available for small vessels.

10-152 Dreger Harbor, the entrance of which is the southernmost of the passages just mentioned, is formed between the mainland and the southern group of islands. The harbor is well sheltered and affords good anchorage for vessels with local knowledge in depths of from 13 to 22 fathoms. Vessels of 500 to 600 feet can enter the harbor and anchor.

The land in the immediate vicinity is low and of coral formation, and gradually rises to the Lugaueng ridge.

The entrance to Dreger Harbor, westward of Nussing Island, is very deep and about one-half of a mile wide between the reef extending westward from the western end of Nussing Island and the barrier reef west-southwestward.

Light.—A light is shown from the east extremity of Nussing Island, the southernmost of the Gingala group.

The main anchorage area of Dreger Harbor is between Matura Island and the mainland westward. General depths, except for two detached shoal areas, are 10 to over 20 fathoms. The northern of the shoal areas, on which there is a least depth of 15 feet,

lies in the north part of the harbor about 200 yards southward of the settlement of Gingala. A can buoy marks the above shoal on its north side. The southern of the two shoal areas, on which there is a least depth of 5 fathoms, lies about 450 yards southward of Gingala.

10-153 Pilotage.—Pilots may be obtained, day or night, by displaying the regular signals while passing Gagidu settlement, situated about $2\frac{1}{2}$ miles northward of the settlement of Gingala. Pilotage is advisable for vessels entering Dreger Harbor if unacquainted with the port. Entrance is made between Nussing Island and the mainland. Care must be taken in anchoring, because the anchorage area is small and restricted, and plenty of swinging room should be allowed. Tidal currents cause no trouble, but swells sweep into the harbor between the various islands, and lines have to be watched to keep vessels from pounding while tied up alongside the docks. Approaches offer no difficulties. The Tami Island Group is clearly visible, and should be given a berth of 4 miles. Beacon "C", south-westward of Cape Cretin, is conspicuous. A high mast on the center of Megim Island and the wreck southward of that island are also conspicuous.

Tides.—The rise and fall of tide at Dreger Harbor is 3 to 4 feet.

Several mooring buoys are located in the west part of the harbor.

10-154 Facilities.—There are several wharves, partially in ruins, in the harbor. These have charted depths of 19 to 33 feet alongside.

Limited supplies are available. No fuel can be obtained.

There is a hospital with a European doctor in attendance.

10-155 SCHNEIDER HARBOR, formed between the mainland and the northern group of the Gingala Islands is also well protected and secure with depths of 7 to 13 fathoms.

There is a narrow channel with a least charted depth of 3 fathoms leading inside the barrier reef from Dreger Harbor to Schneider Harbor. The seaward entrances to Schneider Harbor are very shallow.

10-156 LANGEMAK BAY the southern entrance point of which lies about 3 3/4 miles northward of Cape Cretin, is open to the east and deep throughout. The bay is not easily recognized on account of the uniformly wooded appearance of its coasts and the absence of any break in the mountains. The Bubui River flows into the head of the bay.

It is reported that a pilot is not necessary for vessels entering Langemak Bay, the entrance being wide and free of dangers. A signal station is located on the northern side of the bay.

Anchorage may be obtained in the southwestern portion of the head of the bay, in 16 to 22 fathoms, southward of the mouth of the Bubui River and about 400 yards offshore. The anchorage is sheltered from all winds except those between east and northeast.

10-157 FACILITIES.—Langemak Bay was of importance as an advance base during World War II. There are three wharves on the north side of the bay, and four on the south side. There are depths of 30 feet alongside the wharves on the south side of the bay. A small jetty, the Lutheran Mission Wharf, is located on the southern side of the bay about 1 3/4 miles west of the southern entrance point.

10-158 FINSCH HARBOR.—From the northern entrance point of Langemak Bay, Nugidu Peninsula extends about 1 3/4 miles northward, running parallel to the mainland and forming an inlet known as Finsch Harbor. The harbor, entered westward of Cape Bre-

dow, the northern extremity of the peninsula, is divided by the configuration of its shores into three basins, separated from one another by narrow shallow channels. The roadstead inside the entrance and the northern basin abreast of Madan Island are suitable for ships with drafts up to 30 feet, the depths being between 6 1/2 and 22 fathoms.

Lillum Kapuen (Great Harbor), the middle basin, has depths of from 2 3/4 to 3 3/4 fathoms, but the channel leading into it from the northern basin has but 2 fathoms. Lillum Saun (Little Harbor), the third and southern basin, is only suitable for boats, the connecting channel being less than 50 yards wide with a depth of but 3 feet.

10-159 MANEBA POINT is situated on the western side of the entrance of Lillum Kapuen. A wharf in a state of disrepair (1950) lies on the southeastern side of the point; it is used by the mission boat.

The coasts are everywhere densely wooded; the shores of the outer basin are thickly strewn with coral boulders and fronted by reefs, while those of the inner basins are of sand, clay, or swamp.

The bottom throughout is good holding ground, being of sandy mud.

BUMI RIVER flows into the sea on the western side of the entrance to the harbor. The river has depths of from 1 to 1 1/2 fathoms, and a bar with a depth of 3 feet lies across the mouth. Fresh water may be obtained from the river.

10-160 MADAN ISLAND (6° 34' S., 147° 51' E.), lies in the western part of the northern basin.

REEF.—Harbor Reef, a coral reef with a depth of less than 1 fathom, lies 200 yards eastward of the northern end of Madan Island. The reef can be passed on either side in depth of 5 1/2 to 9 fathoms. A beacon stands on the western side of the reef.

A wreck lies close southwestward of Harbor Reef.

Morla (Flaggen) Peninsula, southward of

Harbor Reef, is a projecting tongue of land on the eastern side of the harbor.

10-161 ANCHORAGE—DIRECTIONS.—Anchorage may be obtained in the roadstead, in 16 to 22 fathoms, sand and mud, with Cape Bredow bearing 052°, and the northern extremity of Morla Peninsula, 186°. In the roadstead, where a swell is felt, vessel is exposed to winds from north-northwest, through north, to east-northeast, but the winds do not blow with sufficient strength to endanger a vessel with good ground tackle. The holding ground is poor.

The fairway eastward of Harbor Reef is about 150 yards in width, and that to the westward is rather less; it is therefore better, if desiring to go farther in, to keep to the eastward, more especially as the reefs off Nugidu Peninsula do not reach out very far, and are for the most part steep-to.

10-162 LANDMARKS.—Sattel Mountain, (Sattelberg), 3,200 feet high, lies about 6 1/2 miles northwestward of Cape Bredow. A landmark is afforded by a saddle-shaped indentation in the mountain range extending to the coast from the northeastern side of Sattel Mountain.

Approaching Finsch Harbor from the northward the coast may be followed at a distance of 2 1/2 miles until the white houses of the settlement are distinguished.

Approaching from the eastward the roofs of two warehouses on Nugidu Point have been clearly made out from a distance of 15 miles on a clear day.

Cape Bredow should be given a berth of at least one-fourth of a mile so as to clear the sunken wreck that lies westward of it.

WINDS AND WEATHER.—Along the whole northeast coast of New Guinea, as well as in Finsch Harbor, the wind by day generally comes from the southeastward. It commences in the morning between 8 and 10 o'clock and dies down towards evening; and at night there is often an absence of wind or a weak westerly land breeze, which is experienced only close under the coast.

Rain and thunderstorms, electrical effects,

and weak earthquake shocks are frequent, but there are no real storms.

TIDES.—The high-water interval at full and change at Finsch Harbor is 7h. 00m.; springs rise 3 feet. There is a large diurnal inequality.

10-163 FINSCH HARBOR is the headquarters of a thriving Lutheran mission. Dairying, boat building, and other industries are successfully carried on. The airport here is used regularly by the airliners on the Sydney Rabaul service.

Wharves, in a state of disrepair, stand on either side of the harbor.

Fresh vegetables and fruits can be procured in about 3 days time from inland villages. Drinking water is plentiful, but precautions must be taken against dysentery.

There is a mission hospital at Finsch Harbor with a European doctor in attendance.

10-164 COAST.—From Finsch Harbor to Cape King William, about 33 miles northward, the coast is backed by mountain ranges, which gradually become higher as Kilumala Point is reached, and then increase more rapidly in height, and attain their greatest elevation at Cape King William. As far as Kilumala Point the coast and mountain ranges are wooded, but the hills in the foreground are in places covered with grass, and vessels coming from the eastward can discern these grassy slopes from a considerable distance. A terrace formation is also a peculiar feature of this stretch of coast.

ARNDT POINT lies 4 miles northward of Finsch Harbor, and the Busma River flows into the sea at the point. A village is situated behind the point, and there is a boat harbor. Bussim River, closed by a bar, flows out northward of Arndt Point, and farther northward are Cape Stations and Kamlagidu (Kirchbach Bluff), the former being a round, coral, chalk cape, and the latter being wooded and about 25 feet high. Southward of Kamlagidu there is a coastal lagoon with an entrance for small boats. The coast is faced with cliffs, 20 to 35 feet high.

10-165 SCARLET BEACH is the name applied to the bay immediately northward of Arndt Point. About 1,000 feet from the shore the depths are around 20 fathoms, thence they rapidly shoal on in to the beach. In the northern part of this bay is the mouth of the Bussim (Song) River.

CAPE KILUMALA (Fortification Point) (Kitumala Point) rises steeply from the sea and is dominated by a hill with terraces, which appear like fortifications. The cape should not be mistaken for a similar projection some miles farther northward. The white patches on the southern slopes of the hills at Kilumala are conspicuous, while the cape to the north is of a brown color. Kilumala also may be recognized by wide grassy flats with some trees.

No bottom at a depth of 60 fathoms could be obtained 3 miles southeastward of Cape Kilumala, and the water had all the appearance of being deep close up to the coast.

10-166 COAST.—The coast between Cape Kilumala and Cape King William, 20 miles northwestward, appears bold and curves slightly, forming a bay. Between Cape Kilumala and Blucher Point, 11 miles northwestward, steep, rugged, and bare spurs descend from the mountains, and at Blucher Point the land is partly wooded and partly covered with grass. About 2 1/2 miles south-southeastward of Blucher Point a drying reef extends about 1/2 mile eastward from the shore. A detached reef lies about 1/2 mile southeastward of this reef.

About 5 1/4 miles northwestward of Blucher Point is Hardenberg Point, between which and Cape King William is Kesseroa Lagoon, formed by the fringing reef and numerous islets and rocks lying off the shore. There is an entrance to it, with a depth of 2 3/4 fathoms, eastward of the large island at the northern end. Neither the channel nor the lagoon have been sounded. Two of the larger islands are inhabited.

10-167 CAPE KING WILLIAM (6° 05' S., 147° 37' E.) is not a very well-defined headland, the coast rounding gradually and preserving its steepness. The point usually accepted as Cape King William is a slight projection, about 20 miles northwestward of Cape Kilumala with a village close northward of it.

At the east end of the Cromwell Mountains, about 15 miles southwest of Cape King William, stands its highest summit, about 9,630 feet high.

10-168 VITIAZ STRAIT is the passage between Cape King William and Astrolabe Bay on the south, and Umboi Island and the others westward of it on the north, but the strait is, in effect, more or less open sea. Its least breadth is about 20 miles in the eastern entrance, between Cape King William and the islets and reefs extending southward of Umboi Island. The southern shore of the strait is known as MacLay coast.

WINDS.—During the period from July to September the southeast trade blows with a force of from 6 to 8, and there is a strong northwesterly current and short chopping sea. As the New Guinea coast is approached the squalls increase in violence.

The western coast of Umboi Island affords some shelter. A few miles from the land the wind will be found to be blowing hard, raising a chopping sea, but on approaching the island the wind is less violent. In the vicinity of Cape King, the northwestern point of the island, it is difficult to realize how hard it is blowing so close to.

TIDES—CURRENT.—The currents are variable. From May to September the westerly sets of the south equatorial predominate with velocities up to 1 1/2 knots through Vitiaz Strait. However, from November through February the northwest monsoon reverses these trends and creates a southeasterly set up to 2 knots.

The normal direction of the current during January is southeasterly, velocity 2 knots.

Caution.—During abnormally strong southeasterly conditions, tidal currents between Umboi Island and Cape King William may run at about 6 knots. During the northwest monsoon, there is a southeasterly set up to 4 knots, and abnormal local conditions of rain and bad visibility are likely in all seasons in Vitiaz Strait east of Teliata Point.

A drift of $1\frac{1}{2}$ knots toward the island has been reported in the vicinity of Umboi Island. Farther north the set was toward Long Island at the same rate.

10-169 Southern shore of Vitiaz Strait—

Aspect.—Southward of the coastal hills is the Finisterre Range, running nearly parallel to the coast. The peaks of the range are usually obscured by clouds, but in the early morning, before sunrise, they are sometimes visible.

Mount Disraeli, a sharp cone about 12,200 feet high, lies toward the western end of the strait. Mount Gladstone, situated 5 miles westward of Disraeli, attains an elevation of 13,500 feet. It is also conical, but not so pointed as Disraeli.

10--170 Kelana (Kelanoa) Harbor ($6^{\circ}02'S.$, $147^{\circ}32'E.$), entered $3\frac{1}{2}$ miles northwestward of Cape King William, is protected from the east and north by a coral reef and Chissi islet at its northern end. The entrance, which lies between Chissi Islet and the point westward on the mainland, is about 50 yards wide, and has depths of from $3\frac{3}{4}$ to $4\frac{1}{4}$ fathoms. A river flows into the sea at the entrance.

Anchorage may be found by vessels with local knowledge, in depths of from $4\frac{3}{4}$ to $5\frac{1}{2}$ fathoms, southward of Chissi Islet. Also here the harbor is narrowed by a fringing

reef, extending 200 yards offshore and a vessel should secure a hawser to one of the trees to prevent it from swinging.

10-171 Scharnhorst Point, about 4 miles northwestward of Kelana Harbor, is about 239 feet in height. In front of the steep coast there is a narrow strip of shore covered with bushes.

Teliata Point is situated about 7 miles northwestward of Scharnhorst Point. On the fringing reef which extends three-fourths of a mile seaward from the point, is Sio Island. There is a large village and a grove of coconut palms on the island. A light is shown from Sio Island. Close westward of Teliata Point is a small bay with a depth of 18 fathoms in its entrance, affording good shelter for small craft with local knowledge.

Anchorage.—Vessels with local knowledge may obtain anchorage, in a depth of 11 fathoms, sheltered from southerly and westerly winds, 600 yards east-southeastward of a village situated $3\frac{1}{2}$ miles south-eastward of Teliata Point. A submerged rock lies, close off the shore reef, about three-fourths of a mile northward of the western entrance point of the small bay where the above anchorage is found.

Vessels may also obtain anchorage, in a depth of 19 fathoms, sheltered from southerly and easterly winds, northward of the small bay lying westward of Teliata Point.

Vincke Point ($5^{\circ}55'S.$, $147^{\circ}18'E.$), $4\frac{1}{2}$ miles westward of Teliata Point, is low and covered with grass. A large stream discharges into the sea close eastward of the point, and the yellow water from this stream flows to the eastward, from

which fact it is supposed there is an easterly counter current in the vicinity.

About one-fourth of a mile off the stretch of coast extending about $3\frac{1}{2}$ miles southwestward of Vincke Point, there are depths of from 8 to 11 fathoms. Several streams enter the sea here, and a high waterfall is visible in the range behind.

10-172 Schlangen Harbor is entered about $7\frac{1}{2}$ miles southwestward of Vincke Point, and is formed between a reef and the coast. The entrance, between a small bush-covered islet and Peschel Point, 8 miles southwestward of Vincke Point, is very narrow, deep, and not easily recognized. The course for entering is close to the breakers on the reef, and the small islet on the east side must not be approached too closely on account of a projecting reef.

There are openings in the coastal reef at other points, but the general depths in them are from $2\frac{3}{4}$ to $3\frac{1}{4}$ fathoms. Outside the islet at the entrance are other islets, covered with bushes on the eastern and western extremities of the reef. Abreast the eastern islet there is a village on the coast, and between them an entrance suitable for small vessels appears to lead into Schlangen Harbor.

Anchorage may be obtained by vessels with local knowledge, in depths of from 16 to 21 fathoms, just inside the entrance to Schlangen Harbor, with Peschel Point bearing 278° , distant one-fourth to one-half of a mile.

10-173 Reiss Point, lying 6 miles west-northwestward of Peschel Point, is fringed by a reef extending 200 yards offshore, and on each side of the point is a village. About 5 miles westward of Reiss Point is a massive grassy hill, 1,312 feet high, which descends steeply to the sea. Off the coast between the point and the hill no bottom was obtained at a depth of 27 fathoms, distant 200 yards from the breakers.

Lepsius Point, 12 miles west-northwestward of Reiss Point, is the northern extrem-

ity of an alluvial plain, covered with trees and grass, and is higher than other points in the vicinity. The coast between the point and the hill mentioned above is fringed by a reef and forms two bays.

In the northwestern bay anchorage, sheltered from all winds except those between north and east, may be obtained by vessels with local knowledge in a depth of $5\frac{1}{2}$ fathoms. As the space between the reefs on either side of the bay is limited, a hawser should be secured to one of the trees to prevent swinging. The coastal reef extends about one-half of a mile offshore in this vicinity.

Shoal.—A shoal is reported to lie about $1\frac{1}{2}$ miles east-northeastward of Lepsius Point. The least depth is 7 fathoms.

10-174 Coast.—The coast trends west-southwestward from Lepsius Point for about 4 miles and thence turns northwestward forming a wide bight known as Sareauk Bay. Sareauk Bay is fringed with coral and opens from the northward. There is a village at the head of the bay. Weber Point is about $10\frac{1}{2}$ miles west-northwestward of Lepsius Point and in its vicinity the coastal reef extends about $\frac{1}{2}$ mile offshore. Gauss Point lies about $1\frac{1}{2}$ miles west-northwestward of Weber Point.

On the western side of Gauss Point anchorage may be obtained by vessels with local knowledge in depths of from 8 to 11 fathoms, close to a village and 200 yards offshore. This anchorage is sheltered from all winds, except those from west-northwest through north to northeast.

10-175 Bunsen Point ($5^\circ 41' S.$, $146^\circ 37' E.$) lies 7 miles west-northwestward of Gauss Point, and about midway between them a river flows into the sea by two mouths. Westward of the point a partially dry reef extends 1 mile offshore. Off the western edge of this reef anchorage may be obtained by vessels with local knowledge in depths of 11 to 16 fathoms.

Helmholtz Point lies about 10 miles northwestward of Bunsen Point, and a large river, with deep water off its mouth, flows out close

to the point. Dekays Bay lies on the eastern side of the point, and a reef extends from the point to nearly the eastern end of the bay. A village lies on either side of the point, and there are numerous other villages to the westward.

Sheltered anchorage in depths of from 11 to 14 fathoms may be obtained off the village on the western side of Helmholtz Point, 150 yards offshore. Anchorage may also be obtained in Dekays Bay.

10-176 Sau (Suri) Point lies about 2 miles east-southeastward of Helmholtz Point. It is the northern entrance point of Dekays Bay, and was reported to be very prominent.

It was reported in 1945 that Dekays Bay is safely entered by heading for the signal station when it bears 225°.

Signal station.—A signal station is established on the southern shore of Dekays Bay.

Iris Point, situated about 7 miles westward of Helmholtz Point, is wooded and fringed by a reef, which dries in places and extends about 1 mile offshore. Southwestward of the point and at the inner end of the bay where the large village of Massai is situated are two small rivers, which form small lagoons at the mouth.

Anchorage in a depth of 19 fathoms may be obtained 400 yards offshore from the above-mentioned rivers. Westward of this anchorage is a reef, on the other side of which anchorage in a depth of 22 fathoms may be obtained near a small stream. These anchorages are protected from the southeast monsoon.

Kepler Point lies about 4½ miles westward of Iris Point. A river flows into the sea at the point, and discolors the water for a considerable distance offshore.

Anchorage in depths of from 22 to 44 fathoms may be obtained by vessels with local knowledge near Kepler Point, off a large village, from 200 to 400 yards offshore,

and between the reefs extending from the coast.

Herwarth Point lies about 7½ miles northwestward of Kepler Point. In the western part of the bay formed between them is a hill, 328 feet high, thickly wooded, and situated close to the coast.

10-177 Pommern Bay lies between Herwarth Point and Cape Rigny, 12 miles west-northwestward. The shores of the bay are wooded. From the mountains about 5,000 feet high, a wooded spur approaches close to the head of the bay, and near it is a wooded point extending to the eastward. A stream flows into the sea at the point, and discolors the water for several miles offshore. Another spur from the mountains descends in the direction of Cape Rigny, and on it is a conspicuous conical hill, 2,300 feet high, named Sirui, and a wedge-shaped ridge, both of which are partially wooded.

For coast westward see section 10-188.

10-178 ISLANDS ON NORTHERN SIDE OF VITIAZ STRAIT.—**Umboi (Rooke) Island** lies 29 miles east-northeastward of Cape King William (sec. 10-167) and is separated from the western end of New Britain by Dampier Strait. The island is about 25 miles in length in a northwesterly and southeasterly direction and has a maximum breadth of about 14 miles. It is of volcanic origin, thickly wooded, and mountainous, the highest peak is 5,200 feet high. On the northern and western sides the high land descend steeply to the sea, but towards the south the slopes are more gradual, and the extreme southern portion is quite low. On some parts the island is well cultivated and populated.

Cape King is the northwestern point of the island. The cape is rocky, and the spurs

from the mountains extend down to the coast, which is fringed with coral reef drying in patches and extending 400 yards offshore.

**10-179 OFF-LYING ISLET AND DAN-
GERS.**—Hein Islet, 95 feet high and wooded, lies about 3 miles northwest of Cape King. A rock, with a depth of less than 6 feet over it, the position of which is approximate, lies about 3 miles west-northwest of Hein Islet. Two detached shoal patches lie about 2 miles and 3 1/2 miles, respectively, southwest of Hein Island.

An obstruction lies on the western side of the passage between Umboi Island and Tolokiwa Island, about 3 miles southeastward of the southeast coast of Tolokiwa Island.

Shoals lie in an area between 2 1/2 and 4 miles eastward of Hein Islet. The shoal area extends southeastward to a short distance from the northern side of Umboi, about 4 miles eastward of Cape King. This shoal area is a part of the large unsurveyed area lying between Hein Islet and Sakar Island (sec. 10-186), about 17 miles eastward of Hein Islet.

RECOMMENDED TRACKS.—Details concerning recommended tracks in the vicinity of Vitiaz Strait, Umboi, and Tolokiwa Islands should be obtained from the local naval authorities.

Rawlings Point, 1,400 yards south-southwestward of Cape King, is low and sandy, with a reef extending 1,050 yards north-westward of it, and shallow water of 1 and 2 fathoms for 200 yards beyond. A sand cay is situated on the highest part of the reef.

10-180 LUTHER ANCHORAGE, entered between Cape King and the reef extending from Rawlings Point, is open to the north-northwestward. The shores are fringed by a reef, 200 yards wide.

ANCHORAGES—DIRECTIONS.—Anchorages in a depth of 16 fathoms, mud may be obtained with Rawlings Point bearing 201°, distant 600 yards. Three hundred yards

140° from this position is a 2-fathom patch, distant 100 yards from the shore reef.

Anchorage has also been taken in a depth of 13 fathoms, mud, with Rawlings Point bearing 227° and Hein Islet 332°, but there is only 200 yards of swinging room.

The entrance to Luther Anchorage is about one-quarter of a mile in width and easy of access, the reefs on either side showing distinctly. Cape King may be approached, bearing 095°, until Hein Islet bears 333°, when it should be brought astern, and course steered for the anchorage. The anchorage should not be approached unless the sun is in a favorable position.

TIDES.—The high-water interval at full and change at Luther Anchorage is 5h. 00m.; springs rise 3 feet.

**10-181 WESTERN COAST OF UMBOI IS-
LAND.**—The western coast of Umboi Island has no large indentations, and the water is deep for anchoring; but the British naval vessel Dart found anchorage in a depth of 30 fathoms at one-quarter of a mile from the edge of the reef, about 12 miles to the southward of Cape King.

A fringing reef borders the west side of Umboi Island for a distance of about 7 miles southward of Rawlings Point. Some rocks lie three-fourths of a mile from the coast at 6 miles southward of the same point. Several reefs lie off the coast between Higgins Point, situated about 16 miles southward of Rawlings Point, and the entrance to Marien Harbor, about 11 miles southeastward of Higgins Point.

SHOALS.—A 5-fathom shoal, 200 yards in diameter, lies about 15 miles 320° from Higgins Point.

O'Brien shoal, a 12-foot shoal, lies about 11 1/2 miles northwestward of Higgins Point and about 4 1/2 miles offshore.

A 4-fathom shoal, 200 yards in diameter, lies about 7 1/2 miles 270° from Higgins Point.

A 14-fathom bank, which has not been ex-

amined, lies about 11 1/2 miles westward of Higgins Point.

10-182 MARIEN HARBOR, situated at the southern end of Umboi Island, is safe and protected. The best approach is from the east, where there are fewer reefs, between Graah Point, the eastern entrance point, and Galelum Islet, southward of the point. This entrance is difficult, and vessels should keep near the islet and steer along the edge of the reef extending from it, where there are depths of from 12 to 15 fathoms.

Anchorage in a depth of 8 fathoms may be obtained in the middle of the harbor.

10-183 SIASSI ISLETS form an extensive archipelago of wooded islets lying southward of Umboi Island, and there are numerous coral reefs between them. Malai, 150 feet high, lies 6 miles southwestward of the southern end of Umboi Island; Tuam, 200 feet high, is the largest of the group, and lies about 6 miles southeastward of Malai. Mass-mass (Vassee) Nesup, and Dingen, are the eastern islets of the group.

Vessels are recommended to give this group a wide berth.

CURRENT.—In August 1911 a current setting to the northwest at the rate of from 2 to 3 knots was experienced southward of the Siassi Islets.

10-184 DAMPIER STRAIT is about 12 1/2 miles wide between Umboi Island and the reef extending from Grass Point, the western extremity of New Britain. Its southern approach is obstructed by the dangers mentioned below, on which the vessels of many of the first explorers touched. There are deep water passages between these dangers which may be navigated with the sun in a favorable position, but it is recommended to keep near the coast of New Britain.

PASSAGE.—A passage believed clear of dangers and with a swept depth of 10 fathoms lies between Umboi Island and the coast of New Britain. The limits of this passage are indicated by dashed lines on the chart. The

narrowest part of this passage is located about 1 3/4 miles north-northeastward of Nesup Island. An unexamined 3-fathom patch was reported (1945) to lie on the edge of the channel, about 6 miles southeastward of Cape Umboi.

CURRENT.—It has been reported that currents up to 6 knots may be encountered in Dampier Strait during the southeast season. Thick weather is reported to be usual in heavy southeast storms.

10-185 BOWEN SHOAL (6° 04' S., 148° 36' E.) lying off the southwestern coast of New Britain and in the southern approach of Dampier Strait, has a depth of 2 fathoms. Discolored water, breaking slightly, was seen 2 miles southward of the shoal. There are many other dangers charted between Bowen Reef and the south side of Umboi Island.

Other reefs reported by the German New Guinea Co. in 1894, in the neighborhood of Bowen Shoal, are charted as follows: A reef in latitude 6° 17' south, longitude 148° 48' east; a reef in latitude 6° 12' south, longitude 148° 40' east; a reef extending 8 miles in an easterly direction from latitude 6° 04' south, longitude 148° 26' east.

NOTE.—The coordinates given for the above reefs do not agree with charted positions shown on B. A. Chart 2018. Caution should be observed in this vicinity.

ALICE REEF, on which the depth is 7 feet lies between 3 and 4 miles offshore and 19 miles northwestward of Bowen Shoal. A reef is situated about 11 miles east-southeastward of Alice Reef.

10-186 RITTER ISLAND, 450 feet high, lies in the northern part of Dampier Strait. The island has the form of a regular cone, broken at the summit, and formerly was an active volcano.

SAKAR (TUPINIER) ISLAND, lying about 4 miles north-northwestward of Ritter, is 3,275 feet high and slopes gently in all directions to the sea. This wooded volcanic island is reported to be inhabited.

A small islet is reported to lie $1\frac{1}{4}$ miles northwestward of the northern point of the island.

Islands westward of Umboi Island.—**Tolokiwa (Lottin) Island**, situated about 12 miles northwestward of the northwestern point of Umboi Island, is a volcanic cone, 4,580 feet high. The island is wooded and inhabited. A reef, $\frac{1}{2}$ to 1 mile wide, fringes the island.

An islet lies about 1 mile westward of the northwestern side of the island, and forms a harbor for small craft.

Long Island, about $21\frac{1}{2}$ miles westward of Tolokiwa Island, is of volcanic origin. The center of the island is occupied by a large lake surrounded by steep slopes. An active volcano rises in the lake. The southern peak is 3,727 feet and the northwestern peak 4,278 feet high. The western and southern coasts of the island are steep-to, except at 7 miles southwestward of the northern extremity of the island, where a reef extends seaward for a distance of 3 miles from the shore. A two fathom depth exists $\frac{1}{5}$ mile southwest of the northwestward extremity of the island. For 2 miles on either side of the northern point there is fringing reef. A small reef extends one-half of a mile from the northeast point, and along the eastern shore there is fringing reef for a distance of about 6 miles, which extends a mile from the shore.

A small islet, about 50 feet high, lies about one-half of a mile east-southeastward of the southeast point of the island, with which it is apparently connected by a reef.

Fruit, vegetables, and pigs are obtainable from the natives.

Crown Island, about 7 miles northwestward of Long Island, has rather a level summit, 1,857 feet high, and is also volcanic. It is surrounded by a reef from $\frac{1}{2}$ to 1 mile in width, in which there are numerous channels. Breakers have been observed off its northeastern side, and several rocks, with little water over them and which show a slight break in a heavy sea, extend about 1 mile westward of the southwestern point of the island.

10-187 Hankow Reef ($4^{\circ}54'S.$, $146^{\circ}45'E.$), with a least depth of $1\frac{1}{2}$ fathoms, lies

15 miles northwestward of Crown Island. The reef, marked by heavy breakers, consists of four isolated patches extending for 2 miles in a northwesterly and southeasterly direction. A 3-fathom shoal was reported (1956) to lie approximately a little over 3 miles west-southwestward of Hankow Reef.

10-188 ASTROLABE BAY (continued from section 10-177), entered between Cape Rigny and Cape Kusserow, 18 miles northwestward, has considerable depths. Behind the southern shore the country is mountainous, and westward of the head of the bay is the Ortzen Range, the highest peak of which is 4,110 feet high. Behind the western shore of the bay is a vast plain, through which the Gogol River makes its way to the sea. The water is deep in most places fairly close to the shore.

From the information supplied by a Russian traveller, who had stayed at this bay for twelve months, it is ascertained that it has over 80 villages around its shore, containing in all about 4,000 inhabitants, among whom as many as twelve dialects were spoken.

10-189 Southern shore of Astrolabe Bay.—**Cape Rigny (Tiwalib)** ($5^{\circ}28'S.$, $146^{\circ}00'E.$) is higher than the points to the eastward, the land within it being about 1,200 feet high and thickly wooded. Behind the cape are seen the peaks of the mountains forming the background of Astrolabe Bay, which gradually slope down to the great plain southwestward of Madang Harbor.

About $7\frac{3}{4}$ miles westward of Cape Rigny is the Kabenau River, which rises in the Finisterre Range, discharging into the bay. Its mouth is apparently closed at times.

10-190 Melanua (Konstantin) Harbor, entered about 2 miles westward of the Kabenau River, has general depths of from 7 to 48 fathoms, and is well sheltered from the prevailing winds.

About 650 yards eastward of Garagassi Point, the northern entrance point of the harbor, is a factory chimney, and near the southern entrance point is a flagstaff and the New Guinea Company's station. The village of Garagassi lies on the northern side of the harbor.

Anchorage.—Good anchorage in a depth of 22 fathoms may be obtained in the harbor.

10-191 Western shore of Astrolabe Bay.—**Bogadjim (Stephansort)** lies about 5 miles west-northwestward of Melanua Harbor. Landing can usually be made at the jetty, and also at the northern end of the town in fine weather, but the breakers are sometimes so heavy that landing is impossible.

Beacons.—Two yellow beacons, with triangular topmarks, in line indicate the approach to the anchorage. Owing to the color of these beacons they are very indistinct.

Anchorage.—Good anchorage may be obtained in a depth of 11 fathoms, with the two beacons in range, bearing 241° , and the boat shed, 286° .

Erima Road, an unloading place for the local plantations, lies $2\frac{1}{2}$ miles northward of Bogadjim, and between them the Gori River, obstructed by a sandbank, flows in the bay.

Anchorage in a depth of not less than $5\frac{1}{2}$ fathoms may be obtained off Erima, by keeping a white square mark in range with a white cross.

Maraga Hook lies about 3 miles northward of Erima Road, and about $2\frac{3}{4}$ miles farther northward the Gogol River flows into the bay. A shoal bank with depths of less than 3 fathoms extends from 600 to 1,000 yards offshore between Maraga Hook and the mouth of the Gogol River. Several patches with depths of $3\frac{3}{4}$ and $4\frac{3}{4}$ fathoms lie close off the bank, the water deepening rapidly beyond.

10-192 Bilibili Islet ($5^{\circ}18' S.$, $145^{\circ}48' E.$), lying about 4 miles northward of Maraga Hook and nearly 1 mile offshore, is 121 feet high and steep-to.

A reef with a depth of about 4 feet lies 1,200 yards west-northwestward of the northern end of the islet.

Anchorage in depths of from 19 to 22 fathoms may be obtained off the northwestern side of the islet.

Urembo, Jabob, and Jomba Islets, composed of coral and wooded, lie from 2 to 3 miles northward of Bilibili Islet, and there is shallow water between the two southern islets and the mainland.
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Between Jomba, the northern islet, and the mainland sheltered anchorage in a depth of from 8 to 9 fathoms may be obtained by small craft. The coast here has a sandy beach with palm trees.

Planet Rock, with a depth of 1 fathom, lies nearly 2 miles eastward of Jabob Islet, the middle islet of the above group, and is difficult to distinguish.

10-193 MADANG HARBOR, approached through Dallmann Pass, is landlocked, and has depths of from 5 to 15 fathoms, with deeper water in the approach. The harbor lies between the northwest side of Schering Peninsula and Beliau Island.

Pier.—**Lights.**—A pier projects from the point eastward of Bode Point, in a northerly direction; the outer face of the pier is about 100 yards in length. Each end is marked by a fixed red light.

Wreck.—A dangerous wreck is located in the inner harbor about $\frac{1}{2}$ mile southward of Bode Point.

10-194 Cape Kusserow ($5^{\circ}13' S.$, $145^{\circ}50' E.$), lying $2\frac{1}{4}$ miles north-northeastward of Jomba Islet, is near the southern entrance point to Dallman Pass and is the eastern extremity of Schering Peninsula. From Schering Peninsula a barrier reef, with several islands on it, extends in a northerly direction parallel to the coast line for a distance of $8\frac{1}{2}$ miles, to Cape Barschatsch. The principal islands on the reef are Ragetta (Gragat) (Kranket), Paeowai or Ortzen, Tab, and Sek. They are all thickly wooded on the seaward side, but on the other they are cultivated.

There are several other islands and many shoal patches within the reef.

10-195 Dallman Pass, between Schering Peninsula and Ragetta Island, immediately northward of Cape Kusserow, is about 400 yards in width and carries depths of 17 to 27 fathoms in the center. It is the southernmost of the several passages in the barrier reef leading to the inner waters and is recommended for vessels approaching from the southward.

Caution.—Many native fishing vessels may be encountered at night, from December to

April, off the entrance of Dallman Pass.

NAVIGATION AIDS.—A light is shown on Kalibobo Point, on the south side of Dallman Pass.

An **AVIATION LIGHT** is located about 1 3/4 miles westward of Kalibobo Point.

Several beacons, each 20 feet high, and consisting of a white board, stand on the northern side of Dallman Pass. A beacon, 40 feet high, equipped with a radar reflector, stands on the mid-southern shore of Dallman Pass.

Two white range beacons, in line 300°, stand on the southeast shore of Beliau Island. A white beacon stands on the southeastern shore of Nui Island, an islet close southwestward of Beliau Island.

There is a copra drying plant on the southeastern part of Beliau Island which gives off considerable smoke.

CAUTION.—A late 1962 report states the interharbor navigational aids, a range and beacons, were erected by and familiar to the Harbor Master. They are marked by empty bottles which act as reflectors at night.

10-196 ANCHORAGE.—The best anchorage, in a depth of 24 fathoms, may be obtained between Ragetta Island and Beliau Island, lying to the westward of it, with Babob Molon Islet, the tiny islet located about 350 yards northward of the northern extremity of Beliau Island, bearing 321°, and the beacon on the southeast side of Beliau Island bearing 252°.

Vessels, after discharging their cargo and having to remain for some time, are recommended to use this anchorage, as there are always cool breezes.

Vessels up to 300 feet in length can also anchor in the inner harbor (Binnen Harbor) in 7 to 9 fathoms.

PROHIBITED ANCHORAGE.—Anchoring is prohibited within an area extending across Madang Harbor from the southeastern side of Beliau Island to the shore south-southeastward. The prohibited area is 200 yards wide.

WEATHER.—The weather is greatly influenced by the neighboring mountain chain in Astrolabe Bay. At night there is generally

a land breeze. In the southeast trade season (sec. 1-40) the sea breeze blows from the northeast and the land breeze from the southwest or west. It is often squally in the afternoon and raises a sea. During the strong trade a swell may reach the harbor rendering it uncomfortable for small craft. In the northwest monsoon season the land and sea breezes are well developed. It is reported that squalls from northeast are often experienced at night, setting in about 0200 and continuing at intervals for 2 or 3 hours.

TIDES.—The tides are very irregular.

TIDAL CURRENTS.—The tidal currents are scarcely perceptible. The flood sets to the southwestward and the ebb to the northeastward; they are much affected by the prevailing wind. The maximum rate is about three-fourths of a knot. As a rule the current sets northward along the coast.

10-197 DIRECTIONS.—Coming from the northward, the houses of the settlement become visible soon after passing Sek Island. If bound for Madang Harbor it is better to enter by Dallman Pass than to navigate the waters westward of the barrier reef.

To enter by Dallman Pass, steer in with Mount Hansemann, 1,414 feet high, and with a conspicuous tree on its summit, situated northwestward of the harbor, bearing 316° until the light tower is recognized, when a midchannel course may be steered to the harbor.

It is reported that Dallman Pass is difficult to identify until within 3 or 4 miles of it, and that Bilibili Islet, 5 1/2 miles south-southwestward, forms a good landmark, being distinguishable at a distance of 10 miles.

It was reported in 1943 that Beliau Island, at the head of Dallman Pass, blends in perfectly with Schering Peninsula and Ragetta Island, which form the sides of the pass, and impedes recognition of the entrance. The white cylindrical tower of the light on the southern side of the pass is visible about 4 miles. The mission, about 1 mile west-northwestward of the harbor, Mount Hansemann, and Bilibili Islet all aid in navigation.

Karkar Island and Bagabag Island are visible for about 50 miles and can be used for approaching Madang.

Pilotage is not compulsory, but it is advisable. The Harbor Master acts as pilot (1965) and is reportedly well qualified. Daylight navigation and pilotage is the rule, however vessels have departed at night under ideal conditions.

The administration of the port is under the control of the Harbor Master.

10-198 MADANG, the second largest town on the north coast of New Guinea, is situated at the northern end of Schering Peninsula. The town consists of a number of bungalows and several storehouses, and is the administration center for the district. Madang is a copra shipping port with a population of about 6,800 (1965).

WHARVES.—The Main Wharf (northeast corner 5° 12' 30" S., 145° 49' 30" E.) is 310 feet long and has a depth alongside of 26 feet. Vessels with greater draft berth close eastward of the wharf with two anchors down, veering about 45 fathoms of cable on each until the stern is about 40 feet from the shore. Stern fasts are then taken ashore and carried around two palm trees, and secured to a mooring post in the vicinity. When the stern fasts are secured, any slack is taken up by shortening in on the cables. In 1962 it was reported vessels up to 560 feet in length with drafts to 31 feet utilize the port.

A small T-head pier lies close eastward of the main wharf.

One 20-ton lighter is available (1965).

REPAIRS.—There are four slipways. The largest can accommodate vessels up to 400 tons and 140 feet in length. There are machine shops and welding facilities.

SUPPLIES.—Limited supply of fruits and vegetables are obtainable. Fresh water can be obtained from a tank near the Main Wharf. Vessels must, however, use their own pumps. In early 1963 it was reported water is available in small quantity at a delivery rate of 5 tons per hour. Diesel and lube oils, gasoline, kerosene, and aviation gas are obtainable. An eight inch pipeline services the main wharf. Petroleum products are also available in drums.

COMMUNICATION.—Steamers from Australian ports call every three weeks. Telegraph, telephone and radiotelephone facilities are available. There is an airport.

RADIO.—There is a radio station. The two towers are conspicuous from seaward.

HOSPITALS.—There is a European hospital in the town, and a native hospital on Beliau Island. The leper settlement is on Tabat Island, 4 1/2 miles northward of Madang.

10-199 SIAR HARBOR, entered 600 yards north-northwestward of the northern point of Beliau Island, is a narrow shallow inlet. It appears that anchorage might be taken off the entrance and also to the southward of the entrance. The best approach to these anchorages is between the northern end of Beliau Island and Pana Tibun, an islet about 400 yards northeastward, where there are depths of 11 to 16 fathoms. Depths in the anchorage off the mouth are from 8 to 10 fathoms.

NAGADA (FRIEDRICH KARL) HARBOR, 2 miles northward of Siar Harbor, is a very narrow inlet with depths of 8 to 15 fathoms.

Although the size of the harbor and the many reefs preclude its general use by vessels of more than 500 tons, a 2,000-ton vessel has been observed at anchor about halfway inside the harbor.

10-200 Rasch Pass is a break in the barrier reef about 1 mile north-northwestward of Tab Island, and is the direct approach to Nagada Harbor. The depth in the pass is 28 fathoms, and the reefs on either side appear steep-to.

BEACONS—in range 229° 30'—lead through Rasch Pass. The rear beacon, a white square, stands on Panab Island, a small island about 1 1/4 miles north of Pana Tibun. The front beacon, a white triangular beacon with a red border, marks the southwest side of an 11-foot patch about 1 mile northeast of Panab Island.

The inner channel within the barrier reef between Madang Harbor and Sek Harbor should only be used by light draft vessels with local knowledge.

Anchorage.—**Tab Anchorage**, within the barrier reef and southward of Rasch Channel, has general depths of 11 to 22 fathoms. The main entrance of this area is by Rasch Channel.

Malamal Anchorage, within the barrier reef and northward of Tab Anchorage, has general depths of 7 to 17 fathoms. A narrow entrance with depths of 6 to 20 fathoms leads into this anchorage across the barrier reef about 2 miles northward of Rasch Channel.

10-201 Sek (Alexis) Harbor entered by Ottilien Pass situated 8 miles northward of Madang, affords excellent anchorage in all weathers, being well protected by Sek and

Admosin Islands. Bostrem Bay is a continuation in a westerly direction of the waters of Sek Harbor. The bay affords good anchorage, but the approach is too tortuous for large vessels to make use of it. Many creeks and streams discharge into the harbor.

Ottilien Pass, between the northern end of Sek Island and the mainland, is about 300 yards wide in the clear, and carries depth of 30 fathoms. The pass is free from danger except a small fringing reef on its northwestern side.

Anchorage.—Anchorage in depths of from 12 to 16 fathoms, mud, may be obtained in the outer part of the harbor, about 200 yards westward of Sek Island.

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Anchorage may also be obtained in the cove southeastward of Admosin Island in a depth of 14 fathoms.

10-202 ST. MICHAEL (Alexishafen) is the headquarters for the Roman Catholic mission, and there is a hospital here. Steamers from Sydney call every six weeks. There are two piers in ruins at St. Michael's.

10-203 COAST.—Northward of Sek Harbor the coast consists of flat land, with mountain ranges some 6 to 8 miles inland. The coast is fronted by a reef, on which lie several islets, extending to Cape Juno, situated nearly 6 miles northward of Sek Harbor.

Cape Croisilles (4° 41' S., 145° 49' E.), about 8 miles northward of Cape Juno, is a prominent point, the coast forming here nearly a right angle. The Ama (Matuka) River discharges into the sea about 4 miles southward of the point, and can only be ascended by boats when not obstructed by a bar.

10-204 OFF-LYING ISLANDS.—Karkar (Dampier) Island, the southern extremity of which lies 8 miles east-northeastward of Cape Croisilles, is conical in shape, volcanic, thickly wooded, inhabited, and 4,920 feet high. A reef fringes the island, and another reef extends 4 miles north-northeastward from the northern point of the island.

Tuale Islet lies on the latter reef, about one-half of a mile from the point, and Mangamarlike Rock, 30 feet high, is charted near the extremity of the reef. An islet, 60 feet high and appearing like a small vessel under sail, lies 2 miles off the northeastern side of Karkar Island.

ANCHORAGE.—On the northern side of Tuale Islet there is an opening in the reef, in which vessels with local knowledge may obtain anchorage in a depth of 19 fathoms, about 1/2 mile southeast of the islet. Beacons with white triangular top marks are situated on the northern end of Karkar Island, and these beacons kept in range, bearing 206°, lead into the opening clear of danger.

GRIEG BANK, with 30 fathoms over it, lies about 12 miles eastward of Tuale Islet. This bank was reported in 1944 and has not been examined. A mud volcano was reported (1944) to lie about 20 miles northeastward of the north point of Karkar Island.

BAGABAG (RICH) ISLAND, situated 10 miles southeastward of Karkar Island, is wooded, volcanic, and 1,968 feet high. The island is fringed with reefs and is also ringed by reefs lying 1 to 1 3/4 miles offshore. There are large gaps between outlying reefs except on the northern and northeastern sides.

On the southeastern side of the island is New Year Bay, about three-fourths of a mile wide, extending in a northwesterly direction. The bay has a depth of 42 fathoms in the entrance, and there is a shelving sandy beach at the head.

The drying reef shown on the chart off the entrance to the bay is reported not to exist, but there is a shoal patch with a depth of 5 fathoms about a mile south-southeastward of the entrance. A breaking reef apparently lies about 2 miles east-northeastward of the entrance.

A British naval vessel reported in 1940 that a course of 325° leads into New Year Bay in depths of 25 to 50 fathoms, but that caution is necessary to avoid a small patch of coral reef in the fairway. The depth over this patch is about 4 fathoms, and it is difficult to see.

ANCHORAGE.—Good anchorage may be obtained by vessels with local knowledge in a depth of 15 fathoms, sand and mud, near the head of the bay. This anchorage is sheltered from all winds except those between east and southeast.

10-205 ISUMRUD STRAIT separates Karkar and Bagabag Island from the mainland and is free from dangers.

CURRENT.—A tidal current of about 2 knots in a northwestward direction to about 2 knots in a southeastward direction was reported (1965) in Isumrud Strait.

It was reported in 1944 that a 1 1/2-knot current setting westward was encountered between Bagabag Island and Manam Island,

and that a 2 1/2-knot current setting north-westward was very apparent between Baga-bag Island and Sek Harbor.

10-206 COAST.—Northwestward of Cape Croisilles the coast forms several bays. In the first of these, Mugil (Elizabeth) Bay, is a small island, connected with the shore by a reef, on either side of which there is anchorage in a depth of 12 fathoms, sheltered from northwest and southerly winds, but the channels leading into the anchorages are too shallow for large vessels.

One and a half miles farther westward is a bay, fronted by an island, with a passage on either side; the western one appeared clear, but the water is shallow.

To the westward of this is another bay, fronted by a reef with heavy breakers, extending in a southeast direction from a group of small coral islets, the westernmost of which is connected with the mainland by a reef.

10-207 SARANG (PRINZ ADALBERT) HARBOR is formed by the above-mentioned islets and the mainland and affords sheltered anchorage in depths from 10 to 15 fathoms. Between the northwestern entrance point of this harbor and Pallas Point, 2 1/2 miles northwestward, is a large bay, having on its southern side a grassy plain. Into this bay two streams discharge, the northern of which discolors the sea for a considerable distance offshore. Northwestward of Pallas Point the coast is mostly wooded and hilly, and a plain lies behind. There are several villages along this coast.

Anchorage may be obtained in fine weather, close inshore.

10-208 REEFS.—A reef, with heavy breakers at times, is situated 1 1/2 miles northward of Pallas Point. A shoal with two rocks on it lies about 1 1/2 miles offshore at a distance of about 4 miles north-northwestward of Pallas Point.

Dove Point (4° 35' S., 145° 33' E.), lying about 11 miles northwestward of Pallas Point, is flat and wooded, and has a grassy

hill close inside. Northwestward of the point are two small bays.

10-209 EITEL FRIEDRICH (ULINGAN) HARBOR, entered two miles westward of Neptune Point which lies 7 1/2 miles north-westward of Dove Point, is enclosed by wooded hills on the southern and eastern sides and partly on the west. A reef extends 400 yards from the point westward of Neptune Point, and anchorage may be obtained by vessels with local knowledge northward of the reef in depths of from 16 to 20 fathoms.

Magnus Point, covered with palm trees, lies 4 miles northwestward of Neptune Point.

KRONPRINZ HARBOR, entered about 1 1/2 miles westward of Magnus Point, has a sandy beach with palms on both sides of the entrance. Over the trees in the inner part of the harbor can be seen Mount Prinz Oscar, 4,101 feet in height. Westward of the harbor is a saddle mountain, half covered with trees. There is a coral reef extending from the northern side of the entrance.

Anchorage may be taken on the following bearings: west entrance point 356°, east entrance point 106°. The depths decrease gradually from 19 fathoms toward the head of the harbor.

10-210 CAPE GOURDON, a sharp bend in the coast 5 miles northwestward of Magnus Point, is a gently rising grassy hill of no great height, but quite distinctive.

Light.—A light is shown from Cape Gourdon.

Samoa Point is a short distance northwestward of Cape Gourdon.

Eastward of Samoa Point the coast is formed by a plain, on which grass alternates with thick wood, and which has flowing through it two streams. This plain extends beyond Samoa Point to the entrance of Hatzfeldt Harbor, and inland it is backed by a chain of thickly wooded mountains.

About 2 miles offshore between Cape Gourdon and Samoa Point, the water was observed to be a bright green color, although no bottom was obtained at a depth

of 41 fathoms. Westward of Samoa Point the water alters in color, and one-half of a mile offshore no bottom was obtained at a depth of 9 fathoms.

10-211 HATZFELDT HARBOR ($4^{\circ}23'$ S., $145^{\circ}14'$ E.), is situated 5 miles westward of Samoa Point. The inner part of the harbor is entered between East Point and West Point, 1 mile apart. Both points are fringed by a reef, that off West Point extending 400 yards in a northerly direction. Deigum River discharges into the head of the harbor.

There is a settlement on the eastern side of the harbor, and a hospital on the southern end of Chirimosh Island. Fresh water may be obtained from a well westward of the settlement.

10-212 Pataki Island lies about 1 mile east-northeastward of East Point, and is connected to the mainland by a sandy spit, overgrown with shrub. A conspicuous, lone palm tree stands near the northwest point of Pataki Island.

Reefs.—Reefs extend about 200 yards northward and 1,500 yards west-northwestward of Pataki Island. There is a least depth of 13-feet about 300 yards southeastward of the latter point. A $3\frac{3}{4}$ -fathom patch lies 1,600 yards westward of Pataki Island. In 1940 this patch was reported to lie farther southward of its charted position.

Schimo Reef, with a least depth of $1\frac{1}{4}$ fathoms, lies 1,400 yards northward of West Point.

These reefs are reported to be easily distinguished.

Chirimosh Island, midway between East and West Points, limits the area of the harbor. The island is fringed by reef, which extends 400 yards northward of it, known as Hedwigs Reef. Southward 250 yards from the south end of Chirimosh Island, is Harbor Reef with a least depth of 6 feet. The reef may be passed on either side, but the channels are narrow and carry depths of only about 4 fathoms.

10-213 Anchorages.—With northwesterly winds the anchorage eastward of Chirimosh Island is recommended, but at other times the western part of the harbor is preferable. The anchorages are reported to be subject to the swell.

A vessel which anchored in the harbor used the following bearings: Chirimosh Island 192° and East Point 147° .

Hatzfeldt Harbor is reported to be capable of accommodating 3 large vessels and 1 small vessel, with swinging room. Strong winds from west through north to east-northeast would, according to the report, make the anchorage unsafe. Landing is dangerous in any but flat-bottomed boats.

Tides.—Springs rise $3\frac{1}{2}$ feet.

10-214 Directions.—The approach eastward of Schimo Reef is reported to be the best. The harbor should be approached with Chirimosh Island bearing 179° until the northern point of Pataki Island bears 089° , when course should be altered to 230° , passing between Schimo Reef and the northern end of Hedwigs Reef, and thence 162° in midchannel between West Point and Chirimosh Island.

Seismic sea wave.—On March 13, 1888, Hatzfeldt Harbor was visited by a seismic sea wave, which was also felt at Cape King William and on the coasts of New Britain. Soon after 6 a. m. a noise like firing was heard to the northward and northeastward, and at 6:40 a wave coming from the former direction broke upon the shore at a height of 6 feet above high-water mark. It then receded with such violence that half the port was dry.

About 8 a. m. the height of the wave was from 23 to 26 feet. The sea continued to rise and fall at intervals of 3 to 4 minutes until 9 a. m., when it began gradually to subside, and by 6 p. m. it had resumed its normal condition.

10-215 COAST.—Dugumur Bay lies on the western side of West Point, and has depths of from 6 to 18 fathoms. Close westward of Dugumur Bay is a small cove, named Bilau Bay.

Westward of Hatzfeldt Harbor the coast mountains become lower, forming a continuous chain of grassy hills, and near the shore are numerous palm trees; farther westward these hills fall to gently undulating land, after which they rise again, becoming steeper and more wooded.

The coast forms several bays, the headlands of which are fronted by reefs, and in which are some villages.

Vessels are recommended not to approach this coast nearer than 6 miles.

10-216 Legoarant Islands, lying about 14 miles northwestward of Hatzfeldt Harbor and about 1 mile offshore, consist of two small islands, one-half of a mile apart in a northwesterly and southeasterly direction. There is an apparently clear passage between them.

A reef extends 700 yards northwestward from the northwestern island. Detached reefs lie northwestward of the same island as follows: one reef at a distance of 1 mile, two reefs at a distance of $1\frac{1}{2}$ miles, and one reef at a distance of 2 miles. There are several reefs in the bight southeastward of the islands, but they are generally visible from aloft.

The anchorage off the Legoarant Islands is dangerous; but good anchorage, easy of access, may be obtained by vessels with local knowledge between two islands, situated on the western side of the bay in which the Legoarant Islands lie, and the mainland.

10-217 Bogia (Prinz Albrecht) Harbor ($4^{\circ}17' S.$, $144^{\circ}59' E.$), entered $1\frac{1}{2}$ miles westward of the northwestern Legoarant Island, is fronted by two coral islets, Kolakola and Reamuna.

Reefs lie 200 yards westward and 200 yards

southward, respectively, of Reamuna, the southern islet. Another reef lies 400 yards northward of Kolakola, the northern islet. Entrance can be made on either side of the islands, but that close southward of Reamuna is preferable.

The southern part of the harbor consists of two bights, separated by a tongue of land, from which a reef extends. There are two villages, one near the northern part of the bay and the other on the western side of the western bight. From abreast the latter a reef extends about 200 yards towards Reamuna Islet.

Anchorage.—Anchorage may be obtained about 300 yards southwestward of Reamuna Islet, and also in the western bight. A small cove close northward of Kolakola Islet affords anchorage.

Podbielsky Point lies $1\frac{1}{2}$ miles northward of Kolakola Islet. A detached coral reef with a depth of $2\frac{3}{4}$ fathoms lies $1\frac{1}{2}$ miles northwestward of the point and one-half of a mile offshore. There is a deep water passage between the reef and the mainland.

10-218 Monumbo (Potsdam) Harbor lying $2\frac{1}{2}$ miles northwestward of Podbielsky Point, is small and exposed to the swell. In the middle of the harbor and 300 yards offshore is Malangin Islet, from which a fringing reef extends 250 yards northward and 200 yards eastward. A $1\frac{1}{4}$ -fathom reef and a $2\frac{3}{4}$ -fathom reef lie 150 yards and 650 yards, respectively, west-northwestward of the southern end of Malangin Islet and 200 yards from the southern shore of the bay.

There are several villages and a settlement along the shores of the harbor.

Anchorage in a depth of 22 fathoms may be obtained in the western part of the harbor, with the southern extremity of Malangin Islet bearing 135° .

Current.—In September 1912 a current was observed setting to the northwestward

at the rate of 1 to 2 knots, between Madang and Monumbo Harbors.

10-219 HANSA BAY, situated about 2 1/2 miles northwestward of the northwestern entrance point of Monumbo Harbor, is 4 miles wide at its entrance and is open to the east-northeast. The entrance is northward of Laing Islet situated near the middle of the bay. Laing Islet, flat and densely wooded, has a shoal extending 300 yards from its southern part.

The bay is visited monthly by a steamer, and another vessel calls every six weeks.

DANGERS.—A rock with a depth of 3 feet lies 1,200 yards north-northeastward of the northern point of Laing Islet. While steering toward the northwestern entrance point of Hansa Bay a vessel struck a clay shoal with a depth of 1 fathom, the depth being 7 fathoms close to it.

It has been reported that foul ground extends about 1 1/2 miles offshore northwestward of Hansa Bay.

ANCHORAGES.—Anchorage may be obtained about 700 yards westward of Laing Islet. Anchorage may also be obtained in the northern part of the bay, with the northwestern entrance point bearing about 036° and the northern end of Laing Islet about 150°.

LIGHT.—A light is shown from Condor Point, about 3 miles northward of Laing Islet.

10-220 OFF-LYING ISLANDS.—Manam (Vulcan) Island, lying about 12 miles north-eastward of Laing Islet, is separated from the mainland by Stephan Strait. The island is conical, volcanic, and about 6,000 feet high, being wooded for about 2,500 feet of its height. In 1903 the crater was emitting dense smoke, obscuring the upper part of the island. In October 1936 the volcano was in eruption.

A magnetic disturbance has been reported in the vicinity of Manam Island.

Foul ground has been reported inshore of Manam Island.

10-221 ARIS ISLAND (3° 59' S., 145° 00' E.), situated about 5 miles northwestward of Manam Island, is about 705 feet high and has a flat summit.

Discolored water, having the appearance of an immense reef, was seen in 1885, by the Samoa, when 10 miles northwestward of Manam Island. No soundings were obtained, and it was apparently caused by the rivers of the mainland.

COAST.—Venus Point, situated about 13 miles west-northwestward of Hansa Bay, is not conspicuous, but is a gradual bend with high casuarina trees. The coast between is apparently suitable for anchorage, depths of 5 fathoms being obtained from 1 to 1 1/2 miles offshore.

10-222 RAMU (OTTILIEN) RIVER, entered close westward of Venus Point, is about 400 yards wide at its mouth, fronting which is a bar having on the western side a channel with a depth of about 2 fathoms, within which the depths increase to 8 and 9 fathoms. The entrance is not easily made out from seaward, as the river turns to the westward near the mouth, and the farther bank gives the line of trees an unbroken appearance.

A vessel has ascended this river for a distance of about 8 miles, carrying for some distance depths of 5 to 7 fathoms. At a distance of 6 miles from its mouth the river, about 400 yards in width, has depths of from 4 to 6 fathoms, but a little farther up, beyond a grassy island, there is a bar with a depth of only 8 feet.

The river was ascended in 1903 for 17 miles by the steam yacht Stephen, which approached the entrance with the bungalow bearing about 252°, and although bends were numerous they were not difficult, and in many of its lower parts it had the appearance of a lagoon or canal. The water was found to

be quite fresh about a mile from the entrance.

10-223 BROKEN WATER BAY, so named on account of its troubled water, lies between Venus Point and Cape Wabusi, 8 miles northward. Immediately westward of Ramu River depths of 4 fathoms were obtained at a distance of 3 miles from the shore, and 2 miles farther westward and at a distance of 2 miles from the shore no bottom could be obtained at a depth of 10 fathoms.

Anchorage in a depth of 3 fathoms has been taken off the mouth of a small river in the northern part of the bay, with Bam Island bearing 041°, and Cape Wabusi in range with Cape Girgir, bearing 342°.

Light.—A light is shown from Cape Girgir.

10-224 Sepik River, the largest and most important river on the north coast of New Guinea, flows into the sea between Cape Franceski, about 2 miles north-northwestward of Cape Wabusi, and Cape Girgir, nearly 1 1/2 miles farther north-northwestward. The mouth of the river is about 1 mile in width, and there is apparently no bar. The depths in the entrance are from 3 to 8 fathoms, but there are sandbanks on either side. The current runs at the rate of from 2 1/2 to 3 1/2 knots and causes the water to be discolored as far seaward as Kadovar and Bam Islands, lying from 15 to 20 miles off the coast. Many snags and trunks of trees are met with near these islands.

The river is navigable 60 miles for large vessels and 300 miles for vessels drawing 13 feet. The channel, which has a width of from 300 yards to 1 mile, is subject to continual change, so great caution is necessary when navigating it. For a distance of 40 miles from the entrance there are general depths of from 6 1/2 to 11 fathoms. Beyond this point are places with depths of from 2 1/4 to 3 fathoms, and 300 miles from the entrance the river expands like a large lake with depths of about 9 feet.

The maximum variation of the water level is 20 feet, the depth being greatest at the end of the rainy season.

The flood season is in April, and the low season is September. At Ambunti, 235 miles from the mouth, there is a difference of about 25 feet between the flood and the low levels.

Fogs are said to be frequent along the river especially between July and September. They rarely last after sunrise.

Floating islands of grass, on which small trees grow, constitute a danger in the river. These islands, which reach half an acre in size, may float down on a ship at anchor, causing her to drag, in which case they must be cut right through to clear the ship.

The banks in the lower reaches are dense sago swamps, sometimes fronted by beds of reeds; but higher up breadfruit trees and sago palms abound. Crocodiles, herons, and pigeons were met with, and fish were plentiful, especially eels.

Mosquitos, encountered in large numbers, are at their worst in April. The type of malaria encountered on the river is malignant.

There are villages, with connecting tracks, near the river banks.

About 35 miles up the banks become a little higher and the ground less swampy, the sagos giving place to stout timber.

About 40 miles up is Marienberg mission station, situated on a small hill. The natives in this vicinity do not live near the river, but there are villages a few miles back.

Angorum, 60 miles up, situated on a hill, is a Government station.

Malu is situated about 233 miles from the mouth of the river, and the country between these two points is generally swampy and impassable. At Malu the first high land begins.

The average mean temperature at Malu is 81° F. The annual rainfall is about 114 inches.

The natives do not inhabit the country adjoining the river to any great extent. They

are becoming civilized, as nearly all the region adjacent to the river for a distance of 300 miles from the mouth has been brought under government control. When treated well the natives are friendly and eager to trade.

10-225 DIRECTIONS FOR APPROACHING SEPIK RIVER.—Bring Bam Island, one of the Schouten Isles, to bear 050°, and steer 230° with the island astern.

10-226 SCHOUTEN ISLES, extending from Bam Island at the eastern end to Vokeo Island at the western end, lie from 12 to 25 miles off the New Guinea coast. The relative positions of the islands are reported to be approximate. These islands are not to be confused by name with the group situated northward of Geelvink Bay.

BAM (LESSON) ISLAND (3° 35' S., 144° 47' E.), situated 21 miles northeastward of Cape Girgir, is an active volcano, 1,970 feet high. At the foot of the cone the ground is covered with trees and grass, which on the northern side reach almost to the summit. On this side also there is cultivation on the lower slopes of the mountain, with many coconut groves and an extensive village, while the south side is burnt and reddish in color.

The native population is evacuated from time to time due to volcanic activity on the island. They are, however, returned to their homes when the eruptions subside.

BANK.—A bank with a depth of 25 fathoms has been reported about 41 miles northeastward of Bam Island.

10-227 BLUPBLUP (GARNOT) ISLAND (3° 30' S., 144° 37' E.), lying 14 miles west-northwestward of Bam Island, is also a steep cone, but not so sharp as the latter island. A fringing reef extends 200 yards from the northern side of the island. A reef projects 1 mile westward from the southwestern point of the island, and another reef extends 1,800 yards south-southwestward from the northwestern point of the island.

Blupblup Island has been reported to lie about 2 1/2 miles eastward of its charted position.

Motmot Islet, situated one-half of a mile westward of the island and lying on the northern side of the reef which extends from the southwest point, consists of two hum-

mocks, about 200 feet high. The islet is covered with brushwood and coconut palms.

Anchorage in about 2 3/4 fathoms may be obtained three-fourths of a mile southwestward of the northwestern point of Blupblup Island and 700 yards westward of the reef which extends south-southwestward from the point.

10-228 KADOWAR (BLOSSEVILLE) ISLAND, 5 miles southward of Blupblup Island, is a steep wooded crater, 984 feet high. There are several large villages on the edge of the crater, and many large coconut plantations on the island.

A reef, which breaks with any swell, extends 1 1/2 miles westward from the island.

VIAI (JACQUINOT) ISLAND, lying 12 miles west-northwestward of Blupblup Island, is wooded, conical, and 525 feet high. This island, which is not permanently inhabited, has been reported to lie about 2 miles south-eastward of its charted position. Viai Island was reported to be prominent, with a high peak at each end of the island.

KOIL (DEBLOIS) ISLAND lies 12 miles west-northwestward of Viai Island. A reef extends about 300 yards southward from the eastern end of the southern side, and a detached reef extends one-fourth of a mile westward from the extremity of this reef. Koil Island has been reported to lie about 5 miles east-northeastward of its charted position.

Anchorage in 7 to 13 fathoms may be obtained by vessels with local knowledge on the southern side of the island. The anchorage is inside the detached reef and about 75 yards offshore.

10-229 VOKEO (ROISSY) ISLAND, the westernmost of the Schouten group, lies 7 1/2 miles northwestward of Koil Island. There are several villages on the island, which is steep and cliffy. Vokeo Island is about 2,000 feet high. When seen from the northeastward, it is double humped, with a slight depression between the two peaks, giving it a saddle-shaped appearance. It is heavily wooded and affords sharp tangents. The northeastern extremity of Vokeo Island has been reported to lie 7 miles 076° from its charted position.

REEF.—An extensive reef lies westward of a line joining Vokeo and Koil Islands. This reef is not usually visible, but it breaks in southeasterly winds.

10-230 COAST.—Between Cape Girgir and Cape Tarabu, 45 miles westward, the coast is flat, rising inland to a chain of hills, 300 to 600 feet high. Krauel Bay, in which depths of 8 to 10 fathoms are charted, lies 10 miles southeastward of Cape Tarabu.

10-231 CAPE TARABU (DALLMAN) (3° 38' S., 143° 51' E.) is a steep, thickly wooded hill, about 460 feet high, which in the distance appears as an island. Nightingale Bay lies southeastward of the cape. A reef fringes Cape Tarabu from the head of a creek in Nightingale Bay to the end of the cape and extends 100 yards to seaward, then falls steeply into deep water. Anchorage can be obtained in the bay in 8 fathoms at a distance of more than 300 yards off the reef. Westward of the cape the coast line is hilly as far as Humbolt Bay, a distance of about 190 miles.

Cape Moem, lying about 9 miles west-northwestward of Cape Tarabu, is the extremity of a narrow peninsula projecting 2 miles northward from the coast. Shoal water of less than 3 fathoms extends almost 1/4 mile northward of Cape Moem. A depth of 4 1/2 fathoms was reported (1963) to lie a little less than 8 2/5 miles north-northwest of Cape Moem. The stretch of coast between this cape and Cape Girgir is named the Hanse-mann Coast. Cape Boroam, the extremity of a small peninsula, lies 2 1/2 miles southwestward of Cape Moem.

LIGHT.—A light is shown from the north extremity of Cape Moem.

10-232 OFF-LYING SHOALS.—Sixdiv Shoal, on which there is a least depth of 2 3/4 fathoms, lies about 2 miles northward of Cape Moem.

Byrne Shoal, on which there is a least depth of 2 fathoms, lies about three-fourths of a mile north-northeastward of Cape Boroam.

BOROAM (BORAM) BAY, which indents the coast between Cape Moem and Cape Boroam, has general depths of 4 to 9 fathoms.

10-233 WEWAK POINT (3° 33' S., 143° 38' E.) lies about 4 miles westward of Cape Moem.

RANGE BEACONS, painted white, are located on the southeast side of Wewak Peninsula.

There are depths of 4 fathoms near the head of the bay that lies between Cape Boroam and Wewak Point. An extensive reef, which partly dries at very low tides, extends about 1/2 mile northward from Mission Point, a point in the bay southwestward of Cape Boroam. Depths of 8 fathoms lie about three-fourths of a mile southeastward of Wewak Point, and a 3 1/2-fathom depth lies about three-fourths of a mile northwestward of Wewak Point.

A **WRECK** lies sunk about 3/4 mile southeastward of Cape Boroam.

ANCHORAGE can be taken in 8 to 9 fathoms about 1 1/4 miles west-northwest of Cape Boroam.

WEWAK.—Wewak is a lighterage port. Many of the structures at Wewak were destroyed during World War II. Copra and ground nuts are the chief exports. The port has a six-inch submarine pipeline 700 feet long. Tankers discharge with their own pumps.

A small wharf with a depth alongside of about four feet at low water is located on the east side of Wewak peninsula close southwestward of Wewak Point.

Limited supplies of fruits and vegetables can be obtained.

A radio station is located at Wewak. There are local telephone and radiotelephone services. There is an airfield at Wewak.

A small hospital is located at Wewak.

WRECK.—A buoy marks a wreck located about 3/4 mile south of the northwest extremity of Wewak Point.

CAPE PUS (POMONE POINT), 9 1/2 miles west-northwestward of Cape Moem, resembles Cape Girgir, being flat and wooded with casuarinas.

DALLMANN HARBOR lies immediately southeastward of Cape Pus. Wom Peninsula, projecting about 1 mile from the coast forms the southeastern side of the harbor. About 3/4 mile northeastward of the peninsula is Raboin (Meta) Islet, low, wooded, and surrounded by drying reef. The passage between Raboin Islet and the peninsula is 950 yards wide clear of the fringing reefs, and has depths of 11 to 15 fathoms. Sheltered **ANCHORAGE** is obtainable in Dallman Harbor most of the time, although in northwesterly weather there is li-

able to be considerable swell.

10-234 Off-lying islands.—Mushu (Gresien) Island, separated from the mainland northwestward of Cape Pus by Mushu Strait, is 6 miles in length, in an easterly and westerly direction. The island is fertile and well populated, Mushu village lying on the southern side. The island is very low, visible about 10 miles, and its tangents are not distinguishable.

Shoals.—Shoals have been reported about $3\frac{1}{2}$ miles southeastward of Cape Barabar, the eastern extremity of Mushu Island.

A 10-fathom shoal has been reported to lie about 4 miles eastward of Cape Barabar.

Anchorage can be taken in Mushu Bay in the western side of the island, particularly suitable in southeasterly weather. The bay is deep and fringed on either side by reef, the center being clear until a white sandy beach is reached at the head of the bay. There is 10 fathoms close off this beach. The small bay southward of Mushu Bay is impassable beyond a reef which extends across its entrance.

In northwesterly weather, anchorage in 10 fathoms, sand, can be obtained by vessels with local knowledge southward of the island, where there are several bays.

Kairiru (D'Urville) Island, situated close northward of Mushu Island, is about 8 miles in length, and appears from the northward as rising gradually to a flat-topped summit, 3,346 feet high, situated near its center. On its southern side there are several plantations.

The island is conical shaped and heavily wooded with a single high peak at its center, and is visible 30 to 35 miles.

Rock.—There is a conspicuous rock, about 30 feet high, resembling a boat under sail, about 400 yards from the eastern extremity of the island.

Kairiru Strait, the passage southward of the island, is reported to be deep for the most part. Reefs fringe the shores of the passage, and a sandbank and reef of unknown depth extend from the southernmost point of Kairiru Island. These dangers restrict the passage to approximately 200 yards width in this part.

10-235 Victoria Bay, situated on the western side of Kairiru Island, is about 1 mile

wide in the entrance and indents the coast for a distance of 1 mile. The bay has depths of from 15 to 20 fathoms, dark mud, near the middle. Streams of fresh water abound; the one which flows into the sea, in the small sandy bight situated on the northern side of the bay, is best, and probably continues to flow during the dry season.

Anchorage.—Victoria Bay affords a snug anchorage, except during the northwest monsoon, when it is exposed.

Good anchorage, sheltered from all winds, may be obtained by vessels with local knowledge in the bay in the western portion of Kairiru Strait, about $2\frac{1}{2}$ miles eastward of the southwestern point of Kairiru Island. A depth of 13 fathoms was found here, and 7 fathoms, sand, is reported at 75 yards offshore. Fresh water was found in a stream flowing into the bay.

10-236 Karsau, Unei, and Guap (Yuo) Islets lie in the western approach to Mushu Strait. The two first-mentioned islets are on the same reef, and the passage between them is foul. Guap, the eastern islet, is very low, covered with coconut palms, and well populated. Karsau Island is thinly populated and thickly wooded; Unei is uninhabited.

A reef extends in a northeasterly direction from the east end of Karsau Islet, reducing the width of the channel between that islet and Guap. The channel between Guap and Mushu Island is reported free from danger.

10-237 Valif (Guilbert) and Tendanye (Tarawai) Island, situated about 10 miles west-northwestward of Kairiru Island, lie apparently on the same reef and are densely wooded. The greatest elevation, about 150 feet, is at the southern end of Tendanye, the western island. The beach at Tendanye is sandy and has a narrow fringing reef, and landing can be made at any time on the lee side of the island.

A reef, marked by breakers, extends $2\frac{1}{2}$ miles eastward from Valif Island, and the entire length of the southern side of the island is fringed by a reef, about 1 mile wide.

Three patches of reef were reported in 1912 to lie $1\frac{1}{2}$ miles southward of Valif and Tendanye. The passage between these islands and the mainland appears to be clear.

Anchorage.—Protected anchorage may be obtained by vessels with local knowledge in a small bay, close inshore, on the southern side of Tendanye Island, care being taken to avoid a patch with a depth of $2\frac{1}{2}$ fathoms or less.

Caution.—Valif Island should not be approached closer than 2 miles.

10-238 COAST WEST-NORTHWEST-WARD OF CAPE PUS.—Between Cape Pus ($3^{\circ}29'$ S., $143^{\circ}34'$ E.) and the boundary between the Mandated Territory of New Guinea and Netherlands New Guinea, about 160 miles west-northwestward, the coast, which is named Finsch Coast, is high and densely wooded in places. There is no fringing reef as far westward as Lapar Point, 75 miles westward of Cape Pus, and anchorage may be obtained from 1 to 2 miles offshore. The coast, which rises in steep cliffs in places, is backed by hills from 600 to 800 feet high. Farther inland Mount Turu, 17 miles southwestward of Cape Pus, is 3,938 feet high; and Mount Sapau, one of the Torricelli Mountains situated 19 miles southeastward of Lapar Point, attains a height of 3,309 feet.

The sea everywhere, with the exception of places where large rivers color it yellow, is of a bright to dark green appearance for a distance of 3 or 4 miles from the coast.

The mouths of rivers, lagoons, or brooks should not be used for bearings, as their positions can not be depended on.

Winds and weather.—Tropical storms do not occur in this region but it is subject to sudden brief storms and squalls. These occur throughout the year but are less frequent in the southeast season than in other months. Also these squalls occur mainly from late afternoon to midnight, and are least likely from early morning to noon. Seas are normally smooth or moderate, except during the squalls or when the monsoon winds reach force 5 or over. A heavy swell is rare, but slight to moderate swells are frequent.

Currents.—On this coast there appears to be a 1 knot current setting to the west, generally following the direction of the coastline during the greater part of the year. A few

reports have indicated a weak flow to the east. The westerly set is proved by the fact of debris from the Sepik River slowly reaching Wewak and Aitape.

10-239 Off-lying dangers.—A 3-fathom patch is charted 36 miles westward of Tendanye Island and about 3 miles offshore, and a shoal with a depth of less than 6 feet is reported to lie about 3 miles west-northwestward of it, and about the same distance offshore. The existence of both is doubtful.

Foul ground, about 8 miles in extent, lies about 4 miles southeastward of Seleo Island, and about $2\frac{1}{2}$ miles off the shore, in the approach to Babelsberg Strait.

10-240 Aitape (Berlin) Road and Harbor.—The area enclosed by Seleo, Ali, and Tamara (Tumleo) Islands, situated eastward of Lapar Point, is known as Aitape Road. The harbor is close westward of Seleo Island.

A large amount of driftwood from the Sepik River, which is sometimes large enough to be dangerous to navigation, is frequently to be found in Aitape Road during the rainy season.

There are many villages on the mainland and on the islands.

10-241 Lapar Point ($3^{\circ}07'$ S., $142^{\circ}21'$ E.), the extreme western point of Aitape Road, is a somewhat projecting coastal hill, easily recognized by black rocks and stones lying in the vicinity. The wooded land in the neighborhood of the point is lower than the coast to the eastward, and the hills and the mountain ranges are lower.

Seleo Island, the easternmost of the islands forming Aitape Road, lies $8\frac{1}{2}$ miles east-southeastward of Lapar Point and 3 miles off the mainland. The island is low and wooded. The reef which fringes the island extends about one-half of a mile from its northern side.

Angel, a small islet situated close southward of Seleo, lies on the western side of a detached reef which extends one-half of a mile southeastward of it. The channel between Angel and Seleo is about 200 yards wide and has depths of from 12 to 29 fathoms in the fairway.

10-242 Babelsberg Strait, southward of Seleu, leads into Aitape Road and Harbor, and has a width of 2.4 miles between the reef projecting from Angel and the main shore. It carries considerable depths, but is encumbered with the following shoals:

On the northern side of the strait Saer Laeing, a dangerous $1\frac{3}{4}$ -fathom patch, lies 1,100 yards southwestward of Angel Islet, and 3- and 4-fathom patches lie about $1\frac{1}{4}$ and $2\frac{1}{4}$ miles, respectively, westward of the same islet.

On the southern side of the strait, south-southwestward of Angel Islet, Samoi Bank, a reef with a least depth of 1 fathom, lies 1,300 yards offshore.

In midchannel between Samoi Bank and

Saer Laeing there is a $5\frac{3}{4}$ -fathom patch, which should be approached with caution.

In consideration of the above dangers, Babelsberg Strait is not recommended.

10-243 Ali Island (*southern extremity*, $3^{\circ}08' S.$, $142^{\circ}28' E.$), lying about 1 mile north-westward of Seleu Island is low, wooded and

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fringed by a reef to a distance of about 400 yards. The channel between the two islands is narrowed to 450 yards in its widest part by Middle Reef and other dangers.

Middle Reef, with 9 to 15 feet over it, lies on the south end of the channel and about 400 yards westward of the reef projecting from the northwest end of Seleo. Tapel Rock has 11 feet over it and lies almost in midchannel between Seleo and Ali.

Sang Reef, which lies about 1 mile west-northwestward of Ali, is steep-to and has 18 feet over it.

Warrego Shoal, with 35 feet over it and steep-to, lies about $\frac{1}{2}$ mile northwestward of Sang Reef.

10-244 Tamara (Tumleo) Island lies 4 miles westward of Ali Island and has a conspicuous 207-foot hill at its northwestern end, a good mark for identifying the locality.

The channel between Ali and Tamara carries uniform depths, decreasing as the mainland is approached, and does not appear difficult to vessels making for Berlin Harbor, but there is a reef with a depth of 11 feet, lying 2 miles west-southwestward of the south point of Ali Island, which must be guarded against. Also a patch with a depth of $4\frac{1}{4}$ fathoms lies 1,600 yards southwestward of the 11-foot patch.

Tamara Island is separated from Rohm (Rom) Point, westward on the mainland, by a channel nearly $2\frac{1}{2}$ miles wide, in which there are several obstructions to navigation.

10-245 Tamara Rock, 49 feet high with several small trees on it, lies on the north end of a reef. This reef, with a depth of less than 6 feet, is about $\frac{3}{4}$ mile long in a north-west-southeast direction, and lies about 1 mile westward of the northwest end of Tunelo. Arak Rock, with a depth of 6 feet, lies about $\frac{1}{2}$ mile eastward of Tomelo Rock. Knight Shoals, are two patches with 28 and 25 feet over them, which lie about $\frac{1}{4}$ and $\frac{1}{2}$ mile,

respectively, south-southeastward of Arak Rock.

10-246 Stein Reef, 4 feet high, lies about $\frac{1}{2}$ mile east-northeastward of Rohm Point. The reef is of small extent. There are moderate depths on either side of it, but the channel southwestward of it is narrowed to 800 yards by the fringing reef off Rohm Point.

Pultata Rock, 3 feet high, Lamak Rock, 2 feet high, and Wolpei Rock, with less than 6 feet over it, all lie between the reef on which Tamara Rock lies and the mainland to the southwestward.

Anchorage.—There is anchorage for all classes of vessels in the road, with fair shelter; but the most sheltered position during the southeast monsoon is in Aitape Harbor, close westward of Seleo Island, in depths of from 15 to 17 fathoms. Anchorage may be found westward of the south point of Tamara Island during the southeast monsoon in less depths, and also off the southeast side of the island in other seasons of the year.

A certain amount of shelter can be obtained in the bight, southward of Rohm Point, where cargo can be handled by surf boats during the greater part of the year.

A heavy swell is invariably felt at Aitape Road, and the surf caused by it makes landing difficult. There is a landing place about $1\frac{1}{8}$ miles southeastward of Rhom Point, where a sand spit extends offshore and behind which boats land. It is very seldom, however, that a landing can be made except in native surf boats.

Tides.—Springs rise about 5 feet and neaps rise 1 foot.

Tidal currents.—The flood sets eastward and the ebb westward at the rate of about three-fourths of a knot.

10-247 Directions.—From any direction the hill on Tamara Island is a good land-

mark, and first appears as a cone above the horizon. Vessels coming from the eastward have a choice of passages; that between Seleo and Angel is used by the mail steamers, and is the one recommended.

The passage northward of Seleo Island, though narrow, is sometimes used; a vessel bound for the harbor may pass on either side of Middle Reef, the channel to the eastward is narrow, but well-defined and clear of danger, while that to the westward is impeded by Tapel Rock (sec. 10-243).

The passage between Tamara and Ali is nearly 4 miles wide, and being deep may be used by vessels proceeding westward from the anchorage off Seleo or coming from the westward, taking care to avoid the charted dangers. There are clear passages close westward of Tamara, and on either side of Stein Reef, which may be navigated provided the reef is visible.

A vessel proceeding to the anchorage off Tamara from Seleo, by keeping the peak of Tamara bearing 294° , or westward of that bearing, will pass northward of the charted dangers in Aitape Road.

10-248 Note.—The following information is based on reports received from merchant vessels which visited Aitape Road in the summer of 1944:

Vessels have entered Aitape Roadstead by the passage immediately westward of Tamara Island. The first visible landfall indicating this entrance is the 207-foot hill on the northwest point of Tamara Island. Keep Tamara Island close aboard to port, and thence follow the mainland coast to a position off the village of Borum. Anchorage is taken about one-fourth to one-half of a mile off-shore.

A vessel reported having anchored in 8 fathoms, good sand and coral holding ground, about two ship's lengths off the village of Limieng. This position was reported as being quite secure.

Another vessel reported having anchored off the coast between the villages of Baroka and Borum, in about 18 fathoms. This anchorage was reported as being good, with good holding ground, one anchor being sufficient to hold the vessel even when moderate swells sweep in from the open sea. Tide was stated to be negligible.

Cargo was discharged to "LCT's" and "LCM's". Heavy swells in this area made discharging operations difficult. A long T-shaped wharf near the village of Borum was used by barges.

10-249 Aitape (Eitape), situated near Rom Point, is the principal settlement, and has a population of 20 white and a large number of natives. The principal trade is in copra. A district officer is stationed here.

Communication.—Steamers from Sydney call every six weeks at Aitape Harbor.

10-250 Coast.—Westward of Lapar Point the coast continues for about 70 miles in a west-northwesterly direction to Angriffs Haven, and presents very few distinctive features. About 16 miles west-northwestward of Lapar Point is the entrance to Norovu Lagoon between which and a position about 12 miles farther west-northwestward depths of 10 fathoms or less extend up to $2\frac{1}{2}$ miles from the coast. A 3-fathom reef, marked by breakers in bad weather, lies three-fourths of a mile north-northeastward of the mouth of the Esim River, situated 7 miles westward of Lapar Point. At Prittwitz Point, 35 miles westward of Lapar Point, a range of mountains, 1,225 feet high, approaches the coast and descends in five spurs, terminating in steep rocks, 100 feet high. A $6\frac{1}{2}$ -fathom coral patch lies about $8\frac{1}{2}$ miles west-northwestward of Prittwitz Point, and about $1\frac{1}{2}$ miles offshore. Leitere (Massilia) village, with a lagoon, lies 12 miles west-northwestward of Prittwitz Point. Daumlinge Rocks, covered with trees, lie 21 miles west-northwestward of Leitere village, and about $1\frac{1}{2}$ and $2\frac{1}{2}$

miles eastward of them are two submerged rocks lying about one-half of a mile and 1 mile offshore. There are heavy breakers on the coast in this vicinity.

ANCHORAGES.—Anchorage in depths of from 5 to 10 fathoms may be obtained by vessels with local knowledge in the southwest corner of Daumlings Bay, situated between Daumlunge Rocks and the peninsula forming the eastern side of Angriffs Haven. Anchorage may also be obtained in a small bay lying one-half of a mile westward of the mouth of the Neumayer River, 8 1/2 miles eastward of the Daumlunge Rocks.

10-251 ANGRIFFS (VANIMO) HAVEN (plan G on H. O. Chart 2976) is about 1 1/4 miles wide in the entrance between Cape Concordia and the point west-northwestward of it. Reefs extend about 700 yards northward from both of these entrance points. The depths decrease regularly from 17 fathoms in the entrance towards the head of the harbor. A native village and a mission station are located on the western side of the harbor.

Cape Concordia, the eastern entrance point, is the extremity of the peninsula which forms the eastern shore of the haven. The cape is about 330 feet high and densely wooded.

Coconuts and yams are obtainable, but the water is not suitable for drinking.

10-252 LANDMARKS.—Mount Bougainville (Pasiri), 3,952 feet high, lies 16 miles westward of Cape Concordia. The mount, which is conical and has a flat summit, forms a conspicuous landmark from the westward or northward. Mount Hartmann (Eyries), 6 miles south-southwestward of the cape, has a cone-shaped summit, and is also conspicuous when closer in. A prominent peak, about 5,800 feet high, stands about 37 miles southeastward of Mount Hartmann and about 44 miles westward of Aitape.

For vessels approaching from the east and keeping close to the coast, the Daumlunge

Rocks form the best guide to the vicinity of the entrance.

Anchorage in a depth of 5 fathoms may be obtained in either corner of Angriffs Haven, depending on the monsoon. This anchorage is fairly protected from the swell.

There is room for one vessel to swing in depths of 15 fathoms, according to a report in 1940. A considerable swell set into Angriffs Haven from the northeast, at the time of the observation.

DIRECTIONS.—Vessels can enter without any difficulty by keeping midway between the entrance points. The reefs fronting the entrance points should be given a berth of 400 yards.

10-253 COAST (H. O. Chart 10219-7 and Neth. Chart 379).—Between Angriffs Haven and Robide Point, 14 miles westward, the coast is flat from 1 to 3 miles inland, and consists of swampy soil and bushes. Farther inland is a range of hills. A coral reef, dry at low water, fringes the coast nearly to the point. Westward of Robide Point the spurs of the Bougainville Range approach the coast, which falls steeply to the sea, and the fringing reef becomes narrower.

The depths up to the coastal reef are from 30 to 40 fathoms. In 1896 a vessel took anchorage in a bay 6 miles eastward of Robide Point in a depth of 8 fathoms, 400 yards from the sandy beach. The bay is easily recognized by an outlying rock and in the eastern part of the bay is a 2-fathom patch lying about 650 yards offshore.

10-254 BOUGAINVILLE BAY, situated 2 1/2 miles westward of Robide Point, lies at the foot of Mount Bougainville. In the middle of the entrance lies a rock with a depth of 2 fathoms. Wutung (Oinake) village lies on the western side of the bay. Anchorage in depths of from 10 to 12 fathoms may be obtained by vessels with local knowledge, about 300 yards east of the village. Approaching from eastward the cliffs imme-

diately before the entrance are steep and conspicuous.

Boundary.—The 141st meridian is the boundary between the Mandated Territory of New Guinea and Netherland New Guinea. The boundary is marked by a white stone pyramid, which can be plainly seen from the sea.

10-255 THE COAST FROM HOEK GERMANIA TO GEELVINK BAY—**Wind, weather, and sea.**—Here, as well as in and around Geelvink Bay, the monsoons do not show a very marked difference between the wet and dry period. Heavy showers even occur during July and August.

During July, August, and September of one year the winds may be dominantly northwest winds, while in another year they may be northeast winds. These winds are far from being as strong as those during the other seasons of the year, and usually change at night into land winds which prevail until approximately 10 p. m., after which it is quiet, sometimes with much haziness, until the early morning hours. During December, January, and February the northwest winds are rather strong during the day and night; they bring very little rain but do cause a difficult sea. April and May and October and November are the turning periods.

Surf is seen along the entire coast as a result of the ocean rollers that sometimes run very high, so that the landing in places which are not very well protected is difficult or impossible.

Currents.—It is only in the mouths of the smaller rivers that the ingoing or outgoing tides are noted. Elsewhere the current consists of the monsoon drifts which run in an easterly direction during the northwest season, and in a westerly direction during the other season. Close to the shore this current is weak; the greatest velocity observed in the open sea was generally about 1.5 knots;

only on one occasion was a velocity of 2.5 knots recorded.

10-256 Aspect.—With the exception of the section near the border, from Humboldt Bay to Tanjong Kamdara ($140^{\circ}07' E.$), the coast is low and monotonous. There are trees back of the beach, and here and there the jungle is interrupted by little groups of tall trees, as well as by the mouths of several rivers. Back of the coast lies a generally flat territory which in the south touches the foothills and spurs of the high mountains. These mountains are chiefly located in the interior. It is only between Humboldt Bay and Tanjong Kamdara that the mountains border the coast. As a natural result the coast here is rocky and has many conspicuous points.

The sea bottom off the coast is generally even and regular. Outside of the 10-fathom curve, which runs fairly close along the shore except in the vicinity of the Mamberamo delta, there are few dangers to navigation.

10-257 Population.—The entire area is sparsely populated. From Geelvink Bay to and including Walckenaer Bay there is little fishing activity, so that this coast has a very desolate appearance. However, from Walckenaer Bay to the border, natives are often seen fishing in the open sea. They are usually people from the villages located in Tanah Merah Bay or those of the upper part of Humboldt Bay. The population, generally speaking, consists of a dark-colored, curly-haired race which lives very primitively.

10-258 Coast.—**Hoek Germania** ($2^{\circ}37' S.$, $140^{\circ}56' E.$, *H. O. Chart 2931*), situated 5 miles westward of the boundary, is a steep off-shoot of a 1,017-foot hill. The coast between is high, rocky, and wooded, and is backed by a hump, 2,575 feet high, the western off-shoot of the Bougainville Range.

The Tami River discharges into the sea close westward of Hoek Germania. From seaward the mouth of the river is easy to

recognize by the quantity of driftwood washed up on the coast, particularly westward of the mouth. The river, as far as depth is concerned, would be navigable by boats as far as its junction with the Sekanto River, but many tree trunks and a 4-knot current make this impossible. Large native proas navigate the river as far as the confluence with the Bewoni River.

Anchorage off the mouth of the river can be recommended only in fine weather. The depths increase in a southeasterly direction toward the shore, making the anchorage dangerous during the northwest monsoon.

Between the entrance to the Tami River and Tanjong Djar, 7 1/2 miles westward, the coast, named Sko, consists of a low sandy beach, strewn with trunks of trees from the Tami River, and there is a constant heavy surf. There are three villages along this coast, the eastern one being conspicuous on account of a little temple with a highly pointed roof. Behind the coast stands a row of hills with about five tops, the 1,073 and 1,161-foot summits being rather sharply pointed and fairly conspicuous.

10-259 HUMBOLT BAY lies with its entrance between Tanjong Djar (Bonpland Point), the northern termination of a hill, 1,047 feet high, and Tanjong Soeadja, 4 1/2 miles north-northwestward. Hollandia Bay, the northwestern portion, is the only part visited by deep-draft vessels. Jautefa Bay, situated at the head of the bay, is separated from it by a narrow isthmus.

The western shore of Humbolt Bay from the western entrance point of Hollandia Bay to Hamadi (Mathilde or Missiotti) Islet, 213 feet high, lying close to the shore and joined to it by a reef, is rocky, and thence southward there is a sandy beach with coconut palms as far as Tanjong Pie, a steep rocky hill, forming the northern entrance point of the channel leading into Jautefa Bay. Tanjong Tjeweri, the southern entrance point of this channel, is the extremity of a long narrow isthmus which separates Humbolt and Jautefa Bays. The southern side of this isthmus is swampy and covered with

mangroves, but on its northern side there is a sandy beach covered with coconut palms, similar to the remaining portion of the southern shore of this bay.

The Poen Islands, eleven rocky formations of which five are wooded, lie off the southern shore where two streams flow into the bay. Sibir Islet, from which a reef extends one-fourth of a mile southward, lies one-fourth of a mile southwestward of Tanjong Kassoe (Hagenaars Point), situated 1 mile southwestward of Tanjong Djar.

10-260 DANGERS.—The following dangers lie in the approach to Humbolt Bay, outside the line joining the two entrance points. Distances and bearings are from Tanjong Soeadja.

A 3-fathom shoal, about 2 miles northward and about 1 1/2 miles offshore.

Nembawewe Reef, with a depth of 2 fathoms and marked on its east side by a BUOY painted in red and white vertical stripes with a ball topmark and a reflector, lies 1 1/2 miles south-southeastward of Tanjong Soeadja, and a 3-fathom patch lies the same distance southward of the point. Westward of this last patch and off the western shore are some more patches, and the same is true of the area fronting the entrance channel to Jautefa Bay. Tjemperia Reef, with a depth of 22 feet, lies 1 1/2 miles northwestward of Tanjong Djar, and is sometimes marked by breakers.

A shoal of 1-foot depth lies about 1 mile eastward of Hamadi Islet; other shoals of 3 3/4 and 1 3/4 fathoms lie nearby.

A shoal with a least depth of 8 feet is located about three-fourths of a mile southeastward of Tanjong Jogoer. Two groups of three piles mark this shoal. A shoal, swept to a depth of about 22 feet, lies about 1/4 mile further southeastward of Tanjong Jogoer.

LIGHT.—A light is exhibited from a white framework tower on Tanjong Soeadja, at an elevation of 130 feet; the high land westward obscures portions of its visibility.

10-261 JAUTEFA BAY.—The northwestern part of this bay is deep and clear.

A vessel cannot enter this bay, because the entrance channel with a depth of 10 feet runs dead on to a sandbank with large emerging areas. Between the emerging areas the channel has a depth of about 7 feet, so small craft can enter. On the north side of the channel is an unnamed fairly high rocky island, used by the natives for a cemetery; and on the south side is Metoe Debi, which is quite low and has a village by the same name.

Small vessels with local knowledge may obtain anchorage in 20 feet of water off the village of Tobadi, situated on the northern side of the entrance channel to the bay. A strong current runs through the channel, either in or out, and the channel is subject to small changes. It would be advisable to sound the channel in a boat before entering. In entering the channel a vessel should approach the northern entrance point rather closely by keeping the rocky point at the village bearing 295°. Vessels should run a shore line as there is little swinging room at the anchorage.

10-262 HOLLANDIA BAY lies in the northwestern part of Humboldt Bay, together with Imbi Bay. The inner portion of Hollandia Bay is known as Challenger Cove. The bays are separated by the high Tanjong Kajoe Batoe. Hollandia Bay extends to the westward and Imbi Bay to the northward. Most of the commercial activity is around Challenger Cove, where the city of Hollandia Harbor is built near the shores.

TANJONG JOGOER, 2 miles southwestward of Tanjong Soeadja, is on the southern side of Hollandia Bay. Two rather high islands, ENTSJAR and MADOERAU lie northeastward of Tanjong Jogoer. On the western side of Entsjau is a native village with a church. Drying reefs lie westward and southward of the islands, and a small REEF on which the sea breaks in an easterly sea, extends northwestward about 300 yards from Entsjau toward the fairway. A yellow water tank and several masts stand on Tanjong Jogoer.

RANGE LIGHTS.—The front light of a range is shown from a metal framework tower with

red bands, surmounted by a white triangle, point upward, located at the head of Challenger Cove. The rear light is shown from a white wooden beacon, surmounted by a white triangle, point down, standing 165 yards 255° from the front light. These lights in range 255° lead to the anchorage. A white BEACON surmounted by a white drum marks the edge of the coastal reef about 650 yards northeastward of the front range light.

TOWERS—LIGHTS.—An iron framework radio tower, from which a fixed red light is shown, together with other towers, are located about 1 mile north-northwestward of Tanjong Soeadja.

BUOYS.—A red buoy marks the northern extremity of the reef northwestward of Entsjau.

A mooring buoy is located in the western part of Challenger Cove close westward of Wharf No. 2. An AERO MOORING BUOY is located about 186 yards east-northeastward of the flagstaff situated close to the southward of the front range beacon.

SIGNAL TOWER.—A signal tower stands on Tanjong Jogoer.

WRECK.—A dangerous wreck lies alongside Government Wharf.

10-263 ANCHORAGE in 20 to 24 fathoms may be obtained off the mouth of the Noebai Naan River, which flows into the head of Challenger Cove.

Imbi Bay offers a safe and protected anchorage, although the water is rather deep. The outer portion is entirely clear except for a 6 1/2 fathom patch in the middle of the fairway and about 1/3 mile within the entrance.

The shores of the bay are strewn with demolished quays and numerous wrecks of pontoons and landing craft. It is inadvisable to anchor northward of the above-mentioned shoal patch since the broad coastal reef on both sides makes swinging space somewhat confined.

RANGE BEACONS—BUOY.—A rear range beacon with a white triangular topmark, point down, is located about 9/10 mile, 014° from

the triangulation station on Tanjong Kajoe Batoe. The front range beacon with a similar topmark, point up, is located about 1/4 mile southward of the rear beacon. These beacons are in range 000°.

A red drum buoy is located about 150 yards southward of the front range beacon. It marks a 5 fathom shoal in the northwest part of the bay.

A beacon with a white triangular topmark, point down, is located a little less than 1/3 mile, 352 1/2° from the triangulation station on Tanjong Kajoe Batoe. A beacon with a similar topmark, point up, is located 66 yards, 096° from the above mentioned beacon. These beacons are in range 276°.

The intersection of the two ranges described above, indicates a recommended anchorage in the outer part of the bay.

FACILITIES.—In Imbi Bay there is an offshore pipeline berth with a depth of 20 feet at the offshore end. A buoy marks the offshore end. An oil-bunkering wharf in Imbi Bay has a length of 150 feet and a depth of 20 feet alongside. Fuel and diesel oils are available at the wharf, or from an oil barge at the rate of 100 barrels per hour.

Depths in Hollandia Bay and the approaches around Tanjong Soeadja are ample for the largest vessels and were wire-dragged to a depth of 46 feet, including Imbi Bay. Except for the dangers charted, the waters are clear to this depth. Vessels with a length of 600 feet and a draft of 28 feet can berth alongside.

PILOTAGE is compulsory within Hollandia Harbor. Pilotage service will not be performed between sunset and sunrise, except in cases of emergency. Application for serv-

ice can be made by radio. The harbor-master also acts as a pilot.

TIDES.—The mean high-water interval at Humbolt Bay is 7h. 20m.; springs rise 3 feet, neaps 2.8 feet.

CURRENT.—In 1945 a current setting northeastward with a velocity of 1 knot was observed on two occasions off the coast between Hollandia Bay and the Loemamba Islands.

WEATHER.—Weather conditions do not normally affect the working of cargo. During the Northwest Monsoon, a heavy swell sometimes renders it inadvisable to be alongside due mainly to the weakness of the wharves.

10-264 DIRECTIONS.—Approaching from the westward, follow the mountainous coastline close-to. Vessels normally enter in daylight only. Vessels can pass inshore of the 3-fathom patch northward of Tanjong Soeadja. The drying rock near the shore abreast the patch will serve as a good guide. After passing this position the coastal reef is wide and the surf breaks on it constantly; behind the reef is a sandy beach. Keep about 225 yards off the surf. Then steer for the high land of Tanjong Djar and gradually come around to the westward when the bay opens clear, having regard for the shoal with a least depth of 2 fathoms which extends about 150 yards southeastward from Tanjong Soeadja. Steer slightly northward giving Membawewe a safe berth of 400 yards to get on the range at Hollandia Harbor bearing 255°. In the event of the range beacons not being seen, the easternmost hill of Soeadja Moko will serve as a rear range bearing 075°.

[illegible]