

and along the west coast of Thailand usually set northward in January and southward in February. In March the water flowing northward from the Strait of Malacca causes a northerly current to flow along these coasts. This flow continues through April. In May the currents set from southward to southwestward, except for the extreme south part of this area where a northgoing current still exists. The currents set southward in June and July and northward from August through December.

The tidal current movement is usually semidiurnal in character with some variations in the velocities and durations of the flows. The tidal currents, as a rule, set from east-northeastward to north-northwestward on the rising tide and from west-southwestward to south-southeastward on the falling tide. Considerable variation in set and drift is to be expected between the many islands off these coasts and in the confined areas and estuaries.

Tidal currents are strong along the entire coast between Tavoy Point and the Burma-Thailand border. Between Tavoy Point and Forrest Strait, the tidal currents usually set northward on the rising tide and southward on the falling tide at rates of 2 to 4 knots. The tidal currents attain a rate of 2 1/4 knots through Forrest Strait. In deeper water offshore, the tidal effect becomes negligible and the general circulation predominates. Tidal bores occur in the mouths of rivers and bays.

There is comparatively little reliable information concerning the tidal currents off

the west coast of Thailand. These tidal currents seldom exceed 2 to 3 knots and are seldom experienced over 8 miles offshore.

CAUTIONS

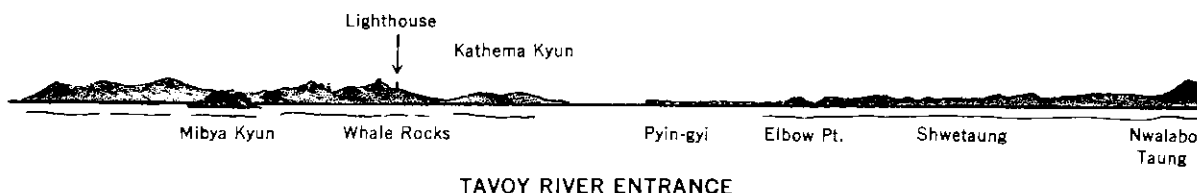
7-5 Vessels must keep a good lookout and sound frequently in passing through any of the channels, or in passing inside the islands, as uncharted reefs and dangers may exist. The channels between the outer islands have not been closely examined.

PART A. TAVOY RIVER AND APPROACHES -TAVOY ENTRANCE TO MERGUI ISLAND

7A-1 Tavoy Point (13°32'N., 98°10'E.) is the south end of a promontory which forms the west side of the estuary of the Tavoy River. A pagoda stands near the point.

GENERAL REMARKS

7A-2 The Tavoy River, which is about 120 miles long, has its main source in the west slopes of the range that separates Burma from Thailand. Tavoy, a river port of some importance, stands on the left bank, about 39 miles northward of Tavoy Point. The river traverses a broad plain about 3 miles above the town, and sandbanks and alluvial islands, which are constantly changing in form and position, impede the course of it. Many tidal creeks intersect the plain between the river and the foot of the hills on either side of it.



The hills extend northward and southward in parallel ranges on the west side of the estuary. Shinmaw Daung, 1,131 feet high, is located about 3/4 mile northward of Tavoy Point on the small peninsula forming that point. Kyan-eik Taung, 1,280 feet high and densely wooded, stands about 3 miles northward of Shinmaw Daung. The hills, farther northward, gradually recede from the west bank of the river. At a position about 16 1/2 miles northward of Tavoy Point, the crest of the range, which is about 2,000 feet high, is located about 2 1/2 miles from the west bank. Abreast Tavoy, the range again closely approaches the river bank.

Low hills, with parallel ridges behind them, are found on the east side of the estuary. These ridges gradually rise to a height of 3,690 feet at Nanpayok Taung which is located about 19 miles eastward of Tavoy Point. Bok Taung, a steep summit, 2,195 feet high, rises from a low range near the coast, about 5 miles westward of Nanpayok Taung. Tetchaung Taung, 2,010 feet high and conspicuous, is located about 9 1/2 miles northward of Bok Taung and is similar in appearance to that hill.

At Elbow Point, located on the east bank of the river, about 9 1/2 miles westward of Tetchaung Taung, the river narrows considerably. Between Elbow Point and Shive Taung, a hill 800 feet high, about 7 miles north-northeastward, the hills approach the east bank and at Shive Taung are within about 1 1/2 miles of it. This distance is maintained as far as Tavoy where they again recede from the banks and rise in successive ranges to Nwalabo Taung, 5,063 feet high and prominent, this peak is located about 14 miles east-southeastward of Tavoy.

Between the mouth of the Tavoy River and Mergui Island, the best landmarks are Shittaunggyi Taung and Round Hill. The former, located 16 miles east-southeastward of Tavoy Point, is 1,500 feet high. The latter is 650 feet high and stands about 10 miles south-southeastward of Shittaunggyi Taung.

The coast between Round Hill and Kalwin Point forms the east side of the inner route to Mergui Harbor.

Mountain ranges with distinctive peaks back the coast for about 40 miles south-southeastward of the entrance of the Tavoy River.

Chimun Taung (Sharp Peak), 5,304 feet high, is located about 20 miles east-northeastward of Round Hill and is the southernmost peak of the highest range.

A 390-foot hill, located close within Zotzit Point, the south extremity of Zotzit Island, about 10 1/2 miles south by eastward of Round Hill, serves as a good mark. Seinnat Taung (South Hill), 550 feet high and located about 6 miles south-southeastward of Round Hill, is prominent. Durbar Peak, 2,170 feet high, is located about 9 miles northeastward of the same hill. Flat Hill, 635 feet high, and Barn Hill, 1,038 feet high, serve as useful marks. They are located 7 1/2 and 14 miles, respectively, southeastward of Zotzit Island.

NAVIGATION

7A-3 The approaches to the Tavoy River from eastward are deep and clear. Coastal vessels, having local knowledge and coming from the northward, can use Moscos Channel (sec. 6B-6).

Vessels bound from the Tavoy River for Mergui Harbor can use the Inner Route which lies between Tavoy Island, and the islands southward of it, and the mainland. Local knowledge is required. Middle Passage (sec. 7B-15) and Iron Passage (sec. 7B-15) lead into the Inner Route from westward.

DEPTHS—DANGERS

7A-4 The 20-fathom curve lies about 11 1/2 miles westward of Tavoy Point and up to 18 1/2 miles off the south end of Tavoy Island. A least depth of 5 1/2 fathoms is found in the fairway of the Inner Route, between Tavoy River and Mergui Harbor. The dangers off this coast, except for the outer islands of the Mergui Archipelago, lie within the 20-fathom curve and are described with their related coastal features.

TIDES—CURRENTS—TIDAL CURRENTS

7A-5 The mean range at Tavoy is 10 1/2 feet; the spring range is 15 1/2 feet. The tidal currents attain a rate of 3 to 4 knots during the dry season and up to 7 knots during the rainy season. During the latter season, the out-going tidal currents may run

continuously. For further tidal information, see section 7-4.

WINDS AND WEATHER

7A-6 Tavoy receives weather information, but no signals are displayed. See section 7-3 for further information on winds and weather.

CAUTIONS

7A-7 Depths in the vicinity of Tavoy Point and in some of the river channels were reported (1958) to be less than charted. For further cautions, see section 7-5.

TAVOY RIVER

7A-8 The estuary of the Tavoy River is about 12 miles wide between Tavoy Point and an unnamed point about 7 miles westward of Nanpayok Taung (sec. 7A-2).

The west bank trends in a general northerly direction for about 11 miles between Tavoy Point and an unnamed point, marked by a pagoda. The south part of this coast is fronted by several islands.

The east bank trends in a general northwesterly direction for about 12 1/2 miles from the first-mentioned unnamed point to Thamokmo (Elbow Point), abreast which the river is about 3 miles wide. The land on the east side of the river is flat, open, and has many rice paddies. There are several hills from about 250 to 1,000 feet high. The higher ranges have been described in section 7A-2. Three small rivers flow out between Thamokmo and a point about 3 miles south-eastward.

Above Thamokmo, both banks trend in a general northerly direction for about 21 miles to Tavoy. Thamokmo is densely covered with mangroves. Between Thamokmo and the village of Sinbyubyin, about 7 1/2 miles northward, the east bank of the river is marked by paddy fields and clumps of trees.

CHANNEL-DEPTHS

7A-9 The main channel passes close eastward of the islands off the south part of the west bank and thence close off the west bank. Northward of Kathema Kyun, the east side of the channel is formed by a spit of sand and mud that extends about 5 1/2 miles southward from Pyin-gyi and divides the river into two channels. Depths of less than 2 fathoms are found on the spit. The recommended channel passes westward of the spit and thence westward of the island.

Depths of not less than 4 fathoms are found in the fairway of the entrance channel for a distance of about 10 miles above the entrance, except for charted depths of 21 feet and 20 feet, located about 1 1/2 miles north-northeastward and 1 1/4 miles northeastward, respectively, of the north end of Mibya Kyun. Depths of not less than 11 feet are found as far as Goodridge Plains, about 16 1/2 miles northward of Tavoy Point. The river is shallow above Goodrich Plains and is navigable only by coastwise and river steamers of light draft.

A 1965 report states that light-draft coastal vessels can proceed up the Tavoy River as far as Sinbyubyin. Surveying, charting, and the laying of marker buoys were reported to be completed.

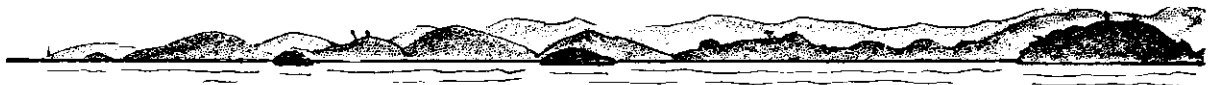
Caution.—Soundings in the Tavoy River between Mibya Kyun and Pyingyi-ashe differ from charted depths.

ISLANDS AND DANGERS

7A-10 ISLANDS AND DANGERS ON WEST SIDE OF RIVER.—Hngetthaik Kyun (Cap Island), located about 2 miles westward of Tavoy Point, has been described in (sec. 6B-41).

Puklaji, a rocky head, lies awash in a position about 1 1/3 miles northeastward of the summit of Shinmaw Daung (sec. 7A-2).

Mibya Kyun, 470 feet high, is located about



Northeast point of Kathema Kyun
in range with west end of Satlaik Kyun, bearing 173°

LEADING MARKS FOR THE WEST CHANNEL, TAVOY RIVER

4 1/4 miles north-northeastward of Tavoy Point. The east and west sides of the island are rather steep-to. A shoal, having depths of less than 3 fathoms and with a least depth of 4 feet, extends a little over 1 mile southward from a position about 400 yards southeastward of the southeast end of the island. A spit, with depths of less than 3 fathoms, extends about 1/2 mile south-southwestward from the south end of the island. Rocks that dry 6 feet lie close off the north end of the island.

Whale Rock, a reef of boulders, 3 feet high, lies about 800 yards south-southeastward of the light house on Mibya Kyun.

Thin-bon Kyun, 725 feet high and densely wooded, lies close off the west shore of the estuary. The bight between the southwest side of the island and the coast to the south-southwestward is encumbered by a drying shoal. Pazin Kyun, 187 feet high, lies close off the west shore of the bight in a position about 2 3/4 miles westward of Mibya Kyun.

Satlaik Kyun, a granite island which is covered with trees; lies about 1 1/2 miles north-northwestward of the light house on Mibya Kyun. The trees attain a height of 162 feet. A narrow ridge, having depths of less than 3 fathoms, extends 3 miles south-southwestward from Satlaik Kyun, between Thin-bon Kyun and Mibya Kyun. Kyauk-pon-gyi, 3 feet high, stands near the middle of the ridge in a position about 3/5 mile westward of the light house on Mibya Kyun.

Kathema Kyun, densely wooded and 550 feet high, is located close offshore, about 800 yards northward of Thin-bon Kyun. A large granite boulder, with a pagoda on it, stands on the northeast point of the island. A 14-foot patch lies on the west side of the fairway, about 3/4 mile northward of the northeast point of Kathema Kyun. Between Kathema Kyun and a point, about 3 miles northward, the west bank has three indentations, each of which is filled with a drying flat.

Mahratta Rock, a pinnacle over which there is a depth of 7 feet, lies on the west side of the fairway in a position nearly 2 1/4 miles north by westward of the northeast point of Kathema Kyun. Rocky ground, over which there is a least depth of 12 feet, lies about 600 yards eastward of the rock; depths in this vicinity are irregular and the bottom is hard.

Shoal patches, with depths of 12 and 14 feet, lie in the fairway in a position about 3/4 mile northward of the rock.

Pyin Gyi, a long, narrow island, lies in mid-river. A conspicuous tree, 50 feet high, stands on the east side of the island, about 2 miles from its north end. Chaukdaung Rock, with a depth of 10 feet, lies about 2 1/4 miles north-westward of the south end of Pyin Gyi and about 300 yards off the west bank of the river.

Many alluvial islands, which are connected by shoals, lie in the river between Pyin Gyi and Tavoy.

7A-11 DANGERS ON EAST SIDE OF RIVER.—Nauwi Rocks, 4 feet high, lie about 4 1/4 miles southwestward of Bok Taung (sec. 7A-2), and about 2 1/2 miles offshore. Some rocks, which dry about 15 feet, lie about 1 1/2 miles south-southeastward of Nauwi Rocks. A rock, awash at low water, lies about 1 mile south-southwestward of the same rocks.

Rocky and dangerous ground, with drying sand and mudflats, fronts the northeast side of the estuary between the east entrance point and Thamokmo, the mudflats extend up to 2 1/2 miles off the common mouth of the before-mentioned three rivers. An extensive shore bank, having depths of less than 3 fathoms, fronts this entire shore and extends up to 7 miles offshore in a position about 6 1/2 miles west-northwestward of Nauwi Rocks.

A 12-foot patch lies close off this shore bank, a little over 4 1/2 miles east by northward of Tavoy Point.

NAVIGATIONAL AIDS

7A-12 A light is shown at an elevation of 309 feet from the north summit of Mibya Kyun.

A beacon stands on the west edge of a spit in a position about 2 1/2 miles northward of the northeast end of Kathema Kyun.

ANCHORAGES

7A-13 Vessels can anchor in 24 feet, northward of, and well clear of Puklaji and between it and the south end of the shoal that extends southward from Kyauk-pon Gyi.

Deep-draft vessels can anchor in 30 to 34

feet, about 3/4 mile eastward of the lighthouse on Mibya Kyun. Such vessels can also anchor in 31 to 38 feet, about 1/2 mile northeastward of Saitlaik Kyun, or in 32 to 40 feet, about 1/2 mile eastward or 3/4 mile north-northeastward of Kathema Kyun. A mooring buoy, used by lighters, is moored about 1/2 mile northward of the same island.

Vessels of light draft and having local knowledge can anchor in 19 feet, from 1 1/4 to 1 1/2 miles south-southwestward of the south end of Pyin Gyi. Such vessels with local knowledge can anchor in 13 feet off Goodridge Plains with a waterfall bearing 270°, distant about 1 1/2 miles.

DIRECTIONS

7A-14 No late directions are available. In 1949 vessels were directed to follow a swept channel running in a 345° direction from a position about 5 1/2 miles east-southeastward of Tavoy Point. This course leads towards the deep-draft anchorages off Mibya Kyun, Saitlaik Kyun and Kathema Kyun.

A course of about 350° leads from a position about 1/2 mile eastward of the lighthouse on Mibya Kyun to the anchorage located 3/4 mile north-northeastward of Kathema Kyun. Care must be taken to avoid the before-mentioned 14-foot patch, westward of the anchorage.

Vessels of light draft, having local knowledge and proceeding to the anchorages farther upriver, should pass eastward of the 14-foot patch and thence alter course gradually to westward to bring the northeast point of Kathema Kyun in range astern with the west edge of Saitlaik Kyun, bearing 173°.

FACILITIES

7A-15 TAVOY (14°04'N., 98°11'E.) stands on the east bank of the Tavoy River, about 35 miles above the mouth, and serves as the headquarters of the Tavoy District. Trade is carried on with Rangoon, Penang, and Thailand ports. Exports consist of rice, rubber, silk, salt, wolfram, tin ore and salted fish. In 1953 the population was about 40,000.

WHARVES.—There are a number of jetties, pontoon piers and finger piers, suitable only for small, light-draft craft.

CARGO INFORMATION.—Almost all the vessels calling at the port are coastal craft,

and all but the smallest of these anchor near the mouth of the river and load or discharge from lighters or small craft which can navigate the channel to the port. Small lighters, launches, and native craft are available.

WATER can be obtained in very limited quantities.

PROVISIONS.—Vegetables are scarce, but fresh fruit and bread are obtainable.

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

COMMUNICATIONS.—Tavoy is connected to the maintelegraph system. Regular sea and air communications are maintained with Rangoon. A road connects Tavoy with Ye, a railroad terminus.

MEDICAL.—There is a hospital at Tavoy.

PART B. MERGUI HARBOR AND APPROACHES—NORTH END OF BENTINCK ROUTE

7B-1 KANTU ROCKS (13°20'N., 98°24'E.), two isolated rocks, 8 and 10 feet high, respectively, lie about 5 1/2 miles west-northwestward of Round Hill (sec. 7A-2); the outer rock is about 4 miles offshore. Shoal ground, as defined by the 5-fathom curve, extends 1/2 mile southward from these rocks.

GENERAL REMARKS

7B-2 The west side of the channel to Mergui Harbor from northward is formed by Tavoy Island and the islands southward of it. The east side of the channel is formed by flats and banks fronting the mainland from abreast Round Hill to Mergui Island. Middle Passage (sec. 7B-15) and Iron Passage (sec. 7B-15) lead into the Inner Route from westward.

The south approach to Mergui Harbor is by way of a channel, about 18 miles long, the southwest extremity of which connects with the Bentinck Route (sec. 7B-27).

Mergui Harbor is of some commercial importance. There are other ports and harbors which afford sheltered anchorage and which can be reached by deep channels.

NAVIGATION

7B-3 VESSELS FROM NORTHWARD using the Inner Route should shape course to pass

about 2 miles eastward of the north extremity of Tavoy Island and thence alter course to pass about the same distance off Cornwall Point, the east extremity of that island. Thence a direct track, which is free from dangers, leads between Iron Island and Long Island.

Vessels from westward should proceed through either Middle Passage (sec. 7B-15) or Iron Passage (sec. 7B-15). Care is necessary in both channels on account of strong tidal currents and tide rips.

Iron Island, King Island and Plantain Island appear as one lofty island to vessels approaching from northward. From a position about midway between Iron Island and Long Island, vessels should steer 167° for the steep east extremity of Plantain Island. When Thita Kyun (sec. 7B-9) bears 113° , the course should be altered to 150° with the summit of Pataw Island (sec. 7B-16) ahead. When the northeast end of Plantain Island comes into range with the summit of Little Cannister Island (sec. 7B-10), bearing about 312° , it should be brought astern and kept on that bearing. This course of 132° leads to the outer anchorage, northwestward of Kalwin Point.

THE APPROACH FROM SOUTHWARD (sec. 7B-19) is suitable only for light-draft craft with local knowledge.

DEPTHS—DANGERS

7B-4 There is a least depth of $5\frac{1}{2}$ fathoms over a width of about $2\frac{3}{4}$ miles in the fairway of the navigable channel between the north part of Tavoy Island and the extensive flat that extends westward from the adjacent mainland. Soundings give no warning of the approach to this flat.

Middle Passage and Iron Passage are deep and clear of dangers.

The approach channel to Mergui from southward is shallow. Vessels with local knowledge, with a draft not exceeding 8 feet, can use this channel at high water.

The dangers off this coast, except for the outer islands of the Mergui Archipelago, lie within the 20-fathom curve.

TIDES—CURRENTS—TIDAL CURRENTS

7B-5 The tide may fall one foot lower than the datum to which the soundings on the chart are reduced in the perigee spring tides of February and March.

During the rising tide the tidal currents set southward off the east coast of Tavoy Island through Port Owen at rates of 1 knot to 2 knots at springs in the dry season, but may attain a strength of 4 knots during the rainy season. During the falling tide these currents set northward at rates of 2 to 3 knots at springs during the dry season. During the rainy season, the rates are weaker and at neaps, the set may be southerly.

The tidal currents set through the channel between the north part of Tavoy Island and the extensive flat that extends westward from the adjacent mainland at a rate of $1\frac{1}{2}$ knots at springs. The tidal currents on the rising tide set towards this flat.

Strong eddies, tide rips, overfalls and tidal currents occur in Middle and Iron Passages, especially during the Southwest Monsoon. In both passages, the tidal currents appear to set eastward on the rising and westward on the falling tide. The tidal currents attain a rate of more than 3 knots at springs in Iron Passage.

Between Pinbwa Island ($12^\circ 17'N.$, $98^\circ 20'E.$) and Christmas Island, about 20 miles southwestward, in the southwest approach to Mergui Harbor, the tidal currents set southeastward on the rising tide. In the vicinity of Shrub Rocks ($12^\circ 15'N.$, $98^\circ 21'E.$) these currents set eastward on the rising tide and are strong at springs. (See tidal currents for Bentinck Route in section 7C-5).

In Fell Passage, eastward of King Island, the tidal currents on the rising tide enter at both ends, meeting abreast of Yemyok (sec. 7B-21). The tidal currents set northeastward in the narrows northward of Payi Kyun from 6 hours after to 1 hour before high water at Mergui at a rate of $1\frac{1}{4}$ knots at springs. The tidal currents in the south approach to Fell Passage are described with the Betinck Route in section 7C-5.

WINDS AND WEATHER

7B-6 Mergui receives weather information, but no signals are displayed. See section 7-3 for further information on winds and weather.

WEST SIDE OF NORTH APPROACH TO MERGUI HARBOR

7B-7 TAVOY ISLAND, the north end of which lies about 20 miles south-southeast-

ward of Tavoy Point, is narrow and mountainous. Its west side is steep and attains a height of 2,254 feet in a position 7 miles southward of its north end. The east side is lower and terminates eastward in Cornwall Point. A LIGHT is shown from Cornwall Point. A small white pagoda, not visible from northward, stands on the east coast of the island, about 2 miles northward of its south end.

PORT OWEN is formed by the northeast side of Tavoy Island, the north side of the peninsula forming Cornwall Point and a group of islands lying up to 3 1/2 miles northward of the north side of the peninsula. Edward, William, Rich and Campbell Islands, a group connected by a shallow drying flat, lie between 3/4 mile and 1 3/4 miles off the northeast coast of Tavoy Island. The flat extends about 2 1/2 miles north-northwestward from a position about 3/4 mile northward of the north side of the peninsula. Edward Island, the northwestern island of the group, is 484 feet high. North Button, Rat and Mouse Islands lie within 1/2 mile northward of the north end of this group.

There are a few small villages in the vicinity of Port Owens. The principal village is located at the head of Fisher Bay (13°05'N., 98°18'E.) which indents the south side of Port Owen. There are some fishing settlements on the south part of the island.

ANCHORAGE is obtainable in Port Owens in 7 to 13 fathoms. CAUTION is necessary as the holding ground is not good, and during the Southwest Monsoon sudden squalls of great violence are liable to sweep down from the mountains. There is a least depth of 6 fathoms in the north approach to the anchorage. Depths of 3 to 5 fathoms are found in the south approach, between Campbell Island and the north side of the peninsula forming Cornwall Point.

An OBSTRUCTION, over which there is a depth of 4 fathoms, lies about 3/4 mile southwestward of the southeast end of Campbell Island. A dangerous WRECK, with topmast

showing at half tide, is located 1 1/2 miles northward of Cornwall Point.

The tidal currents in Port Owen, and between Tavoy Island and the mainland, are described in section 7B-5.

SOUTH ISLAND (12°54'N., 98°19'E.), densely wooded and 504 feet high is separated from the south end of Tavoy Island by a narrow unnavigable passage. South Rocks, a chain of rocky islets, extend 2 miles south-southeastward from a position about 1/2 mile southward of South Island.

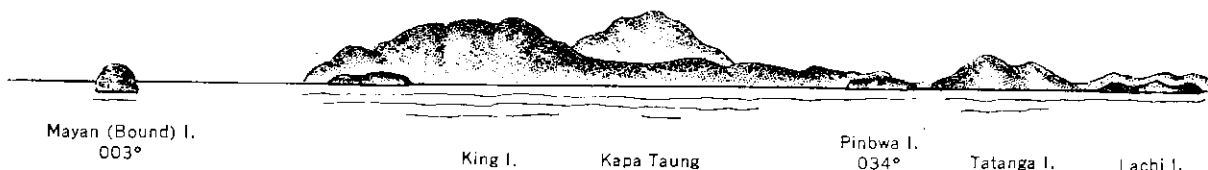
Round Island, 45 feet high, Cochin Island, and South Button Island, 157 feet high, lie from 1/2 mile to 1 1/2 miles off the east side of Tavoy Island, about 8, 6 and 3 miles, respectively, northward of its south end.

7B-8 IRON ISLAND, 1,195 feet high in its south part, is located about 2 1/2 miles south-southeastward of the south end of South Rocks. The west side of the island is precipitous. MIDDLE PASSAGE separates Iron Island from South Rocks. IRON PASSAGE, which is about 1 3/4 miles wide, separates Iron Island from King Island to the southward. These passages are described in section (7B-15).

ANCHORAGE can be taken in 12 fathoms, sand and mud off the east side of Iron Island.

KING ISLAND is large, scarcely populated and densely wooded. Its northeast side forms the west side of the inner route.

Lys Shoal, located about 5 miles southeastward of the south end of Iron Island and about 1 mile off the northeast coast of King Island, consists of two rocky patches. The northwest patch has a least depth of 1 3/4 fathoms; the southeast patch has a least depth of 2 fathoms. The southwest extremity of Iron Island, bearing 308° and in range with the southwest extremity of Little Canister Island (sec. 7B-10), leads close northeastward of Lys Shoal. The north entrance point of Padaw Aw, bearing 248°, leads southward of the shoal.



KING ISLAND FROM SOUTH-SOUTHWESTWARD

Padaw Aw (King Island Sound) is entered between a point about 1 mile southwestward of Lys Shoal and the north end of Plantain Island, about 2 1/2 miles east-southeastward. The latter island appears to be a peninsula. A 1,332-foot peak rises just within the north end of the island. Panella Island, 10 feet high and small, is located about 2/5 mile northwestward of the north end of Plantain Island.

Except near its entrance, Padaw Aw is almost entirely filled by drying flats. ANCHORAGE can be taken in 7 fathoms with the west entrance of the bight bearing 341°, distant about 1/2 mile. CAUTION is necessary as this anchorage lies only about 300 yards from the edge of a 2-fathom shoal.

The approach to Mergui Harbor is continued in section 7B-16.

EAST SIDE OF NORTH APPROACH TO MERGUI HARBOR

7B-9 COAST-DANGERS.—Between Round Hill (sec. 7A-2) and Zotzit Point, about 10 1/2 miles south-southeastward, the coast is fronted by extensive sand and mudflats. Shoal ground, as defined by the 5-fathom curve, extends up to 9 1/2 miles offshore. Zotzit Flat, of sand and mud, extends 7 miles westward from Zotzit Point. It dries in patches.

The channel between the extensive flat and Tavoy Island is described in section 7B-4. The tidal currents set toward the flat on the rising tide, see section 7B-5.

Kyunhla Taung, a conical island, 542 feet high, is located about 6 3/4 miles southwestward of Zotzit Point. Kumla Patch, having a depth of 2 3/4 fathoms, lies about 3 1/4 miles south-southwestward of Kyunhla Taung.

Anyinpo Island, 467 feet high, and Anyinma Island, 350 feet high, are located about 11 and 12 1/2 miles, respectively, southward of Zotzit Point. Both islands are densely wooded. Reefs and shoal ground lie between these islands and the coast. Mandrell Reef, 5 feet high, is an isolated islet which lies about 1 mile north-northwestward of Anyinpo Island.

A reef, that dries 6 feet, lies 1 mile within the 5-fathom curve in a position about 1 1/2 miles southwestward of Anyinma Island. Galbraith Rock (12°50'N., 98°34'E.), located about 4 miles southward of the same island, dries 9 feet and is surrounded by shoal depths. A WRECK, with mast showing, lies

about 6 miles southwestward of Anyinma Island.

Gladys Island, 328 feet high and located about 2 1/4 miles east-southeastward of Galbraith Rock, lies on the east edge of a drying mudbank. It is the northern of a group of islands which are separated from the mainland by narrow creeks and mudbanks.

Long Island (12°48'N., 98°31'E.), 440 feet high and located about 6 3/4 miles south-southwestward of Anyinma Island, is the northeast and outer of a group of small islands that lie off the coast in the north approach to Mergui Harbor. The 5-fathom curve lies about 1 1/2 miles westward of the island. A flat of mud and sand, with depths of 2 to 4 feet, extends about 3/4 mile from the east side of the island.

Daisy Rocks, 22 feet high, lie about 1 mile eastward of Long Island. Cone Island, 127 feet high, lies nearly 3/4 mile east-southeastward of the south end of the same island. Two Spade Island, 273 feet high, lies about 3 miles east-southeastward of Cone Island.

Kadwe Rock, an isolated patch, 4 feet high, is located 2 3/4 miles southward of Long Island.

Kyaukkayan Islands (Pyinban Rocks) consist of a chain of rocks that lie about 2 1/2 miles eastward of Kadwe Rock. The four northern rocks are connected at low water. The southernmost, Peak Island, is 118 feet high. A rock lies awash in a position about 400 yards southward of Peak Island.

Kyaukmi (White Rocks), 14 feet high, lie about 1 3/4 miles southward of Peak Island. A rock, drying 8 feet, and a rocky patch drying 10 feet, lie about 1/2 mile southwestward and 1 mile south-southeastward, respectively, of Kyaukmi.

Sabahlaing Island (High Rock), 5 feet high, lies about 3 3/4 miles southeastward of Kyaukmi. Cap Rock, 22 feet high, lies about 4 1/2 miles south-southwestward of the same island. Thitya Kyun, a steep square rock, 86 feet high, is located about 1 1/4 miles southeastward of Cap Rock. These three islets or rocks stand on an extensive shoal, as defined by the 3-fathom curve. The west side of this shoal extends within 3/4 mile of Kalwin Point from a position about 2 1/4 miles northwestward of Cap Rock.

The approach to Mergui Harbor, south-southeastward of Cap Rock, is described in section 7B-16.

WEST APPROACH TO MERGUI HARBOR

7B-10 ISLANDS WESTWARD OF SOUTH END OF TAVOY ISLAND.—Pinnacle Rock (12°59'N., 98°14'E.), 147 feet high, West Rock, 108 feet high, and Mali Kaing, 338 feet high, are a group of steep-to, black rocks, lying about 3 miles westward of the south part of Tavoy Island.

Great Canister Island, densely wooded and 1,214 feet high, lies about 6 1/2 miles westward of the south end of Tavoy Island. Little Canister Island, conical, densely wooded and 1,017 feet high, lies about 5 1/2 miles south-southeastward of Great Canister Island.

Birds Nest Islands, a group of three gray islets or rocks, lie about 3 miles westward of South Island (sec. 7B-7). Mali Don, the largest and easternmost, is 338 feet high. The next largest and westernmost is 206 feet high.

The channels between these island groups are clear of known dangers.

7B-11 OUTER ISLANDS.—Kabosa Island, the northernmost outer island of the Mergui Archipelago, lies about 26 miles westward of the north end of Iron Island (sec. 7B-8). The island is densely wooded and has four summits arranged in the form of a square. The two southern summits attain a height of 1,300 feet. A rock lies about 200 yards off the southwest end of the island.

West Canister Islet (12°41'N., 97°43'E.), located about 8 miles southwestward of the southwest point of Kabosa Island, is 472 feet high, covered with jungle and steep. North and South Pinnacle, two rocks, 15 and 12 feet high, respectively, stand on an isolated rocky patch, about 4 1/2 miles eastward of the above islet. Freak Islet, conical in shape and 120 feet high, is located about 4 1/4 miles east by southward of North Pinnacle. There are a few scattered trees on this islet.

Investigator Passage, deep and clear, lies between the above three islands on the south and Kabosa Island on the north.

Tenasserim Island is located 10 1/2 miles southward of Kabosa Island. Tenasserim Peak, 1,620 feet high, is the highest and southernmost of several peaks which from a distance appear as separate islands. Herbert Island, 1,047 feet high, and Howard Island, 670 feet high, lie close off the north end of Tenasserim Island. West Islet, 350 feet high,

lies close off the southwest side of the same island and appears to be part of that island. East Islet, 270 feet high and not readily identifiable, lies close southward of the east extremity of the same island. Tenasserim Island and those surrounding it are all densely wooded and steep-to.

Rock Islet, 67 feet high and white in appearance from eastward, is located about 1 mile northeastward of the east end of Tenasserim Island.

Vessels can ANCHOR in 9 fathoms near the head of an inlet, located near the middle of the northwest side of the above island. Protection from the Northeast Monsoon is afforded.

The outer islands of the Mergui Archipelago, southward of Tenasserim Island, are somewhat similar in appearance. They are high, steep and usually covered with dense jungle.

Saurin Island, located about 5 miles southwestward of Tenasserim Peak, is 585 feet high. Two small islets, Ramsey Islet, 348 feet high, and Morgan Islet, 175 feet high, are located 2 1/2 and 4 1/2 miles, respectively, east-southeastward and eastward of Saurin Island. A rock, awash and on which the seas break, lies about 1/2 mile south-southwestward of Morgan Island.

The CHANNEL between these islands and Tenasserim Island is deep. Currents are irregular and tide rips occur.

Blundell Island, 934 feet high, is located about 4 1/2 miles south-southwestward of Tenasserim Island. Chevalier Islet, 358 feet high, lies about 1 1/2 miles westward of the south point of Blundell Island. Chevalier Rock, 6 feet high, lies about 800 yards southward of the islet.

Lion Rock, 130 feet high, is located about 1 3/4 miles southward of Blundell Island. The rock is sparsely covered with scrub.

Sir Charles Metcalfe Island, located about 6 miles southward of Lion Rock, is 1,350 feet high.

The islands and passages, southward of this island are described with the west approach to the Bentinck Route in section 7B-25.

7B-12 MERMAID PASSAGE, entered from southwestward between Lion Rock and Sir Charles Metcalfe Island, is deep and clear of known dangers.

Smart Island, about 880 feet high, has rocky shores and is located about 3 miles eastward of the last-named island. Many rocks lie off the points that form open bays.

Saddle Island, 255 feet high, is located about 5 1/2 miles east-southeastward of the south point of Blundell Island. A reef extends 200 yards from its southwest point.

Oubliee Rock, isolated and 53 feet high, is located about 8 miles eastward of the south end of Blundell Island. A rock, that dries 12 feet, lies about 3/5 mile eastward of this rock.

South Direction Island, 311 feet high, is located about 10 miles eastward of the north end of Blundell Island. Two rocks lie 600 yards off its southwest side. North Direction Island, 150 feet high at its south end, is located about 1 1/2 miles north-northwestward of South Direction Island. A deep CHANNEL separates these two islands.

Elphinstone Island, irregular in shape, hilly and densely wooded, lies with its northwest extremity about 8 miles east-southeastward of the south end of Blundell Island. The most prominent hills are Elphinstone Peak, 1,750 feet high, and appearing from northward as a separate conical island, and False Peak, 1,415 feet high.

A large bay indents the west side of the island. The head of the bay extends in a northeasterly direction almost to the foot of Elphinstone Peak, and in an easterly direction almost to the foot of False Peak. During the Northeast Monsoon, vessels with local knowledge, can ANCHOR in convenient depths, sand, near the head of the bay.

7B-13 PORT MARIA AND APPROACHES.—Port Maria is an open bay that indents the north side of Elphinstone Island. The bay is well-sheltered except from northward and northeastward.

The west side of the bay is irregular and broken, with many small islets close off that side. The east side is steep-to; hills extend down to the high-water line.

Castle Island, with three peaks, is located on the west side of the north approach to the bay, about 3/4 mile north-northwestward of the west entrance point. The highest peak rises to 499 feet. Sack Island, 460 feet high, is located about 1/2 mile southwestward of Castle Island. Two islets lie about 800 yards

southward of Sack Island. These islands and islets all appear to be a part of Elphinstone Island when viewed from northward.

Entrance Islet, 218 feet high and located about 2 miles northeastward of Castle Island, lies in the middle of the north approach to the bay. A reef extends about 400 yards eastward and southward from the island. The east portion of this reef just covers at high water.

Burne Island, 369 feet high and narrow, is located 1 3/4 miles east-southeastward of Entrance Islet. Three small islets are located off the southeast point of the island. The outermost and smallest lies about 800 yards off the north end of Elphinstone Island.

TIDAL CURRENTS in the vicinity of Port Maria are weak. Cross currents are sometimes experienced in the north approach to the port.

ANCHORAGE—DIRECTIONS.—Vessels approaching Port Maria can pass on either side of Entrance Islet and thence steer directly into the bay, keeping nearer the east side until a bay at its west end opens. When Crab Islet, 5 feet high and located close off the west shore, about 1 3/4 miles southward of the west entrance point, is in range with Elphinstone Peak, bearing 261°, anchorage can be taken in 7 fathoms. This anchorage is open to northerly and northeasterly winds.

NOTE.—The islands and dangers between Elphinstone Island and the south part of King Island are described with the northwest approach to the Bentinck Route in section 7B-23.

7B-14 ISLANDS AND DANGERS BETWEEN ELPHINSTONE ISLAND AND IRON AND MIDDLE PASSAGES.—Bowers Island (12°30'N., 98°06'E.), small, steep and 245 feet high, is located about 4 miles northeastward of Entrance Island.

Corbin Island, 447 feet high and densely wooded, is located about 2 1/2 miles southeastward of Bowers Island. It is the northern of a group of islands and rocks lying eastward of Elphinstone Island and in the northwest approach to the Bentinck Route (sec. 7B-23).

Hayes Island, located about 1 mile eastward of Corbin Island, is 300 feet high and densely wooded. The channel between the islands is deep. A sunken rock is charted about 1 mile north-northeastward of Hayes Island.

Maingy Island, separated from the west side of King Island by a narrow and shallow channel, is high and steep-to on its west side. Hills terminate in a peak, 1,970 feet high, in its southwest part. Its southeast side is bordered with mangroves and fronted by an extensive mudbank that dries about 5 feet. A small island, 850 feet high, is separated from the northeast side of Maingy Island by a narrow strip of mud and mangroves. From a distance, it appears as part of the main island. A fishing village is located on the east side of Maingy Island.

Page Islet, a conical rock covered with straggly trees, is 85 feet high and lies 5 miles northwestward of Maingy Island. There is deep water between this islet and Maingy Island, and between the latter island and the Marcus Islands.

Marcus Islands consists of four islands located close together, about 6 miles west-southwestward of the north end of King Island. Marcus Island, 460 feet high, is the northern island of the group. Gifford Island, 440 feet high, is fringed by a reef which extends about 800 yards southwestward from it; a part of this reef is 12 feet high. Harris Island, 460 feet high, appears as two islands, its north and south ends being only connected by a narrow strip of sand and scrub. Genn Island, the smallest and easternmost, is 227 feet high. There is deep water in the channels between the islands. Strong CURRENTS and TIDE RIPS occur.

Brown Rock, about 2 1/2 miles northwestward of Marcus Island, is 66 feet high. Rocks, which sometimes dry, lie close northward and southward of it.

7B-15 MIDDLE PASSAGE lies between the north end of Iron Island (sec. 7B-8) and South Rocks (sec. 7B-7). The passage, which is about 2 miles wide, is deep and clear of dangers.

IRON PASSAGE, deep and clear of dangers in the fairway, lies between Iron Island to the northward and King Island to the southward.

ISLANDS ON SOUTH SIDE OF IRON PASSAGE.—Ant Islet (Kayundaung, 12°42'N., 98°19'E.), 52 feet high and covered with scrub, is located about 1 mile northward of the north end of King Island. Mussel Islet, 27 feet high, lies about 700 yards southward of Ant Islet.

Melhuish (Taungthonion) Island, 223 feet high and densely wooded, lies about the same distance northeastward of the north point of King Island. Three wooded islets lie close off the west shore of an open bight that forms the north side of King Island.

TIDAL CURRENTS in Middle and Iron Passage are described in section 7B-5.

DIRECTIONS.—Middle and Iron Passages lead into the Inner Route to Mergui Harbor. See section 7B-15.

Vessels proceeding eastward through Iron Passage should favor the north side of the passage, so as to minimize the effects of the strong eddies and tide rips off Ant Islet and Mussel Islet. The set of the flood current onto Iron Island must be guarded against.

NORTH APPROACH TO MERGUI HARBOR (CONTINUED)

7B-16 Between the northeast side of Plantain Island (sec. 7B-8) and Cap Rock (sec. 7B-9), about 5 miles east-northeastward, the channel leading to Mergui Harbor is about 2 3/4 miles wide. The east side of the channel is formed by the extensive shoal (sec. 7B-9), as defined by the 3-fathom curve, that extends from a position about 2 1/4 miles northwestward of Cap Rock to within about 3/4 mile of Kalwin Point.

Kala Kyun, an island on the west side of the channel, is separated from King Island by Fell Passage which is described in section 7B-21. Kala Kyun is hilly on its west side and is fronted by mangroves.

Sa Kyun, 293 feet high and steep, is a small islet on the west side of the north entrance of Fell Passage, about 2 1/4 miles north-northwestward of the north point of Kala Kyun.

Kaw Mwe, 200 feet high and surmounted by a white pagoda, is connected to Kala Kyun to the southward by drying flats. A stony shoal, as defined by the 3-fathom curve, extends about 2 1/2 miles northward from the north side of Kala Kyun and forms the east side of the north entrance of Fell Passage.

Except for a narrow channel, with depths of 3 1/4 to 15 fathoms, which extends about 6 miles southward along the east coast of Kala Kyun to within about 1 1/2 miles of its southeast point, the entire area southward of a line joining Kaw Mwe and Kalwin Point, about 6

miles east-southeastward, is studded with small islands, drying banks, and shoals.

Pataw (Mandramakan) Island, located at the southeast corner of this shoal area, is divided into two parts by a large mangrove swamp. The south part is known as Pahtet Island. Pataw Taung, 781 feet high and located near the north end of Pataw Island, is surmounted by a pagoda almost hidden by trees. A pagoda is located a short distance northward of this pagoda. A white pagoda, located about 1/2 mile east-southeastward of Pataw Taung, stands near the east coast of Pataw Island. Pati Taung, 274 feet high and located on Pahtet Island, is also surmounted by a pagoda. Oyster Pagoda, located about 1/4 mile northward of Pati Taung, stands on a 86-foot hill. A pagoda stands about 300 yards east-northeastward of Pati Taung. Two more pagodas are located close northward of the south end of Pahtet Island.

Kalwin Point (12°29'N., 98°36'E.), the northwest extremity of Mergui Island, forms the south entrance point of the Kiaupi River. The latter separates the island from the mainland and forms one of the outlets of the Tenasserim River. The entrance channel of the Kiaupi River is only about 200 yards wide. The extensive bank, that forms the east side of the north approach to Mergui Harbor, forms the north side of the channel.

A LIGHT is shown from a position about 3/4 mile northwestward of Kalwin Point. A new lighthouse was under construction (1965).

MERGUI HARBOR

7B-17 MERGUI HARBOR is located at the south end of the channel that separates Pataw Island and Pahtet Island from Mergui Island. The town of Mergui is located on the west coast of Mergui Island, abreast the south part of Pahtet Island. The west coast of Mergui Island is low and wooded.

TIDES AND TIDAL CURRENTS.—The tidal range at springs is about 16 3/4 feet; the mean range is about 11 1/4 feet.

The tidal currents set southward through the harbor on the rising tide and northward on the falling tide. At springs, the rate of the tidal currents at half-tide is about 2 knots during the dry season. The rate of the ebb current is probably greater during the rainy season.

DEPTHS—DANGERS.—Depths of 5 1/2 to 6 fathoms are found at the outer anchorage.

Depths of 9 to 10 feet are found in the fairway of the channel from the entrance, located about 150 yards westward of Kalwin Point light structure, to a position about 1 mile south by eastward of the entrance. From the latter position, depths of 10 to 15 feet are found in the fairway to a position about 600 yards north by westward of the Main Wharf.

Depths of 19 to 32 feet are found at the inner anchorages, northwestward and westward of the Main Wharf.

A large shoal, with depths of 6 feet or less, lies about 200 yards westward of the channel, 600 yards within the entrance.

A wreck, with a depth of 4 feet, lies close northward of the approach range in a position about 1/2 mile northwestward of Kalwin Point light structure.

An obstruction, with a least depth of 9 feet, lies on the south west side of the entrance channel in a position about 1/4 mile west-northwestward of the same light structure.

A 9-foot patch lies close to the west side of the fairway, about 9/10 mile northward of Main Wharf.

The east sides of Pataw and Pahtet islands are fringed by rocks with the 3-fathom curve lying up to 400 yards offshore. Sand and mudflats, that dry from 1 foot to 5 feet, extend about 300 yards off the west side of Mergui Island.

LANDMARKS.—Mergui Pagoda (12°26'N., 98°36'E.), gilded and prominent, is located about 400 yards eastward of Main Wharf. It stands at an elevation of 239 feet, is brilliantly illuminated, and overlooks the harbor. Various government buildings are located in the vicinity of the pagoda. Wooded hills, about 100 feet high and more, back the town.

Pawdawmu Pagoda, located about 2 miles northeastward of Mergui Pagoda, has an elevation of 187 feet.

Some conspicuous oil storage structures are located about 2 miles southward of Kalwin Point.

The landmarks on the west side of the channel are described in section 7B-16.

NAVIGATIONAL AIDS.—Kalwin Point light structure is described in section 7B-16.

A flagstaff is located 300 yards southeastward of Main Wharf.

A light is shown from Sei-ken-tha Beacon on the seawall in a position about 600 yards north-northwestward of Mergui Pagoda.

ANCHORAGES.—The outer anchorage has depth of 5 1/2 to 6 fathoms and lies in the middle of the approach channel between 1 2/3 miles and 1 mile northwestward of Kalwin Point light structure, with Pataw Pagoda, on the summit of Pataw Island, bearing between 168° and 181°.

Vessels having local knowledge and drawing more than 18 feet can anchor 400 yards westward or 600 yards northwestward of the head of Main Wharf. The anchorage space is reduced in size by the shoals that extend out from the west and east shores of the channel.

Vessels of greater draft can anchor in The Pool, a small deep area off the east end of Patet Island. The swinging room is limited. Eddies occur and the tidal currents are strong. Local knowledge is required.

DIRECTIONS.—Vessels bound for the Outer Anchorage through the Inner Route should follow the directions given in section 7B-3.

Vessels should only enter Mergui Harbor during daytime and under favorable conditions. Navigational aids are inadequate and pilotage is not available.

Vessels of up to 10-foot draft, not having local knowledge, should not attempt entry until after the first quarter of the flood tide, and those of greater draft should not enter until after the first half of the same tide. Vessels with local knowledge and having a draft of 15 feet can enter after the first quarter of the flood tide at neaps.

Vessels entering Mergui Harbor should steer with Kalwin Point light structure in range 130° with Pawdawmu Pagoda, until the lighted beacon on the seawall at Mergui is in range 169 1/2° with Mergui Pagoda. A course of 169 1/2° should then be steered until the white pagoda on the southeast side of Pawtaw Island bears about 258°. Thence course should be altered slightly eastward for a distance of 300 yards to avoid the 9-foot patch, located close westward of the range lines. Having cleared this patch, vessels should steer for the pagoda, located 300 yards east-north-eastward of Pawtaw Pagoda, on a course of 197° and anchor as convenient.

MERGUI (12°28'N., 98°36'E.)

7B-18 FACILITIES.—Mergui extends for more than 1 mile along the southwest shore of

Mergui Island and serves as an administrative and trading center for south Burma. It is a scheduled port of call for small coastal vessels and is the center of rubber and tin-mining operations. Exports consist of fish and fish products, pearls, shells, rubber, wolframite, and tin ore. Pearl fisheries are important. The Port office is located near the root of Main Wharf. The population was 31,000 in 1955.

WHARVES.—A seawall, that extends about 3/5 mile south-southwestward from a position 2 1/5 miles southward of Kalwin Point, fronts the town. Main Wharf is located at the south end of the seawall. Naukle Jetty, located about 700 yards southward of Main Wharf, extends a short distance from the shore. The alongside berths are suitable only for small craft.

A new pontoon wharf, 240 feet long and 20 feet wide, was reported (1963) to be in use. It had a reported depth of 14 feet alongside. A pontoon jetty was scheduled for completion in 1964.

CARGO INFORMATION.—Large vessels anchor and handle cargo by lighters. A 1962 report states special arrangements have to be made for lifts in excess of 5 tons. A mobile crane of 1 1/2 tons is available. Launches, cargo boats and self-propelled and dumb native craft are obtainable. Open and covered storage facilities are available.

WATER is laid onto Main Wharf. The supply is limited, especially during the months of April and May. Drinking water must be boiled before use. A waterboat is available. There is a small ice-making plant.

FUEL OIL and COAL can be obtained in very limited quantities.

COMMUNICATIONS by sea is maintained with Rangoon and other Burmese ports. A road connects Mergui with Tavoy. The town is connected to the general telegraph system.

MEDICAL.—A small hospital is located about 1/2 mile eastward of Main Wharf.

SOUTH APPROACH TO MERGUI HARBOR

7B-19 Mergui Harbor can be approached from southwestward by way of a channel, 18 miles long, that leads between islands and mudbanks that extend southwestward from Mergui Island. The seaward end of the channel connects with the Bentinck Route (sec. 7B-27) in the vicinity of Shrub Rocks. This channel, which can only be used by light-draft vessels with local knowledge, saves

about 15 miles distance. The TIDAL CURRENTS in this area are described in section 7B-5.

CHANNEL-DEPTHS.—The entrance of the approach channel leads between Tatagyi (Burnett) Island, the south end of which is located about 4 miles southeastward of the south end of King Island, and North Round Island, about 1/2 mile farther southward. The entrance lies about 3 miles east-northeastward of the north end of the Bentinck Route (sec. 7B-27).

There are considerable depths in the entrance. The channel has a least depth of 3 1/2 fathoms as far as the anchorage off Limlor (Linmalo) Island, about 6 1/2 miles northeastward of North Round Island. Thence there is a least depth of 1 1/2 fathoms to a position northwestward of the southern Letsari (Ma-aing) Island, about 2 3/4 miles northeastward of Limlor Island. Between the latter position and a position about 1 3/4 miles west-southwestward of the north end of Pataw Island (sec. 7B-16), there is a least depth of 1 foot. Vessels with local knowledge and having a draft of not more than 8 feet, can use this channel at high water.

ISLANDS AND DANGERS.—Tatagyi Island is low, but has some hills on its west, east and southeast sides. The western hill is the highest.

Shrub Rocks, 23 feet high, lie about 1 3/4 miles west-southwestward of the south end of Tatagyi Island. A reef extends nearly 1 mile northwestward from the rocks.

North Round Island, located 1/2 mile southward of the south end of Tatagyi Island, is 243 feet high. South Round Island (Pindan Kyun), 136 feet high, is located about 800 yards southward of North Round Island. A shoal, with a least depth of 2 3/4 fathoms, lies about 1 mile northeastward of North Round Island.

Mergui (Merghi) Islands are bold, densely wooded, and lofty. The summit of the southern island, which is the higher, is 1,254 feet high and pyramidal in shape. Shelving mudbanks, as defined by the 3-fathom curve, extend 1 1/2 and 2 miles westward, respectively, from the north and south islands.

Saunggyi Kyun, located about 1 mile southward of the southern Mergui Island, is 520 feet high. Shoal ground, as defined by the 5-fathom curve, extends about 3 1/4 miles west-southwestward from the west side of Saunggyi Kyun.

The depths, between South Round Island and the northern Mergui Island, are apparently irregular. A 3-fathom patch lies about 3/5 mile southeastward, and a rock that dries 9 feet lies about 1 1/2 miles east-northeastward of South Round Island.

Thetyagi (Palok) Island, small in extent, lies on the south end of a drying shoal on the southeast side of the approach channel, about 2 3/4 miles east-northeastward of North Round Island.

Balu (Thityagi), located about 2 1/2 miles northeastward of Thetyagi Island, is 341 feet high. A hill is located near its southwest extremity.

Pyin Island, 293 feet high and located 1 3/4 miles northeastward of the northeast point of Tatagyi Island, stands on a mudflat that connects that island with Bertie Island. The latter island is low, covered with mangroves, and has a wooded hill, about 200 feet high, near its southeast point. The mudbank, on which the island lies, extends about 1 1/4 miles eastward from the island.

Limlor (Linmalo) Island, 204 feet high, is located near the south end of the above mudbank. ANCHORAGE can be taken in 7 or 8 fathoms, about 1/4 mile southeastward of this island.

Thitya Island, separated from Bertie Island by a narrow channel, is bordered by mangroves. Hills, about 60 feet high, are found near the north end of the island.

Kala Kyun, described in section 7B-16, is separated from Bertie and Thitya Islands by narrow channels. Natsingalit Island, bordered by mangroves and separated from the southeast side of Kala Kyun by a narrow and shoal channel, has a pillar on its south end.

The Letsari Islands, located 4 and 5 miles, respectively, northeastward of Balu Island, are thickly wooded. The southernmost islet is 195 feet high and rises from the north portion of an extensive mudbank. The northernmost is 82 feet high, and lies in the middle of the channel northward of the mudbank.

Greenwich Reef, a patch of rocks that dry at half tide, is located about 3 miles west-southwestward of Pataw Taung (sec. 7B-16).

7B-20 DIRECTIONS.—From a position on the Bentinck Route track with the south point of Yenge Kyun (sec. 7B-27) bearing 316°, dis-

tant about 1 3/4 miles, vessels using the south approach to Mergui Harbor should steer about 049°, with the south end of Tatagyi Island a little on the starboard bow. When Shrub Rocks bears about 041°, distant 1 1/4 miles, the course should be altered to about 066° in order to pass midway between Tatagyi Island and North Round Island. Allowance must be made for the tidal currents which are strong at springs. After passing the south end of Tatagyi Island, the course should be altered to about 042° for 3 1/2 miles until the east end of Pyin Island bears about 012°. Thence the course should be altered to 068° for the anchorage southward of Limlor Island.

Only light-draft craft with local knowledge should proceed northeastward of this anchorage.

MERGUI HARBOR TO AUCKLAND BAY—COAST.—This coast is low and swampy. Several rivers, navigable only by boats, flow out through narrow channels bounded by mudflats. The ridges or hummocks are usually covered with large trees.

AUCKLAND BAY, which has not been closely examined, is entered between the north point of Sellore Island, about 3 miles eastward of Saunggyi Kyun (sec. 7B-19), and Pyingi Island, located about 10 miles northeastward. Sheltered **ANCHORAGE** in 4 to 12 fathoms, mud, can be taken in the outer part of the bay, but **CAUTION** is required.

Tenasserim river has several mouths, the two principal of which are separated by Mergui Island. Tonbyaw Chaung, the southernmost entrance, joins the main river, about 8 miles southeastward of Mergui Harbor.

FELL PASSAGE

7B-21 FELL PASSAGE, which extends southward along the east coast of King Island, is used by coastal vessels proceeding through the Mergui Archipelago. The narrow passage is about 19 miles long and leads between mudbanks which extend out from the islands. Passage thru the channel is not difficult on the rising tide, but local knowledge is required.

DEPTHS.—There is a least depth of 3 1/2 fathoms at high water neaps. Depths of 4 1/4 fathoms are found in the north entrance. A least depth of 3 1/4 fathoms can be carried for a distance of about 7 miles to a position

about 1/2 mile north-northeastward of the north end of Yemyok Island. Thence for about 5 miles farther south-southwestward, there is a least depth of 2 1/4 fathoms.

Considerable depths are found in the south entrance of the passage and for about 5 1/2 miles northeastward of this entrance.

ISLANDS AND DANGERS.—The north entrance of Fell Passage lies between Sa Kyun (Sa Island) (12°33'N., 98°29'E.) and the stony shoal that extends 2 1/2 miles northward from the north side of Kala Kyun. See section 7B-16. The width of the channel is about 600 yards.

Yemyok Island, covered with mangroves, lies in the middle of the passage, about 6 1/2 miles south-southwestward of Sa Kyun. A drying spit extends about 600 yards north-northeastward from its north end. The channel passes westward of Yemyok Island.

Ngo-thok Kyun (Bare Island), 148 feet high, wooded and having a rounded summit, is located on the west side of the channel, about 1/2 mile southwestward of the south end of Yemyok Island.

Payi Kyun (Paye Gyun), 270 feet high on its southeast side, lies in midchannel, about 2 miles south-southwest of Yemyok Island. A pagoda stands on the northwest coast of Payi Kyun. A drying mud spit extends 1 1/4 miles north-northeastward from the north point of the island, and a drying sandflat extends about the same distance southwestward from the southwest side of this island. Sakone Islet, 148 feet high, lies close off the east coast of the island.

Thanbo (Pigele Islet), 90 feet high, lies about 400 yards northwestward of the before-mentioned pagoda. A rocky shoal extends about 250 yards eastward from the islet. A **BEACON**, 12 feet high and surmounted by a black and white ball, marks the southeast end of the shoal.

Myini Islets lie on the west side of the channel. Thila Islet, the southernmost islet, is 65 feet high and lies about 800 yards north-northwestward of Thanbo. Mye-ni-kyun (Thanpo), 220 feet high, lies about 800 yards west-southwestward of Thanbo. A shoal, with a least depth of 1 1/2 fathoms, lies between these islets.

Kantaung Kyun (Gyun Thaug), about 170 feet high, lies on the southeast side of the channel, about 2 miles southwestward of the

southwest point of Payi Kyun. A narrow ridge, with a depth of less than 6 feet, connects the two islands. A 2 3/4-fathom shoal lies in the fairway, about 1/2 mile southwestward of the northwest end of Kantaung Kyun.

7B-22 The south entrance of Fell Passage lies between the south end of KING ISLAND, on the north, and Tatagi (Burnett) Island, Tatange (Fell) Island, and Pinbwa (Passage) Island, on the south.

Tatagi Island, which lies about 1 3/4 miles southwestward of Kantaung Kyun, is described in section 7B-19. Tatange Island, 797 feet high, lies about 1/2 mile westward of the north part of Tatagi Island.

Lachi (Lahchi) Islands, five small conical islets, 136 to 304 feet high, lie from 1/4 mile southward to 1 1/4 miles south-southwestward of Tatange Island.

Pinbwa (Passage) Island, located about 1 1/4 miles southwestward of Tatange Island, forms the south entrance point of Fell Passage. Its summit, 370 feet high, is nearly flat with a slight dip in the middle. A mudbank, with depths of 2 to 3 fathoms, extends about 3/4 mile westward from Pinbwa Island. Shoal ground connects the island with Lachi Islands.

Shrub Rocks, located 1 mile south-southeastward of Lachi Islands, is described in section 7B-19.

TIDAL CURRENTS in Fell Passage are described in section 7B-5.

DIRECTIONS.—Vessels approaching the north entrance of Fell Passage should follow the directions given in section 7B-3 until the east end of Sa Kyun bears 203°. Thence a course of 203° should be steered until a position, about 1/4 mile eastward of the islet lying close northward of Sa Kyun, is reached. Thence the course be gradually altered southward so as to pass about 600 yards off the west coast of Kalo Kyun. A southerly course should be steered until the channel between Yemyok Island and King Island opens. The west side of the passage should then be gradually approached in order to avoid the 1 1/2 fathom shoal, located 7/10 mile north-northeastward of the north point of Yemyok Island, and a course shaped to pass midway between the north point of Yemyok Island and the east side of King Island.

After passing a large double creek, which does not dry, and when Sakone Islet is open

westward of Yemyok Island, and bearing 189°, the course should be altered gradually until that islet bears 184°, or open twice its own breadth eastward of Nga-thok Kyun. After passing close eastward of the latter island, the channel leads westward of the spit extending northward from Payi Kyun and between it and Thila Islet.

A passage leads on either side of Thanbo Islet; the east passage, although narrower, is the more convenient for vessels proceeding southward. Vessels proceeding northward should use the west passage between Thanbo and Thila Islets, taking care to avoid the 1 1/2-fathom shoal located about 300 yards northwestward of Thanbo Islet.

Southward of Thanbo Islet, the channel leads between Payi Kyun and Mye-ni-kyun. Care must be taken to avoid the 1 1/2-fathom shoal located 400 yards northeastward of the latter island. Thence the course leads westward of Kantaung Kyun and of the 2 3/4 fathom patch, located about 1/2 mile southwestward of its northwest point, and thence about midway between King Island on the northwest and Tatagi, Tatange and Pinbwa Islands on the southeast. The EDDIES are strong at springs between King, Tatange and Pinbwa Islands.

Directions southward from Fell Passage through the Bentinck Route are continued in section 7B-28.

NORTHWEST APPROACH TO BENTINCK ROUTE

7B-23 CAUTIONS.—The northwest approach to the Bentinck Route lies between Elphinstone Island (sec. 7B-12) and the south part of Kings Island. Numerous islands, rocks and dangers lie between the two islands. There are irregular depths and due to the nature of the surrounding islands, other dangers than those charted may exist. Tide rips and cross currents occur around the islands. Passage through this area should only be attempted by vessels having local knowledge and then under favorable conditions.

ISLANDS AND DANGERS.—The islands northward of a line joining the north point of Elphinstone Island and the southeast point of Maingy Island have been described in section 7B-14.

Macleod Island (12°25'N., 98°09'E.), close

off the northeast end of Elphinstone Island, is densely wooded and hilly. It has a conspicuous summit, 568 feet high, in its northwest part. Its shores are indented by many small bays, most of which dry at low water. Two small islets, joined to the island by a sand and coral reef, lie off its northeast side. A patch, with a least depth of 3 3/4 fathoms, lies about 800 yards northward of the northern islet and a 2-fathom patch lies about 600 yards southeastward of the southern islet.

Between Macleod Island and Corbin Island (sec. 7B-14), about 2 1/4 miles northward, the water is deep. Tide rips, overfalls and variable currents prevail.

Swirl Rock, an isolated patch of rock, 5 feet high, lies about 1 mile eastward of Macleod Island. Shoals extend 3/4 mile southward from this patch. Depths of 8 to 15 fathoms are found in the channel between the island and the rock.

Johnny Island, 490 feet high and located 4 miles southeastward of Macleod Island, is densely wooded and fringed by reef. Small shallow bays indent its coasts. ANCHORAGE can be taken in 5 fathoms, about 1 mile southwestward of the southwest extremity of Johnny Island.

Six small islands, similar in appearance, are located in the waters between Mainy, Macleod and Johnny Islands. Wilson Island, 345 feet high, Evans Island, 343 feet high, Robert Scott Island, 196 feet high and Peter Scott Island, 160 feet high, form one group. Between this group and Johnny Island is Wood Island, 180 feet high, and Daughlish Island, 225 feet high. A rocky patch, that dries, lies about 800 yards northward of Wilson Island. Reefs extend 600 yards southeastward from the southeast end of Robert Scott Island. An isolated rock, that dries, lies about 600 yards northward of Wood Island. A reef extends about 400 yards from the south side of this island. A detached reef lies about 1/4 mile northwestward of Daughlish Island, and reefs fringe the west, southeast and northeast points of that island. TIDE RIPS and CROSS CURRENTS occur in this area.

7B-24 A sheltered area is formed by the northeast side of Elphinstone Island, the south side of Macleod Island and the north side of Grants Island. The latter island is densely wooded and hilly. Its coastline is indented by many small and shoal bays.

Allans Island, 510 feet high, Patons Island, 400 feet high, and Oates and Bomford Islands, each 220 feet high, form the east side of the sheltered area. Numerous other small islands, among which are Christobal Island, 445 feet high, Sylvia Island, 295 feet high, and Grim Island, lie within this sheltered area. Irregular depths are found in this area.

The north entrance of this sheltered area lies between Elphinstone Island and Macleod Island. It is only 3/5 mile wide and should not be used, because of rocks and foul ground that lie off the northeast end of the former island.

The east entrance, between Macleod Island and Bomford Island, is deep. CAUTION is necessary because of the many islands and dangers within the entrance. A rock, that dries 1 foot, lies 200 yards northeastward of Oates Island.

La-e-ale Island, densely wooded and 304 feet high, lies a little over 3/4 mile south-southeastward of Johnny Island. Two small islets, the highest of which is 260 feet high, lie between these two islands.

La-e-atet Island, lying close southward of the above island, is densely wooded and has a prominent peak, 654 feet high. This peak appears conical when viewed from northward.

Haycock Island, densely wooded and 705 feet high, is the largest and highest of a group of islets and rocky patches that lie from 2 1/2 to 5 1/2 miles westward of La-e-atet Island. Other islands of this group are: Rat, Rock, Flat, Humpty, Mouse, and Dumpty Islands. Mouse Island, 270 feet high and located about 4 1/4 miles westward of La-e-atet Island, should not be confused with another island of the same name, located 2 1/2 miles southward of La-e-atet Island and described in section 7B-27.

The channel, between Grants Island and the north side of Ross Island, about 2 1/4 miles southward, has a least charted depth of 3 1/4 fathoms in the fairway. The greater depths are found close to the former island. This channel has not been closely examined.

WEST APPROACH TO BENTINCK ROUTE

7B-25 SIR CHARLES METCALFE ISLAND, at the southwest entrance of Mermaid Passage, and the islands between it and Kabosa Island, about 29 miles northward, have been described in section 7B-11.

West Spur and East Spur, two islets 1 mile apart in an west-east direction, lie on a rocky shoal in a position about 1 mile southward of Sir Charles Metcalfe Island. The channel between this island and the islets is foul.

Brunnette Island, about 390 feet high, Greenlaw Island, about 530 feet high, and Lion Island lie about 5 miles, 8 1/2 miles, and 11 3/4 miles, respectively, eastward of East Spur Islet.

Thankes Islet (12°15'N., 98°01'E.) is located about 2 1/2 miles northeastward of Lion Island and close southeastward of the south end of Elphinstone Island (sec. 7B-12). Shagstone Island is located about 1 mile southeastward of Thankes Islet. Extending about 5 miles southward from Shagstone Island in the order named are Knap, Basham, Middle and Pym Islands.

Knap and Basham Islands are separated from the west side of Ross Island (sec. 7B-27) by a channel, restricted to a width of 600 yards by rocks, and having a least depth of 3 fathoms. Pym Island, steep-to and conical in shape, is about 400 feet high.

BAILEY ISLAND, 1,163 feet high, is located about 7 1/2 miles south-southwestward of Sir Charles Metcalfe Island. The westernmost islets of a group, that extends about 7 1/2 miles eastward, lie about 11 miles eastward of Bailey Island. This group includes Lump Rock, and Ninepin, South Ninepin, Clyde, Howe, Street, Warden, Lyall, Henry, and Quoin Islands. Howe Island, 576 feet high and Clyde Island are connected by a rocky spit. Quoin Island, which has a rocky spit extending off its east end, has a double peak. Warden Island, the largest and highest of the group, is 808 feet high.

HATTRASS PASSAGE lies between West Spur and East Spur Islets on the north, and Bailey Island on the south.

HENRY PRINSEP ISLAND is located about 5 miles southwestward of Bailey Island. Tower Rock, an excellent landmark, stands on the north point of Henry Prinsep Island. Sargent Island, 1,200 feet high, is separated from the latter island by a foul channel, 1/2 mile wide.

Chester Island, 952 feet high and Mackenzie Island, 866 feet high, are located about 4 miles eastward and 3 3/4 miles east-southeastward, respectively, of Sargent Island. Reefs were

reported (1940) to extend some distance southward from the southwest extremity of Chester Island. These dangers may extend across the passage between this island and Mackenzie Island.

Observation Island, 555 feet high and densely wooded lies about 9 miles eastward of MacKenzie Island.

COURTS ISLAND, 1,130 feet high, lies about 3 miles east-southeastward of Observation Island. Its summit appears as a volcanic cone when seen from the southwestward. The north coast appears to be foul. During the Southwest Monsoon, ANCHORAGE can be taken in 4 or 5 fathoms in a bay which indents the northeast side of the island, about 2 miles northward of its south end. The sandy beach abreast this anchorage is foul to a distance of 150 yards. During the Northeast Monsoon, good ANCHORAGE can be taken, in 5 fathoms, off a sandy beach at the east end of the head of the bay on the south side of Courts Island.

East Islet, 187 feet high, and West Islet, 150 feet high, lie about 2 1/4 miles southward and about 5 miles southwestward, respectively, of Mackenzie Island. Lunka Rock, which dries 6 feet lies about 8 1/2 miles east-southeastward of East Islet.

7B-26 HAYES ISLAND, 1,596 feet high, is located about 7 miles southward of Sargent Island. Fletcher Island, 840 feet high, is separated from Hayes Island to northward by a 3/4 mile-wide channel.

GREAT WESTERN TORRES ISLANDS are the westernmost group of the MERGUI ARCHIPELAGO. They lie from 6 1/2 to 12 miles westward of Fletcher Island. The two largest islands, 1,378 and 1,413 feet high, respectively, are separated by a CHANNEL about 100 yards wide at its southeast end, and about 1,200 yards wide at its northwest end. There is a least depth of 3 fathoms in mid-channel. Depths of 5 1/2 fathoms are found slightly southward of midchannel.

The northernmost island, of the Great Western Torres Islands, is 431 feet high and marks the northwest point of the entrance of this channel. A rock, awash at high water, lies about 1 mile eastward of this island.

Halfway through the channel between the larger islands, a deep cove indents the shore of the southwest island to a distance of about

600 yards. The shores of the cove are fringed with coral. The depths decrease from 12 fathoms off its entrance to about 7 fathoms near its head.

Small vessels with local knowledge can ANCHOR in the cove. Vessels, of too great a length to moor in the cove, can ANCHOR off its entrance in 15 to 18 fathoms. The holding ground is indifferent and the anchorage is open to swells. Vessels should enter through the northwest end of the channel with Northeast Little Torres Island showing through the southeast entrance, and bearing 131°. When the cove opens, ANCHORAGE should be taken, as convenient.

LITTLE TORRES ISLANDS, consist of Northeast Little Torres Island, 228 feet high, with a reef about 1/2 mile westward of it, and three other islets, located in an ellipse, between 4 1/2 miles southeastward and 10 miles southward of Great Western Torres Islands. The highest is 304 feet, and is the islet next northward of the southernmost one. This islet appears as two and has a needle-shaped rock off it. Vessels should not approach within 3 miles of the Little Torres Islands.

Nearchus Rock, covered at high water, is located about 13 miles east-southeastward of Fletcher Island.

Black Rock and the islets south-southeastward of Nearchus Rock are described in section 7C-11.

NEARCHUS PASSAGE connects with the Bentinck Route from the westward. It lies between Fletcher Island, Lunka Rock and Courts Island, on the north, and Great Western Torres Islands, Northeast Little Torres Islands, Nearchus Rock and Bentinck Island (sec. 7C-9) on the south. The peak on the north part of Bentinck Island is not conspicuous from the passage.

DIRECTIONS.—From a position about 2 miles northward of Great Western Torres Islands, steer to pass 1 1/2 miles southward of Fletcher Island. Thence steer to pass 1 mile southward of Courts Island, thence about 1 mile northwestward of Christmas Island, located about 9 miles east-northeastward of Courts Island, where the track joins the Bentinck Route (sec. 7B-28).

BENTINCK ROUTE—FELL PASSAGE TO CHRISTMAS ISLAND

7B-27 BENTINCK ROUTE leads from the south end of Fell Passage (sec. 7B-21) for about 90 miles southward to the north end of Forrest Strait, passing between Bentinck Island on the west and Domel Island on the east. TIDAL CURRENTS in Bentinck Route are described in section 7C-5.

Pinbwa Island and Lachi Islands have been described with Fell Passage in section 7B-22. Shrub Rocks have been described in section 7B-19.

Mouse Island (12°15'N., 98°16'E.), 173 feet high and conical, lies about 5 1/2 miles southwestward of the south end of Fell Passage.

Mayan (Bound) Island, 203 feet high and rounded, lies 1 mile east of Mouse Island. Lump Rock, 20 feet high, lies about 1 1/4 miles southward of the same island. Medina Patches, composed of gravel and having a least depth of 1 1/2 fathoms, rise from a bank of sand and mud, as defined by the 5-fathom curve, that extends about 3 1/4 miles east-southeastward from Mayan Island. White Rock, 12 feet high, lies about 1 3/4 miles southwestward of Mouse Island.

Yenge Kyun (Cantor Island), 359 feet high, is located about 3 3/4 miles southward of the south end of La-e-atet Island (sec. 7B-24). A rock, with a depth of less than 6 feet, lies about 1 1/4 miles east-northeastward of the south end of Yenge Kyun, with foul ground between.

Ross Island lies about 7 miles westward of Yenge Kyun. A prominent, double summit, 806 feet high, forms the southeast point of Ross Island. The north part of the east coast is foul with drying rocks lying 1/2 to 1 mile offshore. The islands off this coast are described in section 7B-24, McClelland Island, 269 feet high, Griffiths Island, 357 feet high, and Helfer Island, 503 feet high, lie between the east coast of Ross Island and Yenge Kyun.

Martin Island, an islet, 209 feet high, lies about 1 1/2 miles southward of the south point of Ross Island. Two larger islets lie between the islet and the island.

Mewstone Island, 500 feet high, Lloyds Is-

land, 840 feet high, Drakes Island, and Criddles Island, 838 feet high, lie close together, from 8 to 13 miles southwestward of the double summit near the southeast extremity of Ross Island. The area between the three last-named islands is foul. A rock, 15 feet high, lies close off the northwest end of Criddles Island. Button Island, 55 feet high, lies about 2 miles eastward of the south end of the same island.

Mergui (Merghi) Islands, on the southeast side of Bentinck Route, about 8 miles east-southeastward of Yenge Kyun, are described in section 7B-19. Auckland Bay, on the southeast side of this group, is described in section 7B-20.

Hext Rock, 4 1/4 miles southward of the south end of Yenge Kyun and lying on the southeast side of the fairway of Bentinck Route, has a depth of 1 foot and is marked by ripples or breakers. The summit of Yenge Kyun in range 002° with the 654-foot peak on La-e-atet Island leads westward of the rock.

Christmas Island, 450 feet high to the tops of the trees and lying about 6 1/2 miles southward of Martin Island, is the northwesternmost of a group of islets and rocky patches. The island is densely wooded. The south side is bold, with off-lying rocks. The north side is indented and has shoals extending 1/2 mile northeastward from it. The summit of the island is prominent from southward. Vessels can pass 1/2 mile off the west side of the island, but CAUTION is required as the TIDAL CURRENTS are strong during the rising tide.

Double Rock, 45 feet high, bare, and having two summits, lies 2 1/2 miles east-northeastward of Christmas Island. Single Rock, 15 feet high, lies about 1/2 mile northward of Double Rock.

7B-28 DIRECTIONS.—Vessels proceeding southward from Fell Passage (sec. 7B-22) through the Bentinck Route should pass about 1/2 mile westward of Pinbwa Island and should then bring the southwest point of King Island in range with the sharp peak on Maingy Island (sec. 7B-14), bearing 340°. Thence a course of 160°, with the range astern, should be steered until Shrub Rocks (sec. 7B-19) bears 046°. Then the course should be altered to 229° until the south end of Yenge Kyun (sec. 7B-27) bears 316°, distant 1 3/4 miles,

when course should be altered to 222° which leads about 1 mile northwestward of Christmas Island.

Note that the double peak on the south end of Ross Island (sec. 7B-27) kept well open southward of the south end of Yenge Kyun leads southward of the banks that extend eastward from the latter island.

Small vessels can cross the shoal eastward of Medina Patches (sec. 7B-27) by keeping the east side of Pinbwa Island open northwestward of Tatange Island (sec. 7B-22) and bearing less than 034°.

Vessels must guard against being set southward between Yenge Kyun and Hext Rock.

Directions southward through the Bentinck Route are continued in section 7C-3.

PART C. BENTINCK ROUTE AND ADJACENT COASTS

7C-1 BASIN ISLAND (11°59'N., 98°10'E.), 260 feet high and sparsely wooded on its north end, lies about 1 mile southeastward of Christmas Island. An islet lies in midchannel between the two islands.

GENERAL REMARKS

7C-2 BENTINCK ROUTE leads from the south end of Fell Passage to the north end of Forrest Strait, about 90 miles southward. It passes between Bentinck Island on the west and Domel Island on the east. The north end of the route has been described in section 7B-27.

The coast, abreast the Bentinck Route, is indented by many mangrove-filled inlets, at the heads of which are meandering tidal streams. The shores are in general extensive mangrove swamps and mudflats with a few areas of rocky headlands and several short, narrow sandy beaches. North-south trending mountain ranges lie close within the south part of this coast.

The nearshore islands are for the most part low-lying and swampy. The offshore islands are mostly high, rocky, and well wooded.

NAVIGATION

7C-3 The track from Rangoon to Singapore leads well seaward of the Mergui Archipelago.

Navigation through this group is very intricate and dangerous.

BENTINCK ROUTE.—Vessels should follow the directions in section 7B-28 to a position about 1 mile northwestward of Christmas Island and thence pass about 1 mile westward of that island. From the latter position a course of 176° should be steered. This course leads about midway between Warning Rock and Bidy Rock and between Cap and Feathers Rock and West Passage Island. Allowance must be made for the tidal currents (sec. 7C-5), as soundings give little warning of the approach to dangers in this area.

When the summit of South Passage Island (11°46'N., 98°07'E.) bears 270°, the course should be altered to 195° which leads about 1/2 mile eastward of Bluff Point, the south extremity of Bentinck Island. When this point comes in range, astern, with the west end of South Passage Island, bearing 005°, the course should be altered to about 185° so as to pass about 1 mile westward of Fly Rock (11°30'N., 98°06'E.).

When Fly Islet, located 2 1/3 miles south-eastward of Fly Rock, bears 090°, distant about 3 miles, the course should be altered to 180°, passing about 2/3 mile westward of Cone Islet. When the summit of Jane Island (11°22'N., 98°01'E.) bears 279°, the course should be altered to 152° which leads about 1 3/4 miles northeastward of Celia Rock, about 4 miles northeastward of Father Island, and about 2 miles southwestward of High Island (sec. 7D-3) at the entrance of Forrest Strait.

NOTE.—South Passage Island is hard to identify from southward. Vessels bound northward should keep Cone Islet (11°23'N., 98°06'E.) bearing not more than 180°, astern, and well open westward of Bushby Island until Fly Rock is passed.

Directions southward through Forrest Strait are continued in section 7D-3.

DEPTHS—DANGERS

7C-4 The approaches to the outer islands of the Mergui Archipelago are deep and clear. Navigation through them is intricate and dangerous. The approaches to the mainland coast are greatly encumbered by these islands. Nearshore approaches are in general obstructed by extensive mudflats and shoals.

There are considerable depths in the fairway of the Bentinck Route, between Christmas Island and the entrance of Forrest Strait. Caution is necessary, however, as there are no navigational aids and the channels have only been partially examined. The least depth in the fairway between West Passage Island and Elephant Island, 2 1/3 miles east-north-eastward, is 3 1/2 fathoms; the greatest depths are near West Passage Island.

CURRENTS—TIDAL CURRENTS

7C-5 In the north approaches to the Bentinck Route the tidal currents set south-southeastward on the rising tide and in an opposite direction on the falling tide, at rates of about 2 knots in open waters. Tide rips, eddies and overfalls are found in the narrow channels.

Near the south entrance of Fell Passage and in the vicinity of Shrub Rocks (sec. 7B-19), the tidal currents set eastward on the rising and westward on the falling tide, at rates of about 2 knots.

Between Shrub Rocks and the Pickwick Group, about 14 1/2 miles south-southwestward, the tidal currents set southeastward on the rising and northwestward on the falling tide. Rates of 4 to 5 knots have been reported at springs.

Between Courts Island (sec. 7B-25) and Parker Island, about 13 miles eastward, the tidal currents set northeastward on the rising and in an opposite direction on the falling tide. A set on to the southwest side of Christmas Island occurs during the rising tide. The rate at springs on the rising tide is 1 1/4 knots; that on the falling tide is 1 3/4 knots.

Between Bentinck Island and Domel Island, northward of West Passage Island, the tidal currents set northeastward on the rising and southwestward on the falling tide, with rates at springs of about 2 knots. In the more open waters northeastward of South Passage Island (11°46'N., 98°07'E.), the tidal currents set northward on the rising and southward on the falling tide, with rates at springs of about 1 knot.

At a position about 4 miles southward of the south end of Bentinck Island, the tidal currents at the start of the rising tide set east-south-eastward and then turn gradually through east

to northeast. The tidal currents set west-southwestward during the falling tide. The rate of both currents at springs is about 1 1/2 knots.

Eastward of Maria Island (11°27'N., 98°00'E.) the tidal currents set southeastward during the rising and northwestward during the falling tide, with rates at springs of about 1 1/4 knots. Between the south end of Domel Island and Carew Island, about 2 miles southward, the tidal currents set northeastward during the rising and southwestward during the falling tide with rates at springs of over 3 knots. The tidal currents are also strong between High Peaked Island and Busby Island, and in Jubilee Channel (sec. 7C-12). Rips occur in this channel, especially off its east entrance.

Between Bushby Island and Owen Island, 8 1/2 miles south-southeastward, the tidal currents set northeastward or east-northeastward during the rising tide and in reverse directions during the falling tide with rates at springs of about 1 1/2 knots.

In the northern approaches to Forrest Strait, between Bernard Island (11°11'N., 98°16'E.) and Dolphin Islands, about 14 1/2 miles southward, the tidal currents set east-northeastward during the rising and in an opposite direction during the falling tide, with rates at springs of about 1 1/2 knots. See section 7D-5 for tidal currents in Forrest Strait.

WINDS AND WEATHER

7C-6 See section 7-3.

CHRISTMAS ISLAND TO BENTINCK ISLAND

7C-7 ISLANDS AND DANGERS.—Courts Island (11°57'N., 98°00'E.), on the west side of the fairway of the Bentinck Route, is described in section 7B-25.

Pickwick Island, 415 feet high, and Weller Island, 320 feet high, the westernmost islands of the Pickwick Group, are densely wooded and lie about 5 1/2 miles eastward of Christmas Island. This group lies on the west side of the entrance of Morrison Bay which is described in section 7C-14. Bare rocks, 25 and 20 feet high, respectively, lie between Weller Island and the north end of Parker Island, about 1/2 mile southward. During spring tides, strong EDDIES occur in this vicinity.

Holly Island, 130 feet high, wooded and

having a prominent summit, lies about 2 miles east-southeastward of Christmas Island. Dangers lie within a radius of 1 mile of Holly Island. Stodart Rock, a small pinnacle having a depth of 6 feet, lies about 2 1/2 miles southward of this island.

Parker, Trotter and Money Islands, which lie southward of the Pickwick Group, form the east side of the Bentinck Route. These islands, which are described with Morrison Bay in section 7C-14, are densely wooded and their west coasts are indented by small sandy bays. An intricate, but rather deep channel, about 1/2 mile wide, separates Parker Island from Trotter Island. The TIDAL CURRENTS are strong in this channel. The channel between the latter island and Money Island almost dries. The channel between Money Island and the north end of Domel Island is narrow and intricate.

Amie Island, 560 feet high and densely wooded, lies about 4 3/4 miles southeastward of Christmas Island, and has a prominent summit. Williams Reef, which dries 4 feet, lies about 1 3/4 miles southwestward of Amie Island. Biddy Rock, with a depth of 16 feet, lies about 1 1/2 miles farther southwestward.

Warning Rock, located on the west side of the fairway, about 6 3/4 miles south-southwestward of Christmas Island, dries about 2 feet. The Bentinck Route track leads midway between this rock and Biddy Rock.

Whale Rock, located about 1 3/4 miles southward of Warning Rock, is 30 feet high. A patch, with a least depth of 1 3/4 fathoms, is located close southeastward of Whale Rock.

Zahora Rock, awash and steep-to, lies about 1 1/4 miles northward of the north end of Bentinck Island.

Marian Island, about 5 miles southward of Amie Island, is sparsely wooded. The most conspicuous peak, at the west end of the island, is 470 feet high. Two grassy summits, 510 and 505 feet high, stand in the east part of the island; the saddle between is prominent from southward.

A group of islands and rocks, including Rosie Island and Biddy Island, lies between Marian Island and Amie Island. Rosie Island has a prominent summit on its northwest side, 485 feet high. Biddy Island, 165 feet high, is a double island, connected by a causeway. A foul channel separates this group from Trotter Island to the eastward.

A pinnacle rock, with a depth of 11 feet, lies

about 1 3/4 miles southward of Marian Island. Several islets and rocks lie between the island and the rock.

Elephant Island, which appears flat-topped from the offing, is 190 feet high and wooded. It lies about 1 3/4 miles southwestward of Marian Island and marks the east side of the channel abreast West Passage Island.

Cap and Feathers, a single rock, 45 feet high, lies 3/4 mile northwestward of Elephant Island. A rock, that dries 10 feet, lies about 100 yards westward of this rock. A shoal, with a depth of 3 fathoms, lies about 1/2 mile northward of the same rock.

Peterson Rock, located on the west side of the fairway, about 3 1/2 miles westward of Elephant Island, dries 6 feet. Crown Island, located about 1 1/2 miles westward of this rock, is 200 feet high, and steep-to on its north side.

West Passage Island, located about 2 1/2 miles west-southwestward of Elephant Island, is bold and wooded. It marks the west side of the channel leading southward from Christmas Island, and is steep-to on its east side.

Dennis Rock, 13 feet high, lies about 1 mile west-southwestward of West Passage Island. It is steep-to.

BENTINCK ISLAND—OFF-LYING ISLETS AND ROCKS

7C-8 BENTINCK ISLAND, with a very irregular and indented coast, is separated from Courts Island (sec. 7B-25) by a deep channel, about 4 1/4 miles wide. The island is densely wooded and hilly. A bold, flat-topped hill, 965 feet high, stands about 2 miles within the north end of the island. A peak, 1,015 feet high and prominent, stands about 2 1/2 miles south-southeastward of the hill. This peak appears as a horn when viewed from northeastward or southwestward. A prominent hill, 885 feet high, stands about 10 miles south-southwestward of the peak and about 1 1/4 miles north-northwestward of the south end of the island.

Bentinck Island is surrounded by relatively deep water with the 10-fathom curve close off the west coast. Shoal ground lies up to 2 miles off the east coast.

The WEST COAST of Bentinck is rugged, wooded, and irregular. Several islets are lo-

cated off this coast, amongst which are Peak Island, 320 feet high, and Charlotte Island, 105 feet high. They lie about 2 miles offshore in positions 9 miles northwestward and 7 1/2 miles west-northwestward, respectively, of the south end of the island.

Three inlets, located about 9, 7, and 4 1/4 miles north-northwestward of Bluff Point, indent the west coast of Bentinck Island. The northern inlet provides ANCHORAGE in 5 fathoms in a bay indenting its north shore. A shallow arm extends southward from the south side of the head of the inlet.

The middle inlet has an arm that extends southward from a position on its south side, about 1 mile within the entrance. Depths of 7 fathoms are found in the entrance. The shores of the arm are fringed with coral. Small vessels with local knowledge can ANCHOR in 4 to 5 fathoms in a cove on the north side of the inlet, abreast the entrance of the south arm. The head of the inlet is shoal.

The south inlet is fringed with reef, and its entrance is obscured from seaward by a number of small islets. Small vessels with local knowledge can ANCHOR in 6 fathoms in this inlet.

The EAST COAST of Bentinck Island is indented by North Bay and by two inlets. Thompson Island, 1,000 feet high and densely wooded, is separated from the northeast coast of Bentinck Island by a narrow and shoal channel. NORTH BAY lies between the northeast side of Bentinck Island and the west side of Thompson Island. ANCHORAGE can be taken in 6 to 15 fathoms, mud.

SOUTH PASSAGE ISLAND (11°46'N., 98°07'E.), bold and wooded, is located on the west side of the Bentinck Route, about 3 1/4 miles southward of West Passage Island (sec. 7C-7). A reef, that dries 2 feet, lies about 800 yards northeastward of the north point of South Passage Island, with shoal depths between. During the dark, rainy nights, which occur during the Southwest Monsoon, ANCHORAGE can be taken about midway between these islands in a position about 2 miles eastward of the south point of Thompson Island.

Doris Rock, which dries 4 feet, and Daphne Rock, which is awash, lie about 6 and 4 1/2 miles, respectively, northward of Bluff Point and about 1/2 mile off the east coast of Bentinck Island.

The south part of the east coast of Bentinck

Island is indented by two inlets, located about 4 and 2 3/4 miles, respectively, northward of Bluff Point. Small vessels with local knowledge can ANCHOR in the north arm of the south inlet.

Several rocks lie off the south end of Bentinck Island. Perforated Rock, 195 feet high and bare, is located 1 1/2 miles west-southwestward of Bluff Point. Fish Rock, 10 feet high, is located about 1 mile south-southwestward of Perforated Rock.

DOMEL ISLAND AND PIGEON ISLAND

7C-9 DOMEL ISLAND, one of the largest islands of the Mergui Archipelago, lies roughly parallel with, and eastward of Bentinck Island, at varying distances from 7 to 13 miles. Domel Island has several conspicuous densely wooded peaks ranging in height from 1,610 to 2,240 feet. Sanderson Hill, which has a bare summit, 1,765 feet high, is located about 9 1/2 miles south-southwestward of the north end of the island. The west coast is interrupted by rocky points, forming many bays with short sandy beaches at their heads.

Livock Bay indents the south coast of the island, near its southeast extremity. The bay is encumbered with dangers, but small vessels with local knowledge can ANCHOR in 4 fathoms in the north arm of the bay. Protection is afforded from the Southwest Monsoon.

Pigeon Island, 390 feet high at its north end, and wooded, lies about 3 miles westward of the northwest point of Domel Island. A shoal spit extends nearly 1/2 mile northward from the island.

BENTINCK ISLAND TO FORREST STRAIT

7C-10 WEST SIDE OF BENTINCK ROUTE.—TREE ISLAND (11°32'N., 97°58'E.) lies about 9 miles southwestward of the south point of Bentinck Island. Northwest Islet lies about 3 miles farther west-southwestward. Flat Islet lies 1 3/4 miles southwestward of Tree Island.

FIVE SISTERS, a group of islands and rocks, lie from 10 to 20 miles south-southwestward of the south end of Bentinck Island. The main islands, named from north to south, are: Maria, Eliza, Jane, Anne, and Charlotte Is-

lands. These islands are wooded; their west coasts are rocky and precipitous. Sandy beaches are found on the east coasts of these islands.

Maria Island has four distinct summits, the northeasternmost attaining a height of 600 feet. Two islets, 160 and 150 feet high, respectively, lie within 1/2 mile northward of the northwest extremity of the island. A reef lies about 1/2 mile westward of the northern islet. A rock, 55 feet high, lies close off the northeast end of Maria Island. Violet Island, wooded and having a grassy summit, 320 feet high, lies about 1/2 mile southeastward of Maria Island. Several rocks, from 1 foot to 120 feet high, lie between the two islands. Maria Rock, 45 feet high, lies nearly 1 mile eastward of Violet Island. A rock, 20 feet high, lies 200 yards northwestward of the rock.

Small vessels with local knowledge can ANCHOR in a small bay that indents the north coast of Maria Island. Protection is afforded from the Southwest Monsoon in 7 fathoms, sand, in a position about 1/2 mile south-southeastward of the northwest end of the island.

Eliza Island, 670 feet high, lies with its north point about 1 1/4 miles southwestward of Violet Island. Northeast Quoin Island, 185 feet high, lies about 1 mile eastward of the southeast end of Eliza Island. Eliza Rock, 35 feet high and bare, lies about 2 miles southeastward of the north end of the same island. Umbrella Rock, 75 feet high and having a rock, that dries 2 feet, about 150 yards southward of it, lies about 3/5 mile south-southeastward of Northeast Quoin Island.

Jane Island, located about 1 mile southward of Eliza Island, is 680 feet high. Jane Rock, 40 feet high and bare, lies about 2 miles east by northward of the north end of Janet Island. A smaller rock lies about 100 yards northwestward of Jane Rock, and a rock, 10 feet high, lies about 400 yards south-southeastward of Jane Rock. Janet Island, 290 feet high and densely wooded, is located about 2/5 mile southeastward of Jane Island. Two rocky ledges lie in the channel between the two islands.

Anne Island, located 1/2 mile southward of Jane Island, is 670 feet high. Two isolated rocks lie about 3 1/4 miles westward of the north end of Anne Island. Small vessels with

local knowledge can anchor in 8 fathoms, sand, in a bay located 1/2 mile south-southeastward of the north end of Anne Island.

Charlotte Island, separated from Anne Island to northward by a channel, about 200 yards wide, is 515 feet high. There is a small rock on either side of the channel. A rock, 100 feet high, lies 200 yards southward of the former island. Charlotte Rock, 70 feet high and bare, lies about 800 yards east-northeastward of the same island. May Island, 135 feet high and densely wooded, lies about 150 yards eastward of Charlotte Island. Pin Island, steep-to and densely wooded, is 205 feet high and lies about 400 yards east-southeastward of South Quoin Islet. The latter, which is 255 feet high, lies about 200 yards southward of May Island.

Celia Rock, awash, lies about 2 miles east-northeastward of May Island. Depths of 8 fathoms are found about 1/2 mile southeastward of this rock.

7C-11 ISLANDS AND DANGERS WESTWARD AND SOUTHWARD OF FIVE SISTERS.—BLACK ROCK (11°23'N., 97°40'E), visible from a distance of about 8 miles, lies isolated in a position about 18 1/2 miles west-southwestward of Maria Island.

Coopers Driver Island, rugged and partly wooded, lies about 5 miles southwestward of Charlotte Island. Except for a small islet lying close off the southwest point, the east and west sides of the island are steep-to. A bare islet, connected by a chain of rocks to a similar islet, about 1 mile eastward, lies close off the north end of the island. Strong EDDIES are found during the strength of the tidal currents.

Hen and Chickens, a group of six rocks, lie about 2 1/2 miles southward of Charlotte Island; the southern and largest rock is 50 feet high.

Son Island and Father Island, 350 and 610 feet high, respectively, are two bare islands, standing close together about 5 1/2 miles southeastward of Hen and Chickens. Cliffs, streaked with red, are found on the south and west side of Father Island. A rock, 3 feet high, lies about 3/5 mile northward of Son Island. Two other rocks, that dry 8 feet, lie about 600 yards northward of this rock.

7C-12 EAST SIDE OF BENTINCK ROUTE.—High Peaked Island, 1 mile westward of the southwest extremity of Domel Is-

land (sec. 7C-9), has a prominent densely wooded summit, 990 feet high. Second Observation Island, 230 feet high, cliffy and wooded, is located about 2/5 mile northward of the north end of this island. Fly Islet, 75 feet high, and Mosquito Islet, 45 feet high, lie within 1/2 mile northeastward of Second Observation Island. A rock, that dries 10 feet, lies close southwestward of Mosquito Islet, and a rock, that dries 8 feet, lies about 1 1/2 miles east-southeastward of Second Observation Island. Fly Rock, a small, steep-to pinnacle, is located 2 1/4 miles northwestward of Fly Islet. It is awash, and is very difficult to identify.

Bushby Island, located about 2 miles south-southwestward of the southwest extremity of Domel Island, is bold and has many wooded summits; the highest of which is 1,005 feet high.

Cone Islet, 215 feet high, conical, and densely wooded, lies about 1 1/2 miles southward of the west extremity of Bushby Island.

Constitution Bank, having a least depth of 41 feet, lies in the fairway between Bushby Island and the Five Sisters.

Vessels with local knowledge can ANCHOR in 8 fathoms, just outside a line joining the entrance points of a small sandy cove, near the northwest point of Bushby Island.

Dorothy Island, 280 feet high, lies about 2 miles east-southeastward of the northeast point of Bushby Island. Within about 6 miles eastward and east-southeastward of Dorothy Island, there are a group of densely wooded islands and rocks. These include: Carew Island, 590 feet high; North Park Island, 525 feet high; South Park Island, 675 feet high; Ravenshaw Island, 990 feet high; and Wendy Island, 185 feet high. Alligator Rock, 15 feet high, lies about 1 1/2 miles eastward of Ravenshaw Island.

JUBILEE CHANNEL is an excellent passage that branches off from the Bentinck Route in an east-northeasterly direction, between Ravenshaw Island and Sir J. Malcolm Island. It has a least width of nearly 1 mile in its east entrance, between Alligator Rock and the north end of the latter island. There are considerable depths in the fairway, and the TIDAL CURRENTS are strong (see section 7C-5).

Katherine Island, 245 feet high and wooded, lies in the southwest entrance of Jubilee Channel. Vessels can pass northward of it, or between it and Barbara Island, located about

1 1/2 miles southward. The latter island is 260 feet high and densely wooded.

7C-13 SIR J. MALCOLM ISLAND AND ISLANDS SOUTHWARD.—Sir J. Malcolm Island has two prominent summits. The northeast summit is 1,230 feet high and the southwest summit is 1,235 feet high.

A rock, that dries 5 feet, lies about 3/5 mile west-southwestward of Barbara Island.

Three islets, 180, 130, and 200 feet high, respectively, lie southward of Barbara Island and close off the southwest extremity of Sir J. Malcolm Island. An islet, 255 feet high, lies in the middle of an inlet that indents the east side of the latter island.

Paines Reef, of coral and drying 7 feet, lies 1 mile eastward of the northeast side of the same island. A rocky patch, with a least depth of less than 6 feet, lies about 1 1/4 miles southward of Paines Reef. Haldane Island, 135 feet high and densely wooded, lies about 4 3/4 miles southeastward of the north end of Sir J. Malcolm Island.

A navigable **PASSAGE**, 700 yards wide, separates the last-named island from Owen Island, to southward. Reefs lie off the east entrance of the channel; therefore Jubilee Channel is considered to be safer.

Owen Island has three distinct summits; the southernmost is 1,250 feet high, and the other two are each 1,550 feet high. Sinclair Bay, having a sandy beach about 1 mile long, indents the west side of the island. Small vessels, with local knowledge, can **ANCHOR** in 8 fathoms, sand, about 1/2 mile westward of a small bluff, in the middle of the head of the bay. Protection from the Northeast Monsoon is afforded.

June Bay, the shores of which consist of rocky ledges, is located just southward of Sinclair Bay. Small vessels with local knowledge can **ANCHOR** in 9 fathoms in the entrance of the bay.

Joan Island, 195 feet high, is located about 3/4 mile eastward of the northeast end of Owen Island. Doris Island, 280 feet high, is located about 1 1/2 miles eastward of the north summit of the same island. Both islands are densely wooded. A reef, that dries 10 feet, lies nearly 1 mile eastward of the east end of Owen Island.

Three small islands lie close southward of

Owen Island. These include: Maxwell Island, 340 feet high and densely wooded; Milne Island, 240 feet high and densely wooded; and Bain Island, 120 feet high.

Bernard Island (11°11'N., 98°16'E.), located about 1/2 mile southward of Owen Island, is 625 feet high and densely wooded. A channel, having a least depth of 15 fathoms, separates the two islands. A shoal bank, with a least depth of 37 feet, extends about 3 1/2 miles westward from the west side of Owen Island. A bank, with a least depth of 47 feet, lies about 1 1/2 miles westward of the south end of Bernard Island.

MORRISON BAY

7C-14 Morrison Bay is entered between the Pickwick Group (sec. 7C-7) and Saunggyi Kyun (sec. 7B-19), about 10 miles northeastward. The bay extends about 15 miles in a south-southeasterly direction to Julian, Kennedy and Tucker Islands near its head. Parker, Trotter, and Money Islands (sec. 7C-7) form the west side of the bay; Sellore Island (sec. 7B-20) forms the east side of the bay. The north side of Kisseraing Island forms the south side of the bay.

Morrison Bay can also be entered from southward by a narrow channel which is approached between Domel and Kisseraing Island. This channel leads between flats that extend from the north parts of these islands into the southwest corner of the bay.

The north entrance of Celerity Passage is in the southwest portion of the bay.

WEST SIDE OF MORRISON BAY.—Parker Island, 620 feet high near its southeast extremity, is densely wooded. Numerous islets lie off the east side of the island. Edmund Island, 210 feet high, and Wilmot Island, 195 feet high, lie close together, about 1/2 mile off its northeast coast. Pirie Island, 430 feet high, densely wooded and conical in shape, lies about 1 mile northeastward of the east extremity of Parker Island. Tree Island, 220 feet high and having shoal ground extending 1/2 mile northward from it, lies about 1/2 mile northwestward of Pirie Island.

Star Island, densely wooded and 370 feet high, lies 1 mile south-southwestward of Pirie Island; it is the northernmost and easternmost of a group of five islands lying off the south-

east point of Parker Island. Reef Island, the southernmost, is 165 feet high and lies about 1/2 mile off the northeast end of Trotter Island. A small mangrove islet lies about 1/4 mile eastward of Reef Island.

Trotter Island, about 1/2 mile southward of Parker Island, is 1,070 feet high and densely wooded. There are moderate depths close off the east end of the island. Whaleback Reef, which dries 5 feet, lies about 1 mile northward of the east end of Trotter Island. Shoal patches lie north-northwestward and southwestward of the reef, but to the eastward there is deep water.

Heath Rock, located about 1 3/4 miles north-northeastward of the east end of Trotter Island, has a least depth of 5 feet. EDDIES are usually found in its vicinity. Forfar Rock, 4 feet high and having surrounding depths of 5 1/4 and 6 1/4 fathoms, lies on a patch of rocky ground, about 1 3/4 miles east-northeastward of the same point.

Money Island, located close southward of Trotter Island, is 1,100 feet high and densely wooded. Several small coves, fringed with mangroves, indent the east side of Money Island. A wooded islet lies in midchannel between this island and Domel Island.

Una Island (11°52'N., 98°18'E.), 75 feet high and separated from Jack Island by a channel, 400 yards wide, lies about 1 mile northeastward of the northeast end of Money Island. Jack Island, 225 feet high and sparsely wooded, lies about 1/2 mile off the northeast side of Money Island. A fishing village is located on the north side of Jack Island.

The channels between the above islands should not be used as the tidal CURRENTS are strong and irregular.

7C-15 EAST SIDE OF MORRISON BAY.—Kayo (Hay) Island, 170 feet high, is located about 2 miles southwestward of the northwest extremity of Sellore Island (sec. 7B-20).

Donnelly Reef, which dries about 4 feet, lies about 8 miles southward of Kayo Island, and about 2 miles off the east side of the bay. Several shoal patches lie between the reef and the island, within 2 1/2 miles of the east shore of the bay.

Donnelly Island, 155 feet high and well wooded, lies about 2 miles south-southeastward of Donnelly Reef. This island marks the northeast side of a CHANNEL that leads between Julian and Kennedy Islands.

Wright Island, which lies between Donnelly Island and the east shore of the bay, is 260 feet high and well wooded. A deep CHANNEL separates the two islands, but the tidal currents are strong and irregular. A 1 1/4-fathom patch lies in the south entrance of the channel.

Twin Rocks, 30 feet high, lie about 3/4 mile south-southeastward of Donnelly Island. Bird Rocks, located about 2/5 mile southward of Twin Rocks, are white in color, and steep-to.

HEAD OF MORRISON BAY.—The north coast of Kisseraing Island is fronted by Julian, Kennedy, and Tucker Islands. Julian Island, 440 feet high on its west side, lies with its southwest point about 3 miles northeastward of the northwest point of Kisseraing Island. A village stands near the south point of the island.

An extensive bank, defined by the 3-fathom curve, extends about 6 1/2 miles north-northwestward from the northwest point of Kisseraing Island. Square Rock, 15 feet high, lies near the end of the bank in position about 2 miles east-southeastward of the east end of Trotter Island. Quoin Rock, 30 feet high, lies about 3/4 mile southward of Square Rock. Both rocks are covered with jungle.

Sidney Island, located 1/2 mile northward of the north end of Julian Island, is 70 feet high and densely wooded. It marks the south side of the approach channel leading to the channel between Julian and Kennedy Islands.

Kennedy Island, densely wooded and 570 feet high, lies about 1 mile eastward of Julian Island. Numerous islets and rocks lie between it and the south end of Sellore Island. A shoal, having a depth of 4 1/4 fathoms, lies between Julian Island and Kennedy Island. Rocks extend about 400 yards from the southeast point of the latter island.

Tucker Island, separated from Kennedy Island to eastward by a narrow and shoal channel, is densely wooded, and has two summits 730 and 700 feet high, respectively.

KANMAW, a large fishing village, is located at the northeast end of Kisseraing Island. A rock, marked by a BEACON, is located about 1/4 mile northeastward of the village. There is regular sea communication between the village and Mergui.

CELERITY PASSAGE

7C-16 CELERITY PASSAGE, narrow and tortuous, leads southward from the southwest

corner of Morrison Bay, between Domel Island, on the west, and the extensive flats, known as Leslie's Garden, on the east. Jubilee Channel (sec. 7C-12) connects from the westward with a channel that leads almost due south to the north entrance of Forrest Strait (sec. 7D-7).

Leslie's Garden, an extensive flat that dries in places, extends about 5 1/2 miles northward from the northwest end of Kisseraing Island to within about 1/2 mile of Jack Island (sec. 7C-14). The flat also extends westward for about 4 1/2 miles from the same point to within a short distance of the east coast of Domel Island.

SOUTH APPROACH TO MORRISON BAY

7C-17 The south approach to Morrison Bay is between the southeast point of Domel Island and Maw-yut Point, the south end of Kisseraing Island, about 15 miles east-northeastward.

A bank, having depths of less than 3 fathoms fronts the west side of Kisseraing Island to a distance of up to 4 miles at a position about 11 miles west-northwestward of Maw-yut Point.

ISLANDS AND DANGERS.—Marble Islands, a group of two large and four small islands, lie from 1 1/2 to 2 miles off the southeast side of Domel Island. Hngetthaik Taung, the largest and highest of these islands, is 1,038 feet high, and is located near the south end of this group. The islands are almost bare of trees, rocky, precipitous and steep-to. Vessels can **ANCHOR** off these islands, according to the monsoon; the greater depth being found between them and Domel Island.

A cove indents the south end of Hngetthaik Taung. A winding tunnel, 150 yards long, leads from the head of the cove, at low water, under the cliff into an open lagoon which is surrounded by cliffs, 400 feet high. Two caves, one of which extends about 200 yards into the heart of the cliff, open out into the lagoon, and form breeding places for the sea swallow, whose edible nests are regularly collected. Small vessels with local knowledge can **ANCHOR** in 6 fathoms off the west entrance point of the cove.

Sydney Island, small, wooded, and brown, is 125 feet high, and lies 1/2 mile off the southwest point of Kisseraing Island. Rocky ledges

extend 400 yards off its northeast and southwest points.

Lalla Rookh Island, 106 feet high, well wooded, and having a prominent dark tree at its north end, is the southernmost of a small group of islands; it lies about 2 miles westward of Maw-yut Point. The other islands of the group are: Pitt Island, 93 feet high; Tango Islet, 105 feet high; and Pillam Island, 80 feet high. These islands are densely wooded and fringed by reef. Foul ground, with numerous drying patches, lies between these islands and Kisseraing Island.

DIRECTIONS.—Small vessels with local knowledge should pass through Celerity Passage on the last of the flood. The tidal currents are not strong.

Vessels from northward should pass close eastward of Una Island and about 400 yards eastward of Jack Island. Thence they should work over to the coast of Money Island to take advantage of the deepest water. When the east point of Money Island is passed, a course of about 180° should be steered for 1 mile, thence a course of 158° should be steered, keeping Pagoda Point, located near the north end of Domel Island, well open of the rock 3/5 mile northward of it.

When the north point of Domel Island bears 271°, the course should be shaped to pass 200 yards eastward of Pagoda Point. Thence a midchannel course should be steered between Leslie's Garden to eastward and the two rocky points on the northeast side of Domel Island to westward.

Farther southward the channel is marked by **BEACONS**. After passing Beacon No. III, which is surmounted by a cone, the course should be altered to 180° until deep water is reached. The channel is well marked by discoloration.

When Hngetthaik Taung bears 270°, distant 1 3/4 miles, vessels bound for Forrest Strait should steer for a position 2 1/2 miles eastward of Holdane Island. Thence a course of 180° should be steered until High Island, about 14 miles southward, bears 270°, distant 2 1/4 miles. Thence course should be altered to 174° which leads clear of all dangers into the east channel of Forrest Strait (sec. 7D-3).

Vessels wishing to use the deeper west channel of Forrest Strait should steer 195°, from the position 2 1/4 miles eastward of

High Island, until the south end of South Dolphin Island (sec. 7D-3) bears 270°. Thence course should be altered to 180°.

Directions for Forrest Strait are continued in section 7D-3).

WHALE BAY AND APPROACHES

7C-18 WHALE BAY lies between the south-east side of Kisseraing Island and the mainland, to the eastward. The entrance lies between Maw-yut Point and Wet Kyun, about 9 miles eastward. The bay is approached from the southwestward. CAUTION is required as the bay and its vicinity have not been closely examined. Vessels can take sheltered ANCHORAGE in 6 to 10 fathoms in the south part of the bay.

ISLANDS AND DANGERS IN APPROACHES.—Pawe Kyun lies about 3 1/4 miles south-southwestward of Maw-yut Point. There is a prominent tree-covered hill, 681 feet high, near the south end of the island. A reef, on which is Firth Rock, extends 1/2 mile northeastward from the northeast side of the island. Shoal ground, as defined by the 3-fathom curve, extends more than 1 mile farther northeastward. Shoal ground, with a least depth of 1 3/4 fathoms, extends about 1 mile off the southeast side of the island.

Vera Island, 295 feet high and wooded, lies about 1 1/2 miles northeastward of the north point of Pawe Kyun. Vera Shoal, which has a depth of 39 feet, lies nearly in midchannel between Vera Island and Lalla Rookh Island (sec. 7C-17). TIDE RIPS are found in the deep channel between Vera Island and Maw-yut Point.

Robert Island, 230 feet high and densely wooded, lies just southward of the south point of Pawe Kyun.

Fink Island, 270 feet high and densely wooded, is the northeasternmost of a group of small islands and rocks that lie up to 5 1/2 miles southwestward of Pawe Kyun. Molly Island, densely wooded, rather flat and 120 feet high, Ruby Island, 140 feet high, and Lawrence Island, 265 feet high, belong to this group. The channels between these islands should not be used because of RIPS and variable CURRENTS.

Malcolm Island, densely wooded and 901 feet high near its south end, lies about 5 1/4 miles southward of Pawe Kyun. The center of

the island is low. Shoal ground, with some drying patches, as defined by the 3-fathom curve, extends about 2 miles southwestward from the southwest side of the island. Several drying patches also lie within 1 1/4 miles southward of the island. The shoals are usually well marked by discoloration, especially during the ebb tide.

Alice Island, 104 feet high and wooded, lies near the northeast end of a shoal, with depths of less than 3 fathoms, which lies about 2 miles north-northwestward of the north point of Malcolm Island.

Barn Island, 374 feet high and densely wooded, lies about 4 1/2 miles westward of the south part of Malcolm Island.

Cheding Flats extend northeastward from Malcolm Island to the mainland just southward of Yengan Chaung. Warrington Reef, an isolated patch that dries 5 feet, rises from the flats in a position about 7 1/2 miles northeastward of Malcolm Island. A tortuous and ill-defined channel with a least depth of 7 feet leads across the middle part of the flats.

7C-19 ISLANDS AND DANGERS IN WHALE BAY.—Maw-yut Point (11°31'N., 98°32'E.), the west entrance point of Whale Bay, is steep to on its south and east sides. Wet Kyun, which forms the east entrance point, is 410 feet high and densely wooded. There is no navigable channel between the island and the mainland, about 4 miles eastward. Ky-auk Kalat, a small islet, 52 feet high, and of whitish appearance, lies about 1/2 mile southward of the island.

Campbell Rock, awash and marked by a BEACON, surmounted by a white circle, lies about 3 miles northeastward of Maw-yut Point. The rock has 2 pinnacles.

WEST SIDE OF BAY.—Mawgaung-don, a projection on the east side of Kisseraing Island, is located about 6 miles northward of Maw-yut Point. Bhadra Reef fronts the shore for about 3 miles southward of Mawgaung-don and lies up to 1 1/2 miles offshore. On the outer part of Bhadra Reef, in a position about 1 3/4 miles southward of the before-mentioned projection is a rock on which a vessel drawing 8 feet struck in 1912.

Northward of Mawgaung-don, the depths decrease, and the channel off the east side of Kisseraing Island nearly dries.

EAST SIDE OF BAY.—The Yengan Chaung is

the largest of several creeks that indent the east shore of the bay. Mangroves fringe the coast between the entrance of Yengan Chaung and the mouth of the Lenya River, about 14 miles northward, at the northeast corner of the bay. The latter river rises close to the Pakchan River and flows approximately northward. Lenya, a small village, is located about 36 miles upstream and can be reached by small light-draft craft.

COAST—YENGAN CHAUNG ENTRANCE TO KARATHURI BAY

7C-20 Between Kabyachaung (11°27'N., 98°43'E.), an islet, 216 feet high, which forms the south entrance point of Yengan Chaung, and the entrance of Bokpyin Chaung, about 11 miles southward, the coast is fringed with mangroves and intersected by creeks.

Sadien Ondawagan, the largest of many villages in this area, is located about 4 1/2 miles southward of the south entrance point of Yengan Chaung. Cheding Rocks, 40 feet high, lie close offshore in a position a little over 1 mile north-northwestward of the village.

Kho Gyun, 215 feet high, well-wooded, and prominent, lies about 5 1/2 miles south-southwestward of the same village. A shoal, with small rocky patches that dry about 4 feet, extends about 1/2 mile northeastward from the island.

Boat Rock, located about 2/5 mile northward of Kho Gyun, is 50 feet high. A shoal spit extends almost 1/2 mile north-northeastward from the rock. Bhadra Rock, located about 1 1/2 miles westward of Boat Rock, dries 3 feet.

Bokpyin Chaung, located about 7 miles southward of Sadien Ondawagan, is a small shallow creek that flows between mudbanks that nearly dry. A village, mostly built on piles, stands on the south side of the entrance of the creek. The District Police Officer's house, which stands on a hill overlooking the village, is prominent. Sand and mudflats are found on both sides of the channel. These dry out for over 2 miles from the village. There is regular sea communication with Mergui.

Small vessels can ANCHOR in 4 fathoms, about 1 mile southward of Kho Gyun.

7C-21 BOKPYIN CHAUNG ENTRANCE TO KARATHURI BAY.—Between the entrance of

Bokpyin Chaung and a position abreast the islands forming the north side of Karathuri Bay, about 13 miles southward, the coast is indented by creeks and intersected by streams. There are high hills in the background.

Nopu Taung Saba, 158 feet high and prominent, is located about 4 1/2 miles southwestward of Kho Gyun. This islet is the northwesternmost of a group of islets and rocks that lie on the south side of the approach to Bokpyin Chaung. Many rocks and reefs lie between this group and the mainland. Needle Rocks lie about 1 1/4 miles northeastward of Taung Saba.

Pulau Ting-nga, three conical rocks, lies about 1 1/2 miles southward of Nopu Taung Saba. The southernmost and highest rock is 70 feet high. Foul ground lies within 1 1/2 miles northeastward and 3/4 mile eastward of Pulau Ting-nga.

Pulau Ampat, three well-wooded islets, are located about 3 1/2 miles south-southwestward of Nopu Taung Saba. The southernmost islet is 250 feet high. From the offing these islets appear as one. Foul ground extends about 1 1/2 miles east-northeastward from Pulau Ampat.

North Cone Island, located 2 miles south-southwestward of Pulau Ampat, is 99 feet high. Pulau Kyn Ngai, 228 feet high, lies about 4 miles west-southwestward of North Cone Island. Pulau Panyam, 240 feet high, lies about 3 miles farther southwestward.

KARATHURI BAY

7C-22 Karathuri Bay lies between Carnac and Jenkins Islands, on the north, and Kyeinni Taung, 231 feet high, and the Brothers Islands, on the south. Carnac and Jenkins Islands are surrounded by numerous islands, all lying on an extensive mudbank, about 6 miles south-southeastward of North Cone Island. The mudbank is separated from the mainland by a narrow and shoal channel.

CARNAC CHANNEL, suitable only for small ships with local knowledge, leads into Karathuri Bay from northward between Carnac Island, which is low, and Kau-ye Kyun, about 3 miles westward. On the west side of the channel, within about 1 1/2 miles eastward of the east coast of Kau-ye Kyun and named from north to south, are Pulau Balat, Pulau Bagang,

and Gerty (Gertrude) Island. On the east side are Pulau Dana (North Sister Island), Pulau Kapang (Middle Sister Island), Pulau Tokadin (South Sister Island), Wing Rocks, South Cone Island, Pulau Kamat, and Pulau Bucho, the latter island, which lies about 1 1/2 miles southward of the south end of Carnac Island, is prominent.

WARRINGTON STRAITS lead into Karathuri Bay from westward between Collies Island and Kau-ye Kyun, on the north, and Mingyi Sakan, Sir Robert Campbell Island and Kandaw (Alice) Island, on the south. Kyaukmedaung (Van Island) and Tunnel Rock, which is prominent, lie close northward of Kandaw Island. The latter island is 259 feet high.

Riou Island, which lies near the west end of Warrington Straits in a position about 1 1/2 miles southward of Collies Island, is 215 feet high. Warrington Passage separates the two islands. Foul ground extends about 800 yards northeastward from Riou Island.

KINNEARS PASSAGE, suitable only for small vessels with local knowledge, separates Collies Island from the southwest side of Kau-ye Kyun. The west side of the latter island is foul, and should not be approached within a depth of 4 fathoms. The passage has a least width of about 1/4 mile.

VILLAGES.—Hangapru is located on the north side of the head of the bay, and Karathuri is located about 5 miles farther southward. A creek flows into the south side of the bay, about 6 miles westward of the latter village. Another creek enters the bay, about 2 1/2 miles farther westward there is regular sea communication between Karathuri Bay and Mergui.

PART D. FORREST PASSAGE AND STRAIT—ISLANDS AND BANKS TO WESTWARD AND SOUTHWESTWARD

7D-1 NORTH SENTINEL ISLET (10°57'N., 97°58'E.) is small and has a rock close off its west side.

CLARA ISLAND has two summits and lies about 1 1/2 miles southwestward of the above islet. The northernmost summit is 1,753 feet high, and the southernmost summit is sharp. South Sentinel Islet lies about 1/2 mile southwestward of the south end of Clara Island.

Kanzagyi, an island 568 feet high, lies about 2 3/4 miles eastward of Clara Island. Wa-ale Kyun (Blunt Island), 1,031 feet high, lies about 1 mile farther eastward.

GENERAL REMARKS

7D-2 FORREST PASSAGE is 16 miles wide at its entrance between Father Island (sec. 7C-11) and North Sentinel Islet, and leads east-southeastward for about 15 miles to the north entrance of Forrest Strait.

FORREST STRAIT, the north entrance of which lies between the north end of Sullivan Island and Collies Island, about 15 miles eastward, is a deep-water passage, well sheltered from westerly winds, and available to deep-draft ships. At its north end, Forrest Strait connects with Forrest Passage, the Bentinck Route, and the route from Morrison Bay through Celerity Passage. Investigator Channel (sec. 7D-16) leads from westward into the strait.

The strait extends about 70 miles southward as far as the entrance of the Pakchan River, and leads between the mainland coast and a chain of islands, islets, and rocks which lie from 10 to 12 miles offshore. A group of islands, located about 18 miles southward of the north entrance of the strait, lie in the fairway and divide the strait into two channels. Areas of discolored water are found throughout the strait.

NAVIGATION

7D-3 Ships without local knowledge should navigate with CAUTION as there are few navigational aids and no lighted aids. The western channel should be used, as the Gregory Islands can be passed within 1 mile in deep water and the position fixed.

From a position about 2 miles southwestward of High Island (sec. 7C-3), ships should steer a course of 152° until the south end of the southern Dolphin Island bears 270°, distant about 4 miles. Note that the latter position can also be reached by steering a course of 195° from the position 2 1/4 miles eastward of High Island. See section 7C-17.

WESTERN CHANNEL.—From the position with the south end of the southern Dolphin Island bearing 270°, distance 4 miles, a course

of 180° should be steered until Bold Promontory (11°44'N., 98°18'E.) bears 270°, distant about 1 1/2 miles. Thence a course of 186° should be steered until Pulau Tuhan bears 090°, distant 2 miles. Thence course should be altered to 165° for a position about 2 miles eastward of the Five Islands.

EASTERN CHANNEL.—From the position about 2 miles southwestward of High Island (sec. 7C-3), ships should steer 152° until Shitpwin Kyun bears 045°. Thence course should be altered to about 172°, which leads in midchannel over a least depth of 4 1/2 fathoms. When Karachi Rock Beacon bears 270°, distant about 1 mile, the course should be altered to about 181° which leads to the position about 2 miles eastward of Five Islands.

JUNCTION.—From the junction of the two channels, at the position 2 miles eastward of Five Islands, a course of about 193° should be steered in order to clear the extensive sand and mudflat that lies off the Pakchan River entrance.

Ships bound for the Pakchan River entrance from the junction point, should steer for a position 4 miles westward of Pulo Mah Puteh and thence follow directions given in section 7E-13.

DEPTHS—DANGERS

7D-4 FORREST PASSAGE and the approaches to Forrest Strait from northward are deep and clear. The west channel of Forrest Strait has a least depth of 6 1/2 fathoms; the east channel has a least depth of 4 3/4 fathoms. The outer islands off this coast are rather steep-to on their seaward sides.

TIDAL CURRENTS

7D-5 The tidal currents in Forrest Passage set eastward with the rising tide and westward with the falling tide. The rate is about 2 1/4 knots at springs.

The tidal currents in the north approaches and entrance of Forrest Strait are described in section 7C-5. Overfalls and eddies occur about 2 miles westward of High Island.

Within the strait, the tidal currents set northward with the rising tide and southward on the falling tide, with rates at springs of about 1 knot. In the vicinity of the channels be-

tween the islands on the west side of the strait, the directions are northeastward on the rising and southwestward on the falling tide, with rates of 1 1/4 to 1 1/2 knots at springs.

In Investigator Channel the tidal currents set east-northeastward on the rising tide and west-southwestward on the falling tide, with rates of 1/2 knot at springs.

WINDS AND WEATHER

7D-6 See section 7-3.

NORTH ENTRANCE OF FORREST STRAIT

7D-7 The north entrance of Forrest Strait lies between the north end of Sullivan Island and Collies Island, about 15 1/2 miles eastward. High Island, located in the middle of the north entrance of the strait, has a double peak, with a greatest elevation of 1,405 feet. A rocky ledge dries out 400 yards from a large sandy beach on the southeast side of the island. A cove is located northwestward of this ledge.

ANCHORAGE can be taken in 12 fathoms close off this cove.

Collies Island, about 450 feet high, is the northernmost of the islands forming the east side of the north portion of Forrest Strait.

WEST SIDE OF NORTH PART OF FORREST STRAIT

7D-8 Two Hill Island (10°59'N., 98°12'E.), 470 feet high, and Pulo Gaban, 395 feet high, lie close eastward of the north end of Sullivan Island. There is apparently deep water off the islands, except over a rock which lies awash in a position about 1/4 mile north-northwestward of Pulo Gaban.

The east coast of Sullivan Island forms the west side of the north part of Forrest Strait. This coast rises steeply to form a thickly-wooded range of hills, about 1,000 feet high. East Peak, 1,515 feet high and located about 12 miles south-southeastward of the north end of the island, is the highest point.

Dolphin Islands, three densely wooded islets, are located between 3 and 5 1/2 miles south-southeastward of Pulo Gaban, and up to 1 1/2 miles offshore. The southernmost, 260 feet high, is the highest. The 6-fathom curve lies 1 3/4 miles eastward of the islands.

A channel, about 3/5 mile wide and having a least depth of 4 fathoms, mud, in the fairway separates Dolphin Islands from Sullivan Island. Small craft can ANCHOR in this channel.

Katyang, 225 feet high, is a small island located about 2 miles southward of Dolphin Islands, and close off the northeast coast of Sullivan Island to which it is connected at low water by a sand causeway.

Half Moon Reef, which dries 1 foot, lies 1 1/2 miles offshore in a position about 2 1/2 miles southeastward of Katyang. About 1 1/4 miles northwestward is a smaller reef which also dries 1 foot. The summit of Pulo Gaban will open northeastward of the northern Dolphin Island, and bearing about 320°, leads eastward of Half Moon Reef. Bold Promontory open eastward of The Foreland, and bearing 190°, also leads eastward of Half Moon Reef.

The Foreland, a headland 435 feet high, is the east extremity of Sullivan Island. It is more prominent than Bold Promontory, 280 feet high, which lies about 2 1/4 miles farther southward.

Marble Island (10°45'N., 98°18'E.), 270 feet high, with an islet close westward of it, lies about 1 mile south-southwestward of the south side of the Foreland. A shoal bay lies between the island and the headland.

Ransom Shoal, over which there is a least depth of 4 fathoms, coral, lies about 2 1/2 miles southward of Bold Promontory.

Pulo Nalo, 770 feet high, and Pulo Kugyi, 440 feet high, lie within 4 1/2 miles southward of the south end of Sullivan Island. Several islets lie between them.

Steep Shoal, of rock and having a least depth of 5 feet, lies about 1 1/4 miles eastward of the north end of Pulo Kugyi. The Foreland open well eastward of Bold Promontory, and bearing about 360°, leads eastward of Steep Shoal.

EAST SIDE OF NORTH PART OF FORREST STRAIT

7D-9 Collies Island (10°59'N., 98°27'E., sec. 7D-7) is the northernmost of the islands forming the east side of the north part of Forrest Strait. Southward of this island, the east side of the strait is formed by Riou Island, 215 feet high, Mingyi Sakan, 165 feet high, and

Sir Robert Campbell Island, 242 feet high, for about 12 miles, and thence by the mainland coast of the Tenasserim District of Burma.

Warrington Passage, between Collies and Riou Islands, leads into Warrington Straits. The straits, lying between Riou Island and Mingyi Sakan, lead into Karathuri Bay which is described in section 7C-22.

Shitpwin Kyun, located about 7 1/2 miles eastward of Half Moon Reef, is 90 feet high, and is the northernmost of several islets and rocks which lie on the coastal bank on the east side of Forrest Strait. A rock, that just dries, lies about 600 yards northward of Shitpwin Kyun. A BEACON, 14 feet high and surmounted by a white ball, marks the rock.

Campbell Reef, flat and rocky, dries about 8 feet. Its southwest end lies about 3 1/2 miles southward of the above island. A BEACON, 20 feet high and surmounted by a white ball, marks the southwest end of the reef.

COAST.—The mainland forms a part of the east side of Forrest Strait. Pinwun Maw, located about 3 miles east-southeastward of the beacon on Campbell Reef, is the northwest point of that part of the Tenasserim District of the mainland which forms the east side of the strait. From this point the coast trends southward from about 7 1/2 miles to Tutthabo Maw. These two points and Kyakye Maw, about midway between them, are the only prominent marks along this low stretch of coast, which rises some distance inland to form summits 2,200 feet high.

Kala Taung, 770-foot high and located about 1 1/4 miles southeastward of Kyakye Maw, is the highest hill near the coast. A smaller hill, 435 feet high, stands 1 1/2 miles southward of Kala Taung.

A mudbank, on which are several drying rocky patches, fronts this coast to a distance of 1/2 mile.

ISLANDS AND DANGERS IN MIDDLE OF NORTH PART OF FORREST STRAIT

7D-10 Jefford Shoal, steep-to and having a depth of 5 fathoms, sand, lies near the middle of the strait, about 4 1/2 miles west-southwestward of Shitpwin Kyun.

A shoal, with a depth of 7 1/2 fathoms, lies in the middle of the strait, about 3 1/2 miles eastward of The Foreland.

Gregory Group consists of five low, wooded islands, which lie in the middle of Forrest Strait, abreast the south end of Sullivan Island.

Leik-u Kyun, 108 feet high, small and wooded, is the northernmost island of the group. Shoals extend 1 1/2 miles northward from the island and terminate in Marble Patch, which has a least depth of 6 feet, sand and shells.

Wa Kyun, 175 feet high, Pulo Myang, 160 feet high, and Pulo Myang Basa, 235 feet high, lie within 3 1/2 miles southward of the above island. Extensive reefs surround these islands. There is a deep gut, about 2/5 mile wide, between Pulo Myang Basa and Pulo Myang.

Myang Shoal, with a least depth of 6 fathoms, sand, lies about 1 1/4 miles west-southwestward of Pulo Myang.

Karachi Rock, which dries 1 foot, lies about 1 1/2 miles southeastward of Pulo Myang Basa, and is marked by a BEACON, 17 feet high, surmounted by a white ball.

Pulo Tuhan, 195 feet high, is the southernmost of the Gregory Group. It lies about 2 miles southward of Pulo Myang Basa. The channel between the two islands is 1 1/4 miles wide and has a least depth of 8 fathoms. A shoal ridge extends about 1/2 mile south-westward from Pulau Tuhan.

WEST SIDE OF SOUTH PART OF FORREST STRAIT

7D-11 Pulo Hayat, 289 feet high, and Saucer Island, 280 feet high, lie close together, about 2 miles south-southwestward of Pulo Kugyi. Pulo Balu, 600 feet high, is located about 1 mile farther south-southwestward.

Pulo Bada, 1,151 feet high near its south end, is located 1 mile south-southwestward of Pulo Balu. A shoal, with a least depth of 23 feet, lies about 3 1/2 miles eastward of the northeast point of Pulo Bada.

An unexamined area, in which lie Pocock Island and five islets extends up to 4 1/2 miles southward and southwestward from the south side of Pulo Bada. Foul ground extends southward from the southernmost island.

Bowen Shoal, of white sand and coral, lies about 1 mile eastward of the southeast extremity of Pulo Bada. It dries 2 feet. A shoal ridge, with a least depth of 1 foot, lies be-

tween 1 mile and 2 miles northward of Bowen Shoal in a position about 1 mile eastward of Pulo Bada.

A chain of islands and islets lies between Pulo Bada and Pine Tree Island, 205 feet high, about 9 1/2 miles south-southeastward. These include Potter Island, Saddle Island, 305 feet high, Naked Islet, 135 feet high, Bare Islet, Ninepins Islands, 80 feet high, and Cat and Kitten Island, 230 feet high. Northwest Hump Island, 400 feet high, lies about 4 miles westward of the last-named island.

These islands should be approached with CAUTION due to the irregular depths and rocky bottom.

A reef, on which are several drying rocks, extends 1 1/4 miles northward from the north coast of Pine Tree Island.

Southeast Hump Island (10°16'N., 98°19'E.), 320 feet high, is located about 4 1/2 miles south-southeastward of Pine Tree Island. Sunken rocks lie close northwestward and southward of Southeast Hump Island. A rock, awash and dangerous, lies about 3/4 mile south-southeastward of the summit of this island.

The Five Islands, a small group of rocky islets, extend about 1 1/2 miles northward from a position about 2 miles eastward of Southeast Hump Island. The northernmost and most prominent islet is 160 feet high. A rock, that dries 5 feet, lies almost 1/4 mile northwestward of the northernmost islet.

Russell Island, covered with trees and jungle, lies about 5 miles south-southwestward of Pine Tree Island, and has a well-defined summit, 875 feet high. Two detached rocks, 25 and 30 feet high, respectively, lie 1/2 mile westward and northwestward, respectively, of the south end of Russell Island.

Two Tree Island, 220 feet high and covered with grass, lies about 3/5 mile northward of the northwest point of Russell Island; a rocky reef lies off its southwest point.

Little Russell Island, 250 feet high and covered with trees, lies nearly 3/4 mile southward of Russell Island. A rocky islet, 60 feet high, lies close off the southwest point of Little Russell Island. The passage between the two islands is deep and about 1/2 mile wide.

CURRENTS around Little Russell Island are variable in strength and direction. Numerous

eddies exist. Ships should keep well clear of the rocky islet located close southwestward of this island.

7D-12 NORTH PHIPPS ISLAND (10°10'N., 98°17'E.), having a prominent summit, 360 feet high, lies about 3 1/4 miles south-south-eastward of Little Russell Island.

South Hump Island, 175 feet high and covered with tall grass, is located 5 1/2 miles east-southeastward of Little Russell Island. Helmet Island, 125 feet high and covered with trees and jungle, is located about 7 miles east-southeastward of the same island. Foul ground extends about 200 yards off Helmet Island.

St. Lukes Island, with a prominent summit 1,590 feet high, lies with its northeast end about 2 miles westward of North Phipps Island. The channel between Little Russell Island and the north end of St. Lukes Island is about 2 miles wide and clear of dangers in the fairway.

Vessels should avoid a 32-foot rocky patch which lies about 1 1/4 miles east-northeastward of the northwest extremity of St. Lukes Island and about 1/2 mile offshore.

South Phipps Island, 510 feet high, Barwell Island, 350 feet high, and Horseshoe Island, 275 feet high, lie between 2 and 4 miles south-southwestward of Helmet Island, and close off the northeast and east coasts of Hastings Island. A channel, about 200 yards wide and having a depth of 17 feet leads between South Phipps and Barwell Islands. Boat channels, having a depth of 10 feet at high water, lead between South Phipps and Hastings Islands and between the latter and Horseshoe Island.

Most of the islands mentioned above, with the exception of South Hump Island and those forming Hastings Harbor, are tree- and jungle-covered. They usually have well-defined peaks, especially South Hump Island and the north summit of Hastings Island which is 875 feet high.

Hastings Harbor, together with Hastings, St. Lukes and St. Matthews Islands which shelter it, and the adjacent islands and islets, are described in section 7D-18.

EAST SIDE OF SOUTH PART OF FORREST STRAIT

7D-13 Between Tutthabo Maw (10°37'N., 98°27'E., sec. 7D-9) and an unnamed point,

about 26 miles southward, the east side of the strait is indented by a number of shallow creeks. Pulo Mah Puteh, 266 feet high, lies close off the unnamed point.

Turrets Islands lie close together about 6 miles southward of Tutthabo Maw and about 2 1/2 miles offshore. Pulau Salangin, the middle and largest island of the group, is a bold, precipitous rock, 341 feet high. In clear weather it appears as a square block of marble. Pulo Beba lies close northward and Pulo Prewang lies about 1/2 mile southward of Pulau Salangin. A 2 3/4-fathom shoal lies nearly 3/4 mile south-southwestward of Pulo Prewang.

An islet, 55 feet high, lies about 1 3/4 miles south-southeastward of Pulau Prewang. Westward of the islet the general depth is 3 fathoms, except for two rocks that dry 3 and 10 feet, respectively.

Whaleback Rock, 3 feet high, lies about 2 1/2 miles southward of Pulau Prewang and about 2 3/4 miles offshore.

Canister Island, 285 feet high, lies about 8 1/2 miles southward of Pulau Prewang and about 4 miles offshore.

Between Pulo Mah Puteh and Victoria Point, the north entrance point of the Pakchan River, about 14 miles south-southeastward, the coast is fronted by an extensive shoal bank, as defined by the 3-fathom curve. This bank extends in a general south-southwesterly direction, the distance offshore of its outer edge increasing from about 1 1/2 miles abreast Pulo Mah Puteh to about 11 miles abreast Victoria Point. Several patches, with depths of 6 feet and less, lie on this bank. A 6-foot patch lies on the outer edge of the bank in a position about 11 miles westward of Victoria Point. The islands and dangers lying on the south part of this bank are described in section 7E-7.

ANCHORAGES.—Vessels can anchor in 7 or 8 fathoms eastward of Pulo Gaban (sec. 7D-8) and south-southwestward of High Island in the positions indicated on the chart.

Anchorage, in 10 fathoms, can be taken off the northeast side of Pine Tree Island (sec. 7D-11), with the summit of that island bearing 231°, distant 3/5 mile. Care should be taken to avoid the reef extending 1 1/4 miles northward from the north coast of the island.

Anchorage can be taken on the east side of the strait between High Island and Turrets Islands in 5 to 6 fathoms, soft mud.

OUTER ISLANDS AND BANKS WESTWARD OF FORREST STRAIT

7D-14 NORTH TWIN ISLAND (10°38'N., 97°42'E.), 450 feet high, is located about 16 miles southwestward of Clara Island (sec. 7D-1). The west side of North Twin Island is bare to a height 100 feet; its north and east sides are densely wooded.

SOUTH TWIN ISLAND, located about 9 1/4 miles southward of the above island, is about 270 feet high. Its west side is almost bare and its summit consists of bare rock. There is an open bay on the north side, and another on the south side. Each has a sandy beach. Two rocks lie close off the northwest point of the island. A sunken rock is charted close northeastward of the east extremity of the island.

OFF-LYING SHOALS AND BANKS.—A number of isolated shoals and banks have been reported to exist in the west approach to Investigator Channel (sec. 7D-16) between the 100-fathom curve and a position about 90 miles west-southwestward of Cavern Island (sec. 7D-16). They have reported depths of 5 to 48 fathoms, but have not been closely examined.

Heckford Bank, the northeasternmost bank, has a depth of 7 fathoms and lies about 48 miles westward of Cavern Island. Coral Bank, located about 49 miles west-southwestward of the same island, has a least depth of 11 fathoms.

A 5-fathom patch was reported to lie in position (10°03'N., 97°03'E.). Depths of less than 6 fathoms were reported (1958) to lie in position (10°08'N., 96°48'E.).

Rose Bank (10°00'N., 96°40'E.), having a depth of 38 feet over it (1963), is about 800 yards wide between the 10-fathom curves and is of sand and coral. A depth of 10 fathoms was reported (1963) to lie eastward of Roe Bank in position 10°08'N., 96°50'E.

ISLANDS AND DANGERS WESTWARD AND SOUTHWESTWARD OF FORREST STRAIT

7D-15 GREAT SWINTON ISLANDS lie about 15 miles east-southeastward of North Twin Island. Numerous small islets lie between Wa-ale Kyun (sec. 7D-1) and the west end of Kyun Pila, about 18 miles south-southwestward. Pulau Tika, 299 feet high, lies

about 3 miles south-southwestward of the south end of Wa-ale Kyun. Brown Island, 100 feet high, and Pulau Tajam, 155 feet high, lie about 2 and 5 3/4 miles, respectively, south-southwestward of Pulau Tika. An unnamed islet, with a sunken rock close westward of it, lies about 5 1/2 miles southwestward of Pulau Tajam.

Kyun Pila, the largest island of the group, lies with its north point about 3 miles south-eastward of the unnamed island. A group of white rocks, 10 feet high, lies about 3/4 mile south-southeastward of the east extremity of Kyun Pila.

Pulo Set, 681 feet high and the easternmost of the group, lies about 3 1/2 miles eastward of Kyun Pila. A rocky islet, 96 feet high and surrounded by sunken rocks, lies about 1 1/2 miles southwestward of Pulo Set. A rocky island, surrounded by sunken rocks, lies about 3 1/4 miles south-southeastward of the same island.

LORD LOUGHBOROUGH ISLAND lies about 3 3/4 miles southwestward of Kyun Pila. The Paps, 1,440 feet high, is the most prominent of several peaks on the island. The west coast of the island is bold, steep-to and densely wooded.

LOUGHBOROUGH PASSAGE lies between Kyun Pila and Lord Loughborough Island. A rock, having a depth of 2 fathoms, lies in the middle of the passage, about 1 1/2 miles south-southwestward of the west end of Kyun Pila. Pollock Reef, with a rock, 50 feet high, near its southwest end, and another rock, 12 feet high, near its northeast end, lies at the east end of the passage. An islet, 80 feet high, stands near the middle of the reef.

Navigation is unsafe through Loughborough Passage.

HAYWARD ISLAND, with sunken rocks extending about 1/2 mile northeastward from it, lies about 1/2 mile northeastward of the east end of Lord Loughborough Island. Richards Island lies about 3/4 mile southeastward of the same point. ANCHORAGE can be taken in 8 to 15 fathoms between the latter island and Lord Loughborough Island. Depths of 3 fathoms lie close to either coast.

O'Connor, Saul, and Skinner Islands lie close together from 1 mile to 2 miles northeastward of Richards Island. Off-lying rocks are reported to lie in their vicinity. Vessels

should keep nearer to Richards Island in passing between that island and the above islands.

INVESTIGATOR CHANNEL

7D-16 INVESTIGATOR CHANNEL lies between McCarthy, Steward and Cavern Islands on the north and the St. Andrew's on the south. The channel is about 6 miles wide and has depths of over 20 fathoms. Vessels from westward bound for Hastings Harbor (sec. 7D-18) or the Pakchan River (sec. 7E-11) use this channel.

ISLANDS AND DANGERS ON NORTH SIDE OF INVESTIGATOR CHANNEL.—Cavern Island, located about 5 miles southeastward of Lord Loughborough Island, is the largest of several islands lying southeastward of that island. There are several caverns, where edible birds' nests are obtained, in the south part of the island. McCarthy Island, 700 feet high, and Steward Island, 505 feet high, lie between the above islands. Prominent rocks lie off the south ends of all three of these islands.

Quoin Island, 375 feet high, lies about 4 miles eastward of Cavern Island. High Rock, 65 feet high, lies about 600 yards southward of Quoin Island.

ISLANDS ON SOUTH SIDE OF INVESTIGATOR CHANNEL.—St. Andrew's Group consists of a number of densely wooded islands and rocks. Horsburgh Island, 250 feet high and located about 9 1/2 miles southwestward of Cavern Island, is the westernmost of the group. Horsburgh Islet, 235 feet high, is located 800 yards south-southeastward of Horsburgh Island. Boulder Rock, 25 feet high, is located about 3/4 mile southwestward of the same island.

The Cockburn Islands, four in number and attaining a greatest height of 535 feet, lie about 5 miles eastward of Horsburgh Island. Mackay Island, 610 feet high, and Macleod Island, 1,080 feet high, are located about 3 3/4 miles southeastward and 5 3/4 miles south-southeastward, respectively, of the same island.

Parsons Island, 910 feet high, is located about 3 miles eastward of the Cockburn Islands. Several islets and rocks lie close southward and eastward of the island. Parsons Rock, a compact group of pinnacles which dry 6 feet, lies about 1 3/4 miles north-north-

westward of the north point of Parsons Island.

Mackenzie Island, 810 feet high, Macbride Island, 765 feet high, McIan Island, 415 feet high, and McNab Island, 295 feet high lie from 3 to 6 miles southward of the main body of the St. Andrews' Group.

ST. PAULS ISLAND, located about 5 1/2 miles eastward of Parsons Island and close westward of the north part of St. Lukes Island (sec. 7D-12), has a prominent peak, resembling a horn, 735 feet high. A channel, about 600 yards wide and fringed with coral, separates the two islands. A depth of 21 feet is found over the bar at the north end of the channel.

The west side of St. Pauls Island is foul. Several islets and rocks lie off this side and off the north side of the island. ANCHORAGE can be taken in 4 fathoms near the head of the bay that indents the north side of the island. Protection is afforded from the Southwest Monsoon.

ST. MATTHEW'S ISLAND—HASTINGS HARBOR

7D-17 ST. MATTHEW'S ISLAND lies to the southward of Hastings Island and is hilly and densely wooded. Its north side forms the south shore of Hastings Harbor. Highest Peak, 2,835 feet high and located near the middle of the island, and South Peak, 1,920 feet high and located near the south end of the island, are both well-defined.

The north and northeast coasts of the island are indented by a number of foul coves. FISH HARBOR, near the northeast extremity, affords ANCHORAGE for small vessels having local knowledge and with a draft of 9 feet or less. White Rock, 30 feet high and prominent, lies about 1/2 mile eastward of the harbor entrance. A 13-foot shoal lies close southeastward of the rock.

A rock that dries 5 feet lies about 1 1/4 miles south-southwestward of the northeast end of the island.

The southeast coast of St. Matthew's Island is densely wooded and much indented. Reefs and shoals extend about 1 mile offshore in places. Tongue Island, 370 feet high and located about 2 1/2 miles southeastward of Highest Peak, is steep-to and densely wooded; a bare grassy mound stands near its south end.

South Bay, a bight in the south end of the island, affords sheltered ANCHORAGE in 10-fathoms, sand and shells. A 6-fathom patch lies in the entrance. A 4 1/4-fathom shoal lies in the east part of the entrance and on the east side of the bay.

7D-18 HASTINGS HARBOR is formed by St. Lukes Island (sec. 7D-12) on the west, Hastings Island on the east and St. Matthews Island on the south. There are two navigable entrances.

NORTH ENTRANCE lies between the northeast end of St. Lukes Island and the northwest end of Hastings Island, about 2 1/4 miles southeastward. Haycock Island, 330 feet high and covered with dense jungle, lies about 1/2 mile southeastward of Bengal Point, the northeast end of St. Lukes Island. The main channel lies between Haycock Island and Minto Point, about 1 1/2 miles southeastward. Depths of 11 to 15 fathoms are found in the fairway. Thomson Shoal, with a depth of 7 feet, lies nearly in midchannel, about 3/5 mile northwestward of Minto Point. The channel is otherwise clear of dangers. Thomson Shoal can be passed on either side, but there is a submerged rock close off Minto Point.

EAST ENTRANCE, between Cornwallis Point, the south end of Hastings Island, and Dufferin Point, the north end of St. Matthews Island, about 1 1/4 miles south-southwestward, has depths of 6 to 10 fathoms in the fairway.

Chaves Shoal, having a depth of 17 feet, lies on the south side of the entrance, about 3/4 mile south-southwestward of Cornwallis Point. Depths of 7 fathoms are found around the shoal.

James Patch, having a least depth of 2 feet, lies on the north side of the entrance, nearly 1 mile east-southeastward of the above point.

WEST ENTRANCE, between St. Lukes Island and St. Matthew's Island, is shoal and intricate. A shoal of sand and mud, having a least depth of 14 feet and extending 1/2 mile in a north-south direction, lies in the middle of the fairway at the north end of the channel.

ISLANDS AND DANGERS IN HASTINGS HARBOR.—St. Marks Islet, 575 feet high, lies in the southwest part of the harbor, about 3 1/4 miles west by southward of Dufferin Point. A boat channel, with a depth of 10 feet at high water, separates the island from the north-

west coast of St. Matthews Island. A small islet and several rocks lie in this channel.

Ryland Patch, a small coral rock that dries 1 foot, lies in the southwest part of the harbor, about 1 mile northward of St. Marks Islet. Depths of 3 1/2 fathoms are found close to the patch.

St. Johns Islet, 400 feet high, is located off the northeast side of Hindustan Bay, about 3 miles southward of Bengal Point.

The reefs that fringe the shores of the harbor are quite distinct, and rise sharply from depths of 3 to 5 fathoms.

TIDAL CURRENTS.—Between South Hump Island (10°11'N., 98°20'E.) and Hastings Island, the tidal currents set eastward on the rising and westward on the falling tide with rates of 1 1/2 knots at springs. The tidal currents in the east and west entrance channels attain a rate of 3 knots at springs. Currents within Hastings Harbor are weak.

CAUTIONS.—Patches of discolored water frequently appear in the harbor, but examination has proven these do not indicate dangers. The west entrance channel is often muddy, making it hard to identify the dangers therein.

ANCHORAGES.—Hastings Harbor affords excellent and safe anchorage for all types of vessels in depths varying from 6 to 12 fathoms, mud. A lee is always obtainable and no sea and current of any consequence is experienced. Evelyn Peak, 970 feet high and located in the south part of St. Luke's Island, serves as a good mark.

ALADDIN ISLANDS—BIRDS NEST ROCK

7D-19 ALADDIN ISLANDS, a scattered group of islands, some of which are high and bold, extends between about 15 miles westward and 18 miles south-southwestward of the south end of St. Matthews Island (sec. 7D-17).

Western Rocky Island (9°51'N., 97°52'E.), 70 feet high, is the westernmost island. A detached rock, 35 feet high, lies about 200 yards northeastward of this island, with some smaller rocks between.

North Rocky Island, 120 feet high, and covered with scrub, lies about 5 3/4 miles east-northeastward of the above island and is surrounded by off-lying rocks.

Davis Island, the largest and highest of the

group, is located about 4 miles west-southwestward of the south end of St. Matthews Island. It is densely wooded and has two main peaks, of which the western, 1,495 feet high, is slightly higher. A rock, 18 feet high and surrounded by a reef extending 200 yards from it, lies close off the east end of Davis Island.

Chimney Island, 140 feet high, lies about 1 1/4 miles north-northwestward of the northeast end of Davis Island. Several rocks, the northernmost of which dries 3 feet, lie between the two islands.

Drake Island, 470 feet high, is located about 3/4 mile southward of Davis Island. A deep channel separates the two islands.

Glasshouse Island, bold, rocky and 450 feet high, lies about 1 3/4 miles west-southwestward of Drake Island. A rock, 170 feet high, lies close off the west end of Glasshouse Island.

Slave Island (9°43'N., 98°00'E.), 210 feet high, lies about 2 miles southward of Glasshouse Island. A chain of rocks extends 1 1/2 miles north-northwestward from Slave Island. Pat Rock, the southernmost rock, is 125 feet high and Sheila Rock, the northernmost, is 200 feet high. A rocky reef, 2 feet high, lies about 1 mile southward of Slave Island.

Lamp Island, located about 2 1/2 miles southward of Drake Island, is 320 feet high. Honor Rock, having a depth of 2 feet, lies about midway between the two islands. North Brother and South Brother, two large rocks, 150 and 195 feet high, respectively, lie about 1/2 mile southward of Lamp Island. Kai Koh, a rock that dries 3 feet, lies about 400 yards southward of South Brother.

Haycock Rock, 230 feet high and steep-to, lies about 5 1/2 miles west-southwestward of Slave Island.

Christie Island, the southernmost of the main Aladdin Islands, is located about 4 miles southeastward of Haycock Island and has several wooded peaks. The highest peak, located at the northwest end of the island, has an elevation of 1,065 feet.

Sanders Island, 350 feet high, lies about 3/4 mile eastward of the south point of Christie Island. Murray Island, 235 feet high, lies about 1/2 mile south-southwestward of the same point. Both islands are rocky. A rock, 18 feet high, lies close off the north point of the latter island. The passage between this island and Christie Island is foul.

Cash Island, 370 feet high, lies about 3/4

mile southward of the southwest extremity of St. Matthews Island. Mawken Passage, the channel between the two islands, has considerable depths and provides a short cut for vessels proceeding westward from the Pakchan River. Rocks lie in the passage within 600 yards of the southwest end of St. Matthews Island. The southernmost rock is 20 feet high. A rocky islet, 120 feet high, lies about 1/4 mile eastward of Cash Island. A similar islet, 140 feet high, lies about 1/2 mile southward of the same island. There are strong rips in the passage at springs. The passage should only be used during daylight hours and then under favorable conditions.

7D-20 DUNKIN ISLAND (9°47'N., 98°07'E.) is 780 feet high near its north end. The Sisters, two rocks, 80 and 75 feet high, respectively, lie about 1/2 mile southward of Dunkin Island. Bruer Island, 960 feet high and densely wooded near its southeast end, lies about 3 miles southward of the same island. A rock, having a depth of less than 6 feet, the position of which is approximate, lies about 1 mile south-southwestward of the south end of Bruer Island.

Auriol Island, densely wooded and 600 feet high at its west end, is located about 2 1/2 miles southward of Bruer Island. A rock, about 3 feet high, lies about 200 yards off the northwest side of Auriol Island. Swallow Island, located 1/2 mile northward of the latter island, is 290 feet high. The channel between the two islands is shoal.

Graham Island, 540 feet high, and having two prominent rocks, 60 and 125 feet high, close to its north end, is located about 2 miles westward of Auriol Island. Ninepin Rocks, 80 feet high, lies about 1/2 mile south-southeastward of the south end of Graham Island.

A 3-fathom shoal, the position of which is doubtful, lies about 5 1/2 miles southeastward of Auriol Island.

BIRDS NEST ROCKS consist of two groups of rocks that lie within about 5 miles south-southeastward and 4 1/2 miles eastward of the southeast end of St. Matthews Island. The principal rocks in the northern group are Horse Shoe Island, 390 feet high, Cupola Island, 695 feet high, Tower Rock, 470 feet high, Square Rock, 270 feet high, and Sloop Rock, 290 feet high. The latter is the northernmost of this group.

The principal rocks in the south group are

Spur Rock, 490 feet high and located about 2 1/4 miles southwestward of Horse Shoe Island, and Cocks Comb Island, 660 feet high. An islet, 250 feet high, lies close southward of the latter island.

KO CHAN (KOH SINDARAR) AND ADJACENT ISLANDS

7D-21 Ko Chan, consisting of Koh Sindarar Nua and Koh Sindarar Tai, lies about 10 miles south-southwestward of Christie Island. A winding channel, that nearly dries, separates the two islands. From a distance, the islands appear as one. Both islands are high and densely wooded. A prominent summit, 1,210 feet high, stands near the north end of the southern island.

Torilla Island, 385 feet high, lies off the south side of the southern island. Pachumba Island, 535 feet high, lies off the west side of the same island. Stork Island, 320 feet high, lies about 1 3/4 miles northeastward of the northern island.

A rocky islet, 42 feet high, lies about 1 mile northeastward of the southeast end of the southern island. Some rocks, 2 feet high, lie close westward of the island. The group is separated from the south island by a channel more than 1/2 mile wide and 20 fathoms deep.

A rocky islet, 46 feet high and steep-to lies about 3/4 mile northwestward of the north end of the north island. A 30-foot islet is charted about the same distance northward of the same point.

An 8-fathom bank was reported (1945) to lie about 1 mile northward of Pachumba Island.

Marshall Rock, a pinnacle with a least depth of 24 feet, rises from depths of over 20 fathoms, about 2 3/4 miles westward of the south point of the southern island.

Richelieu Rock, located about 10 miles eastward of Torilla Island, dries about 4 feet. It is a small coral pinnacle rising from a depth of 20 fathoms. The drying portion is jagged coral, about 30 feet wide. The sea does not always break over this rock at high water, even in a considerable swell.

A depth of 22 fathoms, rock, was reported (1965) to lie about 6 miles west by southward of Richelieu Rock.

ANCHORAGE.—Vessels can anchor in the bay formed by the east sides of the two is-

lands. Protection is afforded from westerly winds. Anchorage can be taken in 25 fathoms, sand, in a position about 1 mile north by westward of the before-mentioned 42-foot rocky islet.

NOTE.—The off-lying islands lying southward of Ko Chan are described in section 7F-7.

PART E. PULO MAH PUTEH TO CASUARINA POINT—PAKCHAN RIVER AND APPROACHES

7E-1 VICTORIA POINT (9°58'N., 98°33'E.), the north point of the entrance of the Pakchan River, forms the south end of a range of hills. The point is high, bold and steep-to. An iron flagstaff, 76 feet high, stands at an elevation of 188 feet on the point. Two radio masts, with elevations of 383 feet, stand on the coast about 4/5 mile northward of the flagstaff.

COAST—GENERAL

7E-2 The land northward of Victoria Point is very hilly, parts of it have been cleared and the remainder is covered with trees and jungle. The summits of the hills are flat-topped and not readily identifiable. The coast between Victoria Point and Pulo Ma Puteh (sec. 7D-13), about 14 miles north-northwestward, is mostly low. Portions of this coast are bordered by mangroves. Tanjong Padah, a bluff headland, is located about 7 1/2 miles northward of Victoria Point. A similar headland is located about 5 miles northward of the same point.

Pakchan River rises in about 10°50'N., 99°00'E. and is about 80 miles long. Its banks are densely wooded and intersected by many streams. The river forms the boundary between Burma and Thailand and provides access to the vicinity of many of the tin mines in the south part of Burma and the north part of Thailand.

The coast southward of the river entrance, between Seaward Peak (Khao Bang Chak) and Casuarina Point, about 38 miles south-southwestward, is mostly low, densely wooded and intersected by numerous creeks and rivers. Seaward Peak, located about 9 miles southward of Victoria Point, is 1,315 feet high and prominent. Double Peak, 3,100 feet high and

located about 6 miles east-southeastward of Seaward Peak, is prominent when visible.

A range of mountains backs this stretch of coast at a distance of about 10 miles. Round Mountain, 3,182 feet high and located about 9 1/2 miles south-southeastward of Seaward Peak, has a very distinct conical summit with a peak appearing vertical Kao Phrami, located about 5 3/4 miles east-northeastward of Casuarina Point, culminates in three peaks, each about 3,600 feet high.

The coast, between the south entrance of the Pakchan River and the mouth of the Banlin River, about 9 1/2 miles south-southwestward, is fronted by mangroves, and is bordered by extensive banks of sand and mud.

NAVIGATION

7E-3 Vessels from northward should follow the directions given in section 7D-3 in order to clear the extensive sand and mud flat that lies off the Pakchan River entrance. Vessels wishing to enter the Pakchan River can use one of the three approach channels which lead from the recommended track. (See section 7E-13).

Vessels from westward can use Investigator Channel (sec. 7D-16).

Small vessels with local knowledge approaching from westward can use Mawkin Passage. (See section 7D-19).

DEPTHS

7E-4 The 6-fathom curve lies about 2 1/2 miles westward of Pulo Mah Puteh and up to 12 1/2 miles westward and west-southwestward of Victoria Point. This curve is not clearly defined off Casuarina Point.

The least depths in the north, west, and south approach channels to the Pakchan River entrance are 11 feet, 19 feet, and 24 feet, respectively. The depths at the anchorage in Kawson (Victoria Point) Harbor close northward of that point, are 7 to 8 fathoms. Depths of 15 feet are charted off the entrance of Ranong Creek at the recommended anchorage.

Vessels of 12 to 13 feet draft can proceed upriver about 14 miles to the entrance of the Klong (Ghlong) Maliwun River, and then 3 miles up that river.

TIDAL CURRENTS

7E-5 The tidal currents, near the coast southward of Pulo Mah Puteh, set southward on the rising tide and northward on the falling tide. In the north approach channel, the tidal currents set in a direction parallel with the channel at a rate of 2 knots at springs.

Between Ko Chan (Koh Sindarar Nua) and Koh Chang, the tidal currents set northeastward on the rising tide and southwestward during the falling tide. The rate is 3/4 knot at springs. Between the latter island and the mainland, the tidal currents set northward on the rising tide and southward on the falling tide.

In the south approach channel, the tidal currents set in a direction parallel with the channel, toward the Pakchan River entrance on the rising tide and away from it on the falling tide. Strong rips are found between the north end of Koh Chang and Ko (Koh) Kan. Both the flood and the ebb currents set strongly towards Ko Kan. The flood current sets eastward past the north coast of Pulo Ru, and then turns northeastward towards the entrance of the river. The ebb current from the Pakchan River divides at the northeast point of Pulo Ru, one part setting westward and the other setting southward. Tide rips are found in the channel northward of Pulo Ru.

WINDS AND WEATHER

7E-6 See section 7-3.

ISLANDS AND DANGERS IN NORTH APPROACH

7E-7 Several islands are located on the extensive bank which fronts the coast between Pulo Mah Puteh and Victoria Point. Pulo Remiah, the northernmost of these islands, is 60 feet high and lies about 3/4 mile southward of Tanjong Padeh. A group of islands, islets and reefs lie between 10 miles northwestward and 12 miles westward of Victoria Point.

Sims Reef, marked by a BEACON, 23 feet high and surmounted by a ball, dries 9 feet and is located about 5 1/4 miles northwestward of Victoria Point.

Thane Island, 100 feet high and of small extent, lies about 800 yards eastward of Sims

Reef. A small reef that dries about 11 feet lies close southward of the island.

Pulo Tonton, 405 feet high and located 4 miles northwestward of Victoria Point, has been partially cleared. Some villages stand on its east and west coasts. A drying bank of sand and mud extends eastward to the mainland and southeastward nearly to Victoria Point.

Pulo Besin, 645 feet high, lies about 1 mile south-southwestward of the south point of Pulo Tonton. Several reefs that dry about 6 feet lie close off the east side of Pulo Besin. One of these reefs is marked by a BEACON surmounted by a globe. A 13-foot patch lies northward of the northeast end of the island.

Akha Barit, 215 feet high and steep-to, is a small islet located 1/2 mile northward of the above point.

Pulo Jungis, 600 feet high, is located about 2/5 mile northward of Pulo Besin. The channel between the islands is narrow and dries. Shoal ground, as defined by the 1-fathom curve, extends about 4 1/2 miles north by westward from Pulo Jungis.

Pulo Perlin, 480 feet high, lies about 2/5 mile southward of the southeast point of Pulo Besin. Two small reefs, that dry about 2 feet, lie within 1 mile southward of Pulo Perlin. A white BEACON, surmounted by a white globe, marks the northernmost reef.

A beacon, lower part red and upper part white, is located close off the southeast side of Pulo Perlin.

ISLANDS AND DANGERS IN SOUTH APPROACH

7E-8 Shoal ground, as defined by the 3-fathom curve, extends up to 6 miles offshore between a projecting headland, 600 feet high, located about 10 1/2 miles north-northeastward of Casarina Point, and a point about 15 miles north-northeastward. A tongue of this shoal extends as far as the east side of Ko Kam Yai.

Ko Nui, a small islet 196 feet high, lies about 1/2 mile westward of the projecting headland. Shoal ground extends about 4 miles west-southwestward from that point.

Ko Kam Yai (9°29'N., 98°21'E.), 1,030 feet high, lies about 13 miles northward of Casuarina Point. Shoal ground, as defined by the

6-fathom curve, extends about 2 miles off the west side of the island. An extensive sandbank, as defined by the 1-fathom curve, lies 1/2 mile eastward of the south point of the island. Ko Kam Tok, 345 feet high, lies close northward of Ko Kam Yai. Ko Kam Nui, 945 feet high, is located about 1 mile eastward of the same island. The depths between the islands are very irregular and no attempt should be made to pass between them.

Double Islet, located 1/2 mile southward of the south end of Ko Kam Yai, consists of two peaks joined by a low and narrow strip of sand. The north peak is 272 feet high and the south peak is 146 feet high. A rock, with a depth of less than 6 feet, lies about 400 yards northeastward of the north peak. South Rock, 19 feet high, lies about 1/2 mile southwestward of Double Islet.

Ko Lan (Metcalf Island), 730 feet high and wooded, is located about 2 miles south-southeastward of the south point of Ko Kam Yai and about 4 miles offshore. A sandy spit, as defined by the 3-fathom curve, extends about 1 1/4 miles east-northeastward from Ko Lan.

Ko Khai Hyai (Hayes Island), located about 6 miles south by westward of Ko Lan, is circular in shape, high and wooded.

Umbrella Island, located about 3/4 mile northwestward of Ko Khai Hyai, is rocky and shows up prominently when not in range with the latter island. A high tree, resembling an umbrella, stands on the island. These islands are surrounded by large sandbanks and rocks, and at low water, breakers occur in several places westward and southward of them.

Koh Chong Pianam, located about 4 miles north-northeastward of Ko Kam Yai, is 515 feet high and wooded. The east side of the island is fringed with rocks that extend 200 yards offshore.

Hin Sawai, 21 feet high and having a white summit, lies about 800 yards northward of Koh Chong Pianam.

7E-9 KO PHAYAM (Koh Piam), located about 15 miles southwestward of Victoria Point, is densely wooded and has a prominent peak, 790 feet high. A rocky reef extends along its west coast; the depths within 1 mile of the reef are 8 to 10 fathoms. Two open bays indent the west side of the island.

A rocky islet, 50 feet high, lies about 600 yards off the southwest point of Ko Phayam. A rock, that dries 5 feet and with depths of 7 to 8 fathoms close to it, lies about 1/2 mile southwestward of the island. Extensive sandbanks lie between the island and the mainland.

Koh Chang, located about 2 miles north-northeastward of Ko Phayam, is densely wooded and 1,280 feet high. Large sandbanks extend from the east side, and also from the mainland opposite. Some wooded islets lie off the south end of Koh Chang, the nearest of which lies about 600 yards southward and is 300 feet high.

A sandbank having depths of less than 3 fathoms extends about 1 1/4 miles southwestward from the southwest side of Koh Chang toward the north end of Ko Phayam. Depths of 4 1/4 to 6 fathoms lie between the extremity of this bank and the north end of Ko Phayam. A 2-fathom patch lies about 800 yards eastward of the north point of the latter island.

Harry Head, the north point of Koh Chang, is a high bluff covered with trees. Tree Island, 45 feet high and wooded, lies about 1 1/2 miles southwestward of Harry Head and about 600 yards off the northeast end of Koh Chang. A rock, 2 feet high, lies close off the west coast of Koh Chang in a position about 1 mile southward of Tree Island.

A shallow bay with a bushy islet forming its east side indents the north coast of Koh Chang, eastward of Harry Head. Stainer Rock, low and bush-covered, lies about 900 yards eastward of the bushy islet.

Ko Khan, a rocky islet lying about 1/2 mile northwestward of Harry Head, is steep-to on its south and east sides. A LIGHT is shown from the summit of the islet. The light structure is not easily distinguished by day because of the surrounding trees that obscure all but the top.

Several shoal patches, having a least depth of 3 feet, extend up to 2 1/2 miles west-southwestward from Ko Khan.

ISLANDS AND SHOALS OFF THE PAKCHAN RIVER ENTRANCE

7E-10 A group of islands and islets, surrounded by shoals and dangers, lie between

Ko Kan and Victoria Point. Pulo Pingngwe, 605 feet high, lies about 1 3/4 miles north-eastward of Ko Kan. A large shoal, that dries 3 feet, extends up to 1 mile east-southeastward from the island. A shoal, with a least depth of 5 feet, lies 3/5 mile southward of the south part of the island. Other shoal patches lie westward of the same island.

Pulo Saung Kharang, 435 feet high, lies about 2 miles east-northeastward of Pulo Pingngwe. Reef and foul ground extend about 3/4 mile westward from Pulo Saung Kharang.

Dyke Island lies about 1/2 mile southward of Pulo Saung Kharang.

Pulo Ganga, 405 feet high, lies about 1 1/2 miles northward of Pulo Pingngwe with Pulo Gattai, about 2 miles eastward of it. A narrow spit, that dries, extends about 1 3/4 miles westward from Pulo Gattai and nearly joins that island with Pulo Ganga. A shoal, with a least depth of 4 feet, extends about 2 1/4 miles westward from Pulo Ganga.

Pulo Ru, 610 feet high near its northwest end, lies with its south point about 1/4 miles eastward of Pulo Gattai and its northeast point about 1 mile southward of Victoria Point. A narrow shoal of sand and mud nearly joins Pulo Gattai and Pulo Ru at low water. A shoal, as defined by the 3-fathom curve, fronts the west side of Pulo Ru and extends 4 1/2 miles westward from it. The inner part of this shoal dries. Pulo Ganga lies on this shoal.

Dyke Island, Pulo Saung Kharang, Pulo Gattai, and Pulo Ru are separated from one another by narrow channels.

Round Island, 290 feet high and steep-to, lies about 3/4 mile southeastward of the south end of Pulo Ru. The intervening channel is moderately deep.

A shoal, with a least depth of 11 feet, lies on the south side of the entrance channel, between the northeast extremity of Pulo Ru and the south side of the river entrance.

APPROACH CHANNELS AND PAKCHAN RIVER ENTRANCE

7E-11 There are three approach channels leading to the Pakchan River entrance. The channel from northward leads between the shoal ground extending northward from Pulo Jungis and Pulo Remiah. The least depth in

this channel, 11 feet, is in a position southward of the latter island. The channel leads between Sims Reef and Thane Island and thence between Akha Barit and the northeast end of Pulo Besin.

The channel from westward leads between Pulo Perlin and the reef lying about $4/5$ mile southward of that island. The least depth in this channel 19 feet, is in a position about $4\frac{1}{2}$ miles west-southwestward of the southwest end of Pulo Besin.

The channel from southward, known as Bell Passage, leads between Ko Kan and the north end of Koh Chang and thence eastward between the north coast of the latter island and the shoals extending southward from Pulo Pingngwe. The channel then leads southeastward of the drying bank that extends southeastward from the latter island and thence southeastward of Round Island. The least depth in this channel, 24 feet, is located about $3/4$ mile southwestward of Ko Kan.

The entrance of the Pakchan River lies between Victoria Point and the entrance of Ranong Creek, about $2\frac{1}{2}$ miles east-southeastward. Kawsong (Kauthong) Harbor, small in extent, lies on the east side of the point, between it and Browning Island, about 600 yards eastward. The village of Kawsong is located on the northwest shore of the harbor.

The limits of Kawsong Harbor are as follows: NORTH: A line bearing 131° , distant $2/5$ mile, to the northwest point of Pulo Nyor group of islands from a boundary pillar at high-water mark on the mainland on the right bank of the Pakchan River. EAST: A line bearing 212° , distant $3\frac{4}{5}$ miles from a boundary pillar located at the southeast point of Pulo Nyor to a boundary pillar located on the northeast point of Pulo Ru. SOUTH: A line drawn 196° , distant 1 mile from a boundary pillar located on the northeast point of Pulo Ru.

Ko Phi is an islet lying $1/4$ mile northward of the entrance of Ranong Creek and about

$2\frac{1}{4}$ miles east-southeastward of Victoria Point. A LIGHT is shown from Ko Phi. A sandbank, with depths of 3 to 11 feet, extends about $1/4$ mile south-southwestward from the islet.

Shoal ground, as defined by the 3-fathom curve, extends about 350 yards west-southwestward from the south end of Browning Island. Depths of 13 to 18 feet are found between the outer edge of this bank and Victoria Point.

ANCHORAGES

7E-12 Vessels with local knowledge can anchor in the bay that indents the southwest coast of Ko Phayam. The anchorage is in $5\frac{1}{2}$ fathoms, sand and mud, off a sandy beach.

Vessels with local knowledge can anchor in 5 or 6 fathoms off the northeast side of Ko Phayam. Protection from the Southwest Monsoon is afforded.

Sheltered anchorage can be taken in the north approach channel, between Pulo Jungis and Pulo Tonton.

Vessels with local knowledge can anchor in the south approach channel, southward of Pulo Pingngwe. Vessels of light draft can anchor eastward of Pulo Ru.

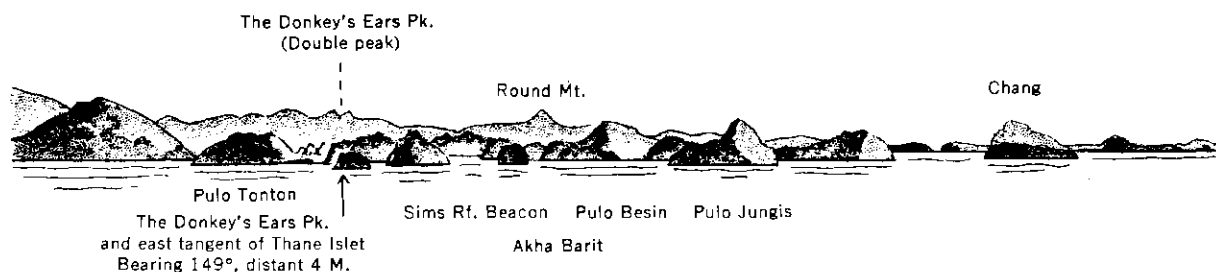
Small vessels with local knowledge frequently anchor in 15 feet off the entrance of Ranong Creek in a position about 700 yards southward of Ko Phi.

Vessels can anchor $1/2$ mile southward of Victoria Point in 5 to 10 fathoms.

Vessels can anchor in 7 to 8 fathoms in Kawsong Harbor. The area suitable for anchoring is about 350 yards long and 150 yards wide and lies eastward of the pier. Vessels using this anchorage must pass over a shoal, having depths of $2\frac{1}{4}$ to 3 fathoms, that lies across the harbor entrance.

DIRECTIONS

7E-13 CAUTION is required due to lack of navigational aids.



LEADING MARKS FOR NORTH APPROACH TO PAKCHAN RIVER

NORTH APPROACH CHANNEL.—From the position 4 miles westward of Pulo Mah Puteh (sec. 7D-3 and sec. 7E-3), steer toward Thane Islet on a course of 149°. Double Peak in range with the east tangent of Thane Islet makes an excellent mark for this course. Double Peak is seldom visible before noon.

When the beacon marking Sims Reef bears 185°, steer 172° so as to pass between that reef and Thane Islet. When the north point of Akha Barit bears 090°, steer 148° to avoid the 13-foot patch located southwestward of Akha Barit and the reefs off the east coast of Pulo Besin. Vessels can pass close off the southwest coast of Akha Barit which is steep-to.

When the southeast and southwest points of Pulo Besin are in range, bearing 261°, change course to 128°. When Ko Phi light structure bears 095°, steer 095° through the entrance. When Victoria Point bears 045°, the course may be altered for the selected anchorage.

Vessels bound for the anchorage off Ko Phi should, after passing Victoria Point, approach that island from a more northerly direction in order to avoid the 11-foot shoal in midchannel, southeastward of Victoria Point.

WEST APPROACH CHANNEL.—From a position about 9 miles westward of Pulo Ganga, steer 090° for that island until the southeast end of Pulo Besin bears 061°. Thence steer 061° until the southeast end of Pulo Perlin bears 090°. The least depths on this track are about 19 feet which are found after proceeding about 2 miles along the latter track.

When the southeast point of Pulo Perlin bears 090°, steer 095° for Ko Phi light structure. This course leads between Pulo Perlin and the beacon marking the reef southward of it. The southeast point of Pulo Perlin can be passed at a distance of 200 yards. Continue on course 095° and proceed as per directions for the north approach channel.

SOUTH APPROACH CHANNEL.—From a position about 4 1/4 miles westward of Ko Phayam, steer 048° for the summit of Pulo Pingngwe. This course leads between the north end of Koh Chang and Ko Kan, after passing Tree Island at a distance of 800 yards abeam. A least depth of 24 feet is found about 4/5 mile southwestward of Ko Kan.

Vessels approaching this channel from the northward should keep westward of the shoals in the approach until the summit of Koh Chang

bears 120°. Then bring the summit of Pulo Pingngwe to bear 048° and proceed as above.

When the north tangent of Ko Kan bears 270° and is in range with South Peak on St. Matthews Island (sec. 7D-17), steer 090°, keeping that range astern.

When the summit of Pulo Pingngwe bears 335°, alter course gradually to 045° and steer for Ko Phi light structure on that bearing. The least depth on this track is 24 feet.

Vessels bound for the anchorage off Ko Phi should keep on this course and anchor as convenient.

Vessels bound for the anchorage off Victoria Point should continue on the 045° course until the summit of Round Island bears 270°. Thence alter course northward and steer 013° for Browning Island. The least depth on this track, 24 feet, is located about 1 mile northeastward of Round Island. When the northeast end of Pulo Ru has been passed, steer for the anchorage located 1/2 mile southward of Victoria Point.

FACILITIES

7E-14 KAWSONG (Kawthaung) (9°59'N., 98°33'E.), the southernmost settlement of Burma, is a small government station, and a port of call for ocean vessels. A police station stands on the summit of the hill forming Victoria Point. Some government buildings stand on a ridge to northward.

Ranong, a village located about 2 miles above the entrance of Ranong Creek, is a Thailand government station. Several tin mines are located in this area.

PIER.—A pier extends about 450 feet from the west shore of Kawsong Harbor. The Customhouse stands at the root of the pier.

A jetty, consisting of a 50-foot bridge, an 80-foot pontoon bridge, and a 120-foot pontoon jetty, is located at Kawsong. Depths alongside are reported (1966) to be 18 to 20 feet.

CARGO INFORMATION.—Cargo is handled by lighter at the anchorages. Lifts in excess of 5 tons would not be accepted (1962) at either Kawsong Harbor or Ranong unless previous special arrangements were made by the ships agent.

COMMUNICATION.—Regular sea communication is carried on between Kawsong

Harbor, Penang, Mergui, and Rangoon. An airfield is located 7 miles northward of Victoria Point.

MEDICAL.—A hospital is located at Kawsong.

PAKCHAN RIVER ABOVE VICTORIA POINT

7E-15 Pulo Nyor and Pulo Jitan lie close together on the west side of the channel, about 3 miles north-northeastward of Victoria Point. Koh Lek, having dangerous rocks close northward and southward of it, lies about 2 1/2 miles north-northeastward of Pulo Jitan.

Pulo Pao (Goh Muang), with smaller islands close northwestward and southeastward of it, is located about 9 miles north-northeastward of Victoria Point and close off the west bank of the river. Above-water rocks lie close off the east side of Pulo Pao.

Buoy Island is located on the west side of the channel, about 1 mile northeastward of Pulo Pao. Ko Kwan and some smaller islands lie on the east side of the channel and off the entrance of the Klong Maliwun.

The Klong Maliwun enters the Pakchan River about 13 1/2 miles upriver of Victoria Point. Vessels drawing 12 to 13 feet can proceed to the entrance of a tributary, the Klong Lama. Maliwun, a settlement located about 9 miles above the entrance of the Klong Maliwun, can be reached only by small craft.

Koh Kamut is located on the west side of the Pakchan River, just above the Klong Maliwun entrance.

A small island is located about 2 miles east-northeastward of Koh Kamut. A narrow channel, that separates this island from the marshes fronting the east bank of the Pakchan River, lead into the Ghlong River. A settlement stands on the north bank of the Ghlong River.

The Klong Kamou Yei intersects the west bank of the Pakchan River at a position about 4 miles upriver of Koh Kamut. A rocky patch, that dries 4 feet, lies 300 yards off the north entrance point of the tributary.

The Klong Kamou Duen intersects the west bank of the Pakchan River at a position about 7 miles upriver of Koh Kamut. A rocky patch, that dries at three quarters ebb, lies about 100 yards off the west bank of the Pakchan River, about 3/4 mile northward of the entrance of the tributary.

Light-draft vessels can proceed about 4 miles upriver of this entrance. Vessels drawing about 10 feet can proceed farther upriver at high water only.

Kraburi, a Thailand settlement located about 28 miles upriver of Victoria Point, can be reached by small vessels only during the rainy season.

DIRECTIONS.—The channels are not buoyed and local knowledge is required. No directions are given due to the changing conditions in the Pakchan River and its tributaries.

COAST—KHLONG BANG BEN AND SHONG PIANAM

7E-16 KHLONG BANG BEN, an extensive shallow inlet, is entered about 7 miles southeastward of the south end of Ko Phayam (sec. 7E-9). The 1-fathom curve lies over 1 mile offshore, southward and westward of the north entrance point. The channel, which lies on the south side of the entrance, has depths of 1 fathom to 2 fathoms.

SHONG PIANAM, or the "Entrance of the Three Big Rivers," an extensive inlet, is entered between Ko Pianam and Hlaem (Laem) Tashin, about 3/4 mile southwestward. Ko Pianam, wooded and 750 feet high, is located about 9 miles south-southeastward of the south end of Ko Phayam. Hlaem Tashin, a wooded point, rises to a height of 435 feet, about 2/5 mile southeastward of its extremity.

DEPTHS.—The outer edge of a bar lies about 3 1/2 miles westward of the entrance. The bar has depths of 1 fathom to 2 fathoms, and a width of about 1 mile. The bottom is sand and mud.

The entrance is about 1/4 mile wide and has irregular depths of 10 to 16 fathoms.

TIDAL CURRENTS attain a rate of 2 to 3 knots at springs in the narrow part of the entrance. In the offing and on the bar, the rate is about 1 knot at springs. The north-going current on the rising tide is stronger than the south-going current on the falling tide.

ANCHORAGES—DIRECTIONS.—Small vessels with local knowledge can anchor in 5 to 9 fathoms, mud, about 1/2 mile inside the entrance.

From a position about 1/2 mile northward of Hin Sawai (sec. 7E-8), vessels should steer 089° for a 300-foot hill on the north end of Ko Pianam. When the summit of Hlaem Tashin

(9°33'N., 98°28'E.) bears 132°, the course should be altered to that bearing. When the conical hill, 695 feet high, at the head of the inlet, bears 095°, it should be steered for on that bearing. This course leads through the entrance to the anchorage.

PART F. CASUARINA POINT TO LAEM PAK PHRA

7F-1 CASUARINA POINT (9°14'N., 98°21'E.), the east entrance point of Pak Kura, is low and densely wooded. Takua Pa, the west entrance point of Pak Kura, forms the north point of Ko Ra, a high, densely wooded island. Ko Ra, which is steep-to on its west side, is 951 feet high in its north part and 1,128 feet high in its south part.

A LIGHT is shown from Takua Pa.

COAST—GENERAL

7F-2 Takua Pa Inlet is the estuary of a large river which flows into the sea through four channels that intersect the west coast of Thailand between the parallels of 9°15'N. and 8°52'N.

Laem Krangnor, a low, sandy point, is located about 3 1/2 miles southward of the south entrance point of the south channel of Takua Pa Inlet. Laem Krangyai, located about 4 1/2 miles south-southwestward of Laem Krangnoi, is low, sandy and backed by tall trees.

From Laem Krangyai, the coast trends southward for about 7 miles to Laem Hin Bai (Laem Lachan), a wooded bluff, 305 feet high. This stretch of coast is low in the north part and backed by high hills. These hills gradually approach the coast, reaching it at the latter point, they recede southward from this point.

Laem Ao Kham, about 2 miles south-southwestward of Laem Hin Bai, forms the west entrance point of a common estuary of several rivers. A hill, 275 feet high, stands on the point. Laem Ao Kham is the north extremity of a bold peninsula. Kao Tam Chok,

a hill located about 2 miles southward of the point, is 545 feet high. Laem Tam Chok, about 1/4 mile southwestward of the hill, forms the west extremity of the peninsula. This peninsula is isolated from, and is considerably westward of any other high land in this vicinity. It is the only readily identifiable land between Ko Ra (sec. 7F-1) and Ko Phuket (H.O. Pub. 70).

Between Laem Tam Chok and Laem Pak Phra, about 22 miles south-southeastward, the coast consists of sandy beaches backed by high wooded hills. In places trees grow down to the water's edge. The latter point forms the north entrance of Chong Pak Phra, the strait that separates Ko Phuket from the mainland. The strait and the island are described in H.O. Pub. 70.

Laem Pak Phra is marked by a group of tall trees. A conical hill, about 200 feet high, stands just within the point. Ko Pilai, a small hill standing near the coast about 2 1/2 miles northward of the point, is the only coastal hill between Laem Tam Chok and Laem Sai (H.O. Pub. 70), about 7 1/2 miles southward of Laem Pak Phra. Ko Pilai is hard to identify.

NAVIGATION

7F-3 The track from Rangoon to Singapore passes from 10 to 12 miles westward of the Similan Islands. Coasting vessels should give a wide berth to the salient points and adjacent islands.

DEPTHS

7F-4 The 20-fathom curve lies about 15 1/2 miles westward of Casuarina Point and about 5 miles westward of Laem Tam Chok. The inlets and estuaries that intersect the coast northward of the latter point are shoal. The coast, between Laem Tam Chok and Chong Pak Phra, is rather steep-to, with the 10-fathom curve lying up to 2 miles offshore.

Ko Raja Yai
Bearing 067°, distant 17 M.

Ko Raja Noi
Bearing 087°, distant 14 M.



KO RAJA YAI AND KO RAJA NOI FROM WESTWARD

Islands Southward of Ko Phuket

TIDAL CURRENTS—CURRENTS

7F-5 During the Northeast Monsoon, the current off the coast between Ko Ra and Laem Tam Chok sets either northward or southward. It sets in one direction for a considerable period, and then without apparent reason, changes its direction.

Its direction does not seem to be related to the wind as the current often sets northward during and after periods of moderate northerly winds.

Even when opposed by the tidal current, this offshore current maintains its direction. When the current and tidal current are confluent, the resultant current may attain a rate of nearly 2 knots; when in opposition, the rate is usually not more than 1 knot.

WINDS AND WEATHER

7F-6 See section 7-3.

MIDDLE ISLAND—PERFORATED ISLAND—SIMILAN ISLANDS

7F-7 MIDDLE ISLAND (Koh Tasai) (9°04' N., 97°50' E.), located about 18 miles southward of Koh Sindarar Tai (sec. 7D-21), is densely wooded and 742 feet high at its south end. A peak, 298 feet high, is located near the north end of the island, with another peak, slightly lower, between it and the 742-foot summit. The island is steep-to, except on its east side where depths of 23 feet are found about 600 yards off a sandy beach, located about 1/2 mile from the north point of the island.



MIDDLE ISLAND (KO TASAI)

Bearing 067°, distant 10 miles

PERFORATED ISLAND (Koh Born), about 14 miles southward of Middle Island, is wooded and has two distinct peaks. The eastern peak is 465 feet high and the western peak is about 150 feet high. The island derives its name from a hole near the water's edge in the dip between the two summits. The island is steep-to, except northward of its west end where a depth of 21 feet is found about 400 yards offshore.



PERFORATED ISLAND (KO BORN)

Bearing 140°, distant 13 miles

SIMILAN ISLANDS, a group of six islands, extend about 12 miles southward from Ko Bangu, the northern island, which is located about 12 1/2 miles southwestward of Perforated Island. Ko Bangu is 315 feet high and wooded. Several large, prominent boulders lie close off its southeast end. A rock, that dries 5 feet, lies about 200 yards northward of the west end of the island. The remainder of the island is steep-to.

Great Sayer Island (Ko Similan), wooded and flat-topped, is separated from Ko Bangu by a channel about 600 yards wide, with a depth of about 14 fathoms. The island is 856 feet high in its north part. Two well-defined peaks, 516 and 539 feet high, are found near the south end of the island. A small cove, with a depth of 5 fathoms, indents the northwest end of the island. Some small sandy coves indent the east side of the island.

Ko Similan



Ko Bangu
Bearing 182°, distant 20 M.

GREAT SAYER ISLAND (KO SIMILAN) AND KO BANGU

From Northward

Hin Pular, a group of three detached rocks from 16 to 27 feet high and steep-to, lies about 1/2 mile southwestward of the southwest end of Great Sayer Island. A rock, with a depth of 8 1/2 fathoms, lies about 300 yards southward of Hin Pular.

Center Islands lie between 2 and 4 miles southward of Great Sayer Island. Ko Pabu, the northern most island, is 392 feet high, conical, wooded and steep-to, except on its northeast side where depths of 2 fathoms extend about 600 yards offshore. Ko Miang, the southernmost island, is 420 feet high, flat-topped, and wooded. A rock, that dries 5 feet, lies close off the north end of the island. A small, sandy cove, with a depth of 4 fathoms, indents the northeast side of the island.

Two islets rise from a reef about 400 yards

off the northeast end of Ko Miang. The channel between the island and the reef has a depth of 37 feet in the fairway. The westernmost islet is 159 feet high and wooded. The easternmost islet is 66 feet high and rocky.

Ko Tayan, located about 3 miles south-southeastward of Ko Miang, is a small, bare, conical rock, 138 feet high and steep-to. The summit is covered with scrub.

Hin Payan, a group of steep-to rocks, lies about $3\frac{5}{8}$ mile east-southeastward of Ko Payan. The channel between the rocks and the island has a depth of $10\frac{1}{2}$ fathoms. The main group has several drying heads, and two rocks about 1 foot high. An isolated rock, that dries 9 feet, lies about 400 yards east-southeastward of the main group.

Ko Payang, 414 feet high and wooded, lies about 1 mile southwestward of Ko Payan. The channel between the two islands has depths of 4 to 6 fathoms.

Ko Huyong (South Island), wooded and having two rounded peaks, 362 and 360 feet high, respectively, is located about $\frac{1}{2}$ mile southward of Kp Payang. The channel between the islands has depths of $7\frac{1}{4}$ to 26 fathoms. Ko Kuyong is steep-to, except on its northeast side, when a reef fronting a sandy beach extends about 200 yards offshore.

TAKUA PA INLET AND APPROACHES

7F-8 TAKUA PA INLET is the estuary of a large river which flows into the seaby way of four channels between the parallels of $9^{\circ}15'N$. and $8^{\circ}52'N$.

CAUTIONS.—No recent surveys have been made of Takua Pa Inlet and its approaches. Entry should only be attempted by small vessels having local knowledge.

CHANNELS—DEPTHS.—PAK KURA, the northernmost entrance of the inlet, lies between the northeast end of Ko Ra and Casuarina Point (sec. 7F-1), about 2 miles southeastward. Depths of 6 to 2 fathoms are

found in the channel. The greater depths are found on the west side of the channel. This channel, the only safe entrance during the Southwest Monsoon, is narrow, intricate and steep-to.

PAK CHIK, the entrance between the south end of Ko Ra and the north end of Ko Phra Thong (Koh Pratang), is foul and can be used only by small craft with local knowledge.

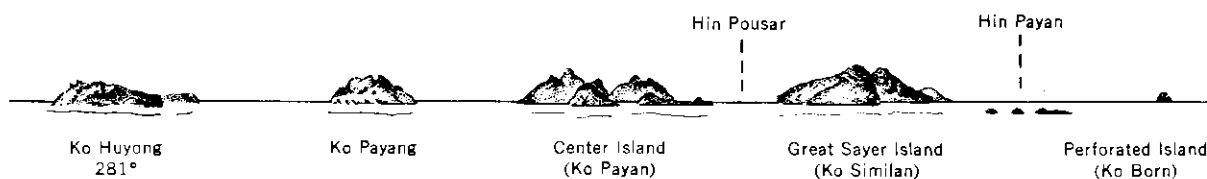
PAK KRUE is entered between the south end of Ko Phra Thong and the north end of an unnamed island, about 1 mile southward. Extensive sandbanks, parts of which dry 5 feet, extend seaward from 1 mile to 2 miles from both sides of the entrance. The entrance bar, which lies between $2\frac{1}{2}$ and $3\frac{1}{2}$ miles westward of the entrance, has a reported depth of 10 feet. Depths of 5 to 7 fathoms are found along the north side of the channel, between the entrance points.

A heavy swell is found on the bar during the Southwest Monsoon.

PAK KO (Klong Pakkoh), the south entrance of Takua Pa Inlet, is located about 9 miles southward of Pak Krue. The land in the vicinity of the entrance is densely wooded and intersected by creeks. The channel leads between sandbanks which are reported to be stationary. Depths of $2\frac{1}{2}$ to 3 fathoms are found for about 2 miles within the entrance. A large part of the country is flooded at high water and becomes a mangrove swamp. Small vessels with local knowledge can use the entrance only under the most favorable conditions.

ISLANDS—DANGERS.—Ko Phra Thong, which lies in the entrance of Takua Pa Inlet, is densely wooded. The west coast of the island is low and sandy. Depths of 8 to 10 fathoms are found about 2 miles off this coast.

Ko Gah ($8^{\circ}54'N$., $98^{\circ}14'E$.) is a sandy islet, located about 1 mile offshore in a position about $7\frac{1}{2}$ miles southward of the south end of Ko Phra Thong. The islet is surrounded by extensive sandbanks; these are fronted by



SIMILAN ISLANDS FROM EAST-SOUTHEASTWARD

rocks around which are depths of 2 to 5 fathoms. The rocks are partly visible at low water. Sandbanks, with depths of only a few feet, lie between the islet and the mainland. Depths of 10 to 12 fathoms are found about 5 miles westward of the islet, but depths of 5 to 6 fathoms have been reported in this area.

COAST.—Elbow Point lies abreast the Macauley Point, the southeast end of Ko Phra Thong. A black BEACON off the latter point marks foul ground over which there is a depth of 9 feet.

TIDAL CURRENTS.—The rate of the tidal currents is 2 to 3 knots in the lower part of the river forming Takua Pa Inlet, and up to 4 knots in the upper part. In Pak Ko, the flood and ebb currents are regular and set at a rate of 2 to 3 knots.

ANCHORAGES.—Small vessels with local knowledge and drawing up to 12 feet can anchor about 1/2 mile northward of Feather Tree which is located on the north side of Elbow Point. An anchorage for vessels drawing less than 12 feet is located about 2 1/2 miles south by eastward of Macauley Point.

DIRECTIONS.—Local knowledge is required for entering Takua Pa Inlet. No directions are given due to lack of recent surveys.

TAKUA PA, a town of some importance, is located 4 1/2 miles above the mouth of a creek which flows into the east side of Pak Ko, about 2 miles within the entrance. A 1962 report states that lifts in excess of 5 tons should not be accepted for Takua Pa unless special arrangements are made through the vessels' agents.

COAST—PAK KO TO LAEM TAMCHOK

7F-9 The general aspect and the salient points have been described in section 7F-2. A reef, that dries, extends about 3/4 mile westward from Laem Krangnoi. A similar reef surrounds Laem Krangyai and extends 3/4 mile northward and southward, and 1/2 mile westward from the point.

Klong Kokak, a small river, intersects the coast at a position about midway between Laem Krangyai and Laem Lachan (Laem Hin Bai). Ban Kokak (Bang Bang Niang), a village with tin mines in its vicinity, is so close within the entrance that lights in the village are sometimes visible from seaward.

Krung Nork, an isolated reef that dries 2 feet, lies about 1 mile off the entrance of the Klong Kokak. The coast close inshore between this reef and Laem Lachan is foul.

Laem Ao Kham, the north end of the bold peninsula (sec. 7F-2), is fronted by a drying reef that extends about 1/4 mile seaward.

AO KAULAK, an open bay, indents the coast between Laem Lachan and a point about 3 miles southward. Laem Ao Kham forms the south entrance point of this bay. A reef, that dries in patches and extends about 1/2 mile westward from a sandy point, about 1 mile south-southeastward of Laem Lachan, divides the bay into two parts. A rock, 12 feet high, lies near the outer end of this reef. The bight, northward of the reef, is foul for about 1 mile offshore. Foul ground extends 3/4 mile offshore for about 1/2 mile southward of the reef.

A shallow flat, on which the depths are less