PUB. 174

SAILING DIRECTIONS (ENROUTE)

★

STRAIT OF MALACCA AND SUMATERA

★

Prepared and published by the
NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY
Bethesda, Maryland

2004

NINTH EDITION

Pub. 174, Sailing Directions (Enroute) Strait of Malacca and Sumatera, Ninth Edition, 2004, is issued for use in conjunction with Pub. 160, Sailing Directions (Planning Guide) South Atlantic Ocean and Indian Ocean. The companion volumes are Pubs. 171, 172, 173, and 175.

This publication has been corrected to 27 March 2004, including Notice to Mariners No. 13 of 2004.

Explanatory Remarks

Sailing Directions are published by the National Geospatial-Intelligence Agency (NGA), under the authority of Department of Defense Directive 5105.40, dated 12 December 1988, and pursuant to the authority contained in U. S. Code Title 10, Sections 2791 and 2792 and Title 44, Section 1336. Sailing Directions, covering the harbors, coasts, and waters of the world, provide information that cannot be shown graphically on nautical charts and is not readily available elsewhere.

Sailing Directions (Enroute) include detailed coastal and port approach information which supplements the largest scale chart produced by the National Geospatial-Intelligence Agency. This publication is divided into geographic areas called "Sectors."

Bearings.—Bearings are true, and are expressed in degrees from 000° (north) to 360°, measured clockwise. General bearings are expressed by initial letters of points of the compass (e.g. N, NNE, NE, etc.). Adjective and adverb endings have been discarded. Wherever precise bearings are intended degrees are used.

Coastal Features.—It is assumed that the majority of ships have radar. Available coastal descriptions and views, useful for radar and visual piloting are included in geographic sequence in each Sector.

Corrective Information.—Corrective information and other comments about this publication can be forwarded to NGA, as follows:

1. Mailing address:
   Maritime Safety Information Division
   National Geospatial-Intelligence Agency
   ST D 44
   4600 Sangamore Road
   Bethesda MD 20816-5003
2. E-mail address:
   sdpubs@nga.mil

New editions of Sailing Directions are corrected through the date of the publication shown above. Important information to amend material in the publication is available as a Publication Digital Update (PDU) from the NGA Maritime Safety Information Division website.

NGA Maritime Safety Information Division Website (PDUs)
http://164.214.12.145/sdr

Courses.—Courses are true, and are expressed in the same manner as bearings. The directives "steer" and "make good" a course mean, without exception, to proceed from a point of origin along a track having the identical meridianal angle as the designated course. Vessels following the directives must allow for every influence tending to cause deviation from such track, and navigate so that the designated course is continuously being made good.

Currents.—Current directions are the true directions toward which currents set.

Dangers.—As a rule outer dangers are fully described, but inner dangers which are well-charted are, for the most part, omitted. Numerous offshore dangers, grouped together, are mentioned only in general terms. Dangers adjacent to a coastal passage or fairway are described.

Distances.—Distances are expressed in nautical miles of 1 minute of latitude. Distances of less than 1 mile are expressed in meters, or tenths of miles.

Geographic Names.—Geographic names are generally those used by the nation having sovereignty. Names in parentheses following another name are alternate names that may appear on some charts. In general, alternate names are quoted only in the principal description of the place. Diacritical marks, such as accents, cedillas, and circumflexes, which are related to specific letters in certain foreign languages, are not used in the interest of typographical simplicity. Geographic names or their spellings do not necessarily reflect recognition of the political status of an area by the United States Government.

Heights.—Heights are referred to the plane of reference used for that purpose on the charts and are expressed in meters.

Index-Gazetteer.—Navigational features and place-names are listed alphabetically in the back of the book. The approximate position, along with the Sector and paragraph numbers (e.g. **1.1**), facilitate location in the text.

Internet Links.—This publication provides internet links to web sites concerned with maritime navigational safety, including but not limited to, Federal government sites, foreign Hydrographic Offices, and foreign public/private port facilities. NGA makes no claims, promises, or guarantees concerning the accuracy, completeness, or adequacy of the contents of the web sites and expressly disclaims any liability for errors and omissions of these web sites.

Light and Fog Signals.—Lights and fog signals are not described, and light sectors are not usually defined. The Light Lists should be consulted for complete information.

Ports.—Directions for entering ports are depicted where appropriate by means of chartlets, sketches, and photos, which facilitate positive identification of landmarks and navigational aids. These chartlets and sketches are not always to scale, however, and should be used only as a general informational guide in conjunction with the best scale chart. Specific port facilities are omitted from the standard format. They are tabulated in Pub. 150, World Port Index.

Radio Navigational Aids.—Radio navigational aids are not described in detail. Publication No. 117 Radio Navigational Aids and NOAA Publication, Selected Worldwide Marine Broadcasts, should be consulted.

Sales.—For sale by the Superintendent of Documents, U.S. Government Printing Office, Mail Stop: SSOP, Washington, DC 20402-0001. Phone: toll free (866) 512-1800, DC area (202) 512-1800.

GPO Bookstore Website
http://bookstore.gpo.gov

Soundings.—Soundings are referred to the datum of the charts and are expressed in meters.

Special Warnings.—A Special Warning may be in force for the geographic area covered by this publication. Special Warnings are printed in the weekly Notice to Mariners upon promulgation and are reprinted annually in Notice to Mariners No. 1. A listing of Special Warnings currently in force is printed in each weekly Notice to Mariners, Section III, Broadcast Warnings, along with the notice number of promulgation. Special Warnings are also available on the Maritime Safety Information Division website.

NGA Maritime Safety Information Division Website (Special Warnings)
http://164.214.12.145warn/warn_j_query.html

Wind Directions.—Wind directions are the true directions from which winds blow.

Reference List

The principal sources examined in the preparation of this publication were:

British Hydrographic Department Sailing Directions.

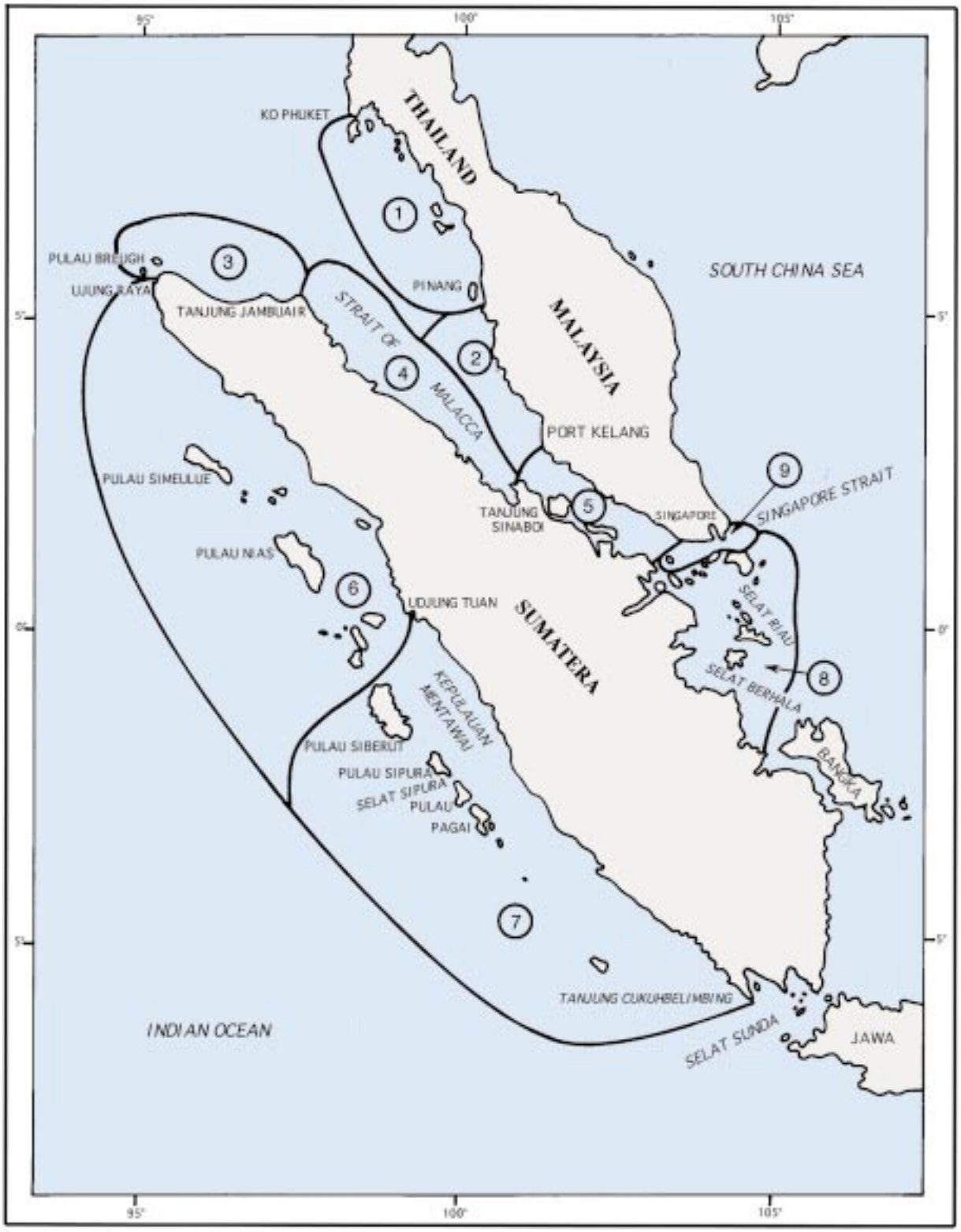
Various port handbooks.

Reports from United States Naval and merchant vessels and various shipping companies.

Other U.S. Government publications, reports, and documents.

Charts, light lists, tide and current tables, and other documents in possession of the Agency.

Contents



SECTOR LIMITS — PUB. **174**

Feet to Meters

Feet	0	1	2	3	4	5	6	7	8	9
0	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.93
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.55	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.17

Fathoms to Meters

Fathoms	0	1	2	3	4	5	6	7	8	9
0	0.00	1.83	3.66	5.49	7.32	9.14	10.97	12.80	14.63	16.46
10	18.29	20.12	21.95	23.77	25.60	27.43	29.26	31.09	32.92	34.75
20	36.58	38.40	40.23	42.06	43.89	45.72	47.55	49.38	51.21	53.03
30	54.86	56.69	58.52	60.35	62.18	64.01	65.84	67.67	69.49	71.32
40	73.15	74.98	76.81	78.64	80.47	82.30	84.12	85.95	87.78	89.61
50	91.44	93.27	95.10	96.93	98.75	100.58	102.41	104.24	106.07	107.90
60	109.73	111.56	113.39	115.21	117.04	118.87	120.70	122.53	124.36	126.19
70	128.02	129.85	131.67	133.50	135.33	137.16	138.99	140.82	142.65	144.47
80	146.30	148.13	149.96	151.79	153.62	155.45	157.28	159.11	160.93	162.76
90	164.59	166.42	168.25	170.08	171.91	173.74	175.56	177.39	179.22	181.05

Meters to Feet

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.06	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.80	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.45	183.73	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.54	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.28	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80

Meters to Fathoms

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	0.55	1.09	1.64	2.19	2.73	3.28	3.83	4.37	4.92
10	5.47	6.01	6.56	7.11	7.66	8.20	8.75	9.30	9.84	10.39
20	10.94	11.48	12.03	12.58	13.12	13.67	14.22	14.76	15.31	15.86
30	16.40	16.95	17.50	18.04	18.59	19.14	19.68	20.23	20.78	21.33
40	21.87	22.42	22.97	23.51	24.06	24.61	25.15	25.70	26.25	26.79
50	27.34	27.89	28.43	28.98	29.53	30.07	30.62	31.17	31.71	32.26
60	32.81	33.36	33.90	34.45	35.00	35.54	36.09	36.64	37.18	37.73
70	38.28	38.82	39.37	39.92	40.46	41.01	41.56	42.10	42.65	43.20
80	43.74	44.29	44.84	45.38	45.93	46.48	47.03	47.57	48.12	48.67
90	49.21	49.76	50.31	50.85	51.40	51.95	52.49	53.04	53.59	54.13

SAILING DIRECTIONS
INFORMATION AND SUGGESTION SHEET

The National Imagery and Mapping Agency values your input for the next edition of Sailing Directions. Any additional information from you is greatly appreciated.

For your convenience mailing is now easier with this self-addressed, perforated page which may also be used to fax information directly.

Fax: 301-227-3174
INTERNET: SDPUBS@NIMA.MIL

Contributor: _____ **Date:** _____

Vessel: _____

Address: _____

Pub. number: _____

Please provide details of your observations. Indicate affected sector and paragraph, along with the date of observation.

FOLD

NATIONAL IMAGERY AND MAPPING AGENCY
ST D 44
4600 SANGAMORE ROAD
BETHESDA MD 20816-5003

FOLD

The following abbreviations may be used in the text:

Units

˚C	degree(s) Centigrade	km	kilometer(s)
cm	centimeter(s)	m	meter(s)
cu.m.	cubic meter(s)	mb	millibars
dwt	deadweight tons	MHz	megahertz
FEU	forty-foot equivalent units	mm	millimeter(s)
grt	gross registered tons	nrt	net registered tons
kHz	kilohertz	TEU	twenty-foot equivalent units

Directions

N	north	S	south
NNE	northnortheast	SSW	southsouthwest
NE	northeast	SW	southwest
ENE	eastnortheast	WSW	westsouthwest
E	east	W	west
ESE	eastsoutheast	WNW	westnorthwest
SE	southeast	NW	northwest
SSE	southsoutheast	NNW	northnorthwest

Vessel types

LASH	Lighter Aboard Ship	ro-ro	Roll-on Roll-off
LNG	Liquified Natural Gas	ULCC	Ultra Large Crude Carrier
LPG	Liquified Petroleum Gas	VLCC	Very Large Crude Carrier
OBO	Ore/Bulk/Oil		

Time

ETA	estimated time of arrival	GMT	Greenwich Mean Time
ETD	estimated time of departure	UTC	Coordinated Universal Time

Water level

MSL	mean sea level	LWS	low water springs
HW	high water	MHWN	mean high water neaps
LW	low water	MHWS	mean high water springs
MHW	mean high water	MLWN	mean low water neaps
MLW	mean low water	MLWS	mean low water springs
HWN	high water neaps	HAT	highest astronomical tide
HWS	high water springs	LAT	lowest astronomical tide
LWN	low water neaps		

Communications

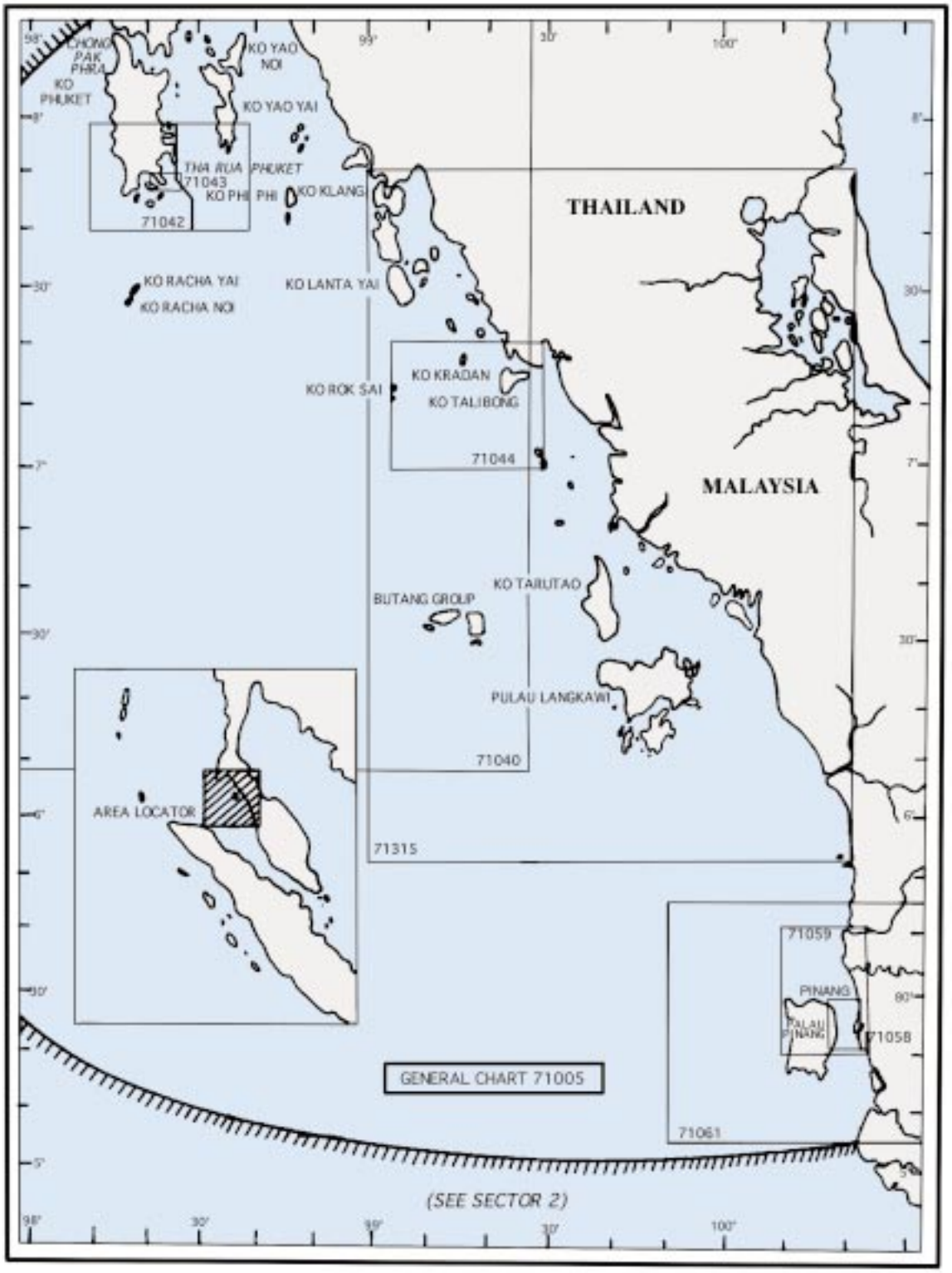
D/F	direction finder	MF	medium frequency
R/T	radiotelephone	HF	high frequency
GMDSS	Global Maritime Distress and Safety System	VHF	very high frequency
LF	low frequency	UHF	ultra high frequency

Navigation

LANBY	Large Automatic Navigation Buoy	SPM	Single Point Mooring
NAVSAT	Navigation Satellite	TSS	Traffic Separation Scheme
ODAS	Ocean Data Acquisition System	VTC	Vessel Traffic Center
SBM	Single Buoy Mooring	VTS	Vessel Traffic Service

Miscellaneous

COLREGS	Collision Regulations		
IALA	International Association of Lighthouse Authorities	No./Nos.	Number/Numbers
		PA	Position approximate
IHO	International Hydrographic Office	PD	Position doubtful
IMO	International Maritime Organization	Pub.	Publication
loa	length overall	St./Ste.	Saint/Sainte



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **1** — CHART INFORMATION

SECTOR 1

THE STRAIT OF MALACCA—KO PHUKET TO PULAU PINANG

Plan.—This channelsector describes the E shore of the Strait of Malacca and off-lying islands from Ko Phuket to Pulau Pinang (Penang). The descriptive sequence is N to S and W to E.

General Remarks

1.1 Winds—Weather.—Along the N coast of Sumatera, the Southwest Monsoon prevails from about April to November and the Northeast Monsoon from about November to April. During the Southwest Monsoon the wind frequently holds both day and night near Ug Raya, while farther E it is not so permanent.

In the strength of the Northeast Monsoon, the wind blows from E to NE from about 1000 to 1600, strengthening near the close. It then begins to drop and is usually calm about sundown; there is a land breeze during the night. In April, SW and W winds begin; the Southwest Monsoon is established in May. Waterspouts are seen off the coast at times.

At the N and NE portion of Sumatra, during the Northeast Monsoon, there is generally a swell on the coast, which gives rise to a considerable sea in the afternoon, if accompanied by a stiff sea breeze. Both subside quickly, so that the water is generally smooth at night and in the forenoon.

At times, the monsoon blows strongly for some days, at which times communication with the shore is reported impracticable. December and January, are usually the worst months. The Southwest Monsoon is the best for landing on this portion of Sumatera.

Although the Strait of Malacca is within the limits of the NE and Southwest Monsoon of the Indian Ocean, on account of the high land on either of the strait, the winds are variable. However, land and sea breezes are regular on both coasts.

In the offing, the monsoons are regular when they are at their height in the adjacent sea; even then the wind is moderate in the strait, and only lasts during a part of the day. The monsoon becomes more regular near Singapore.

Between Ug Raya and Ko Phuket, the Southwest Monsoon commences in the latter part of April or the early part of May, and ceases in October. In November there are calms and variables, and W winds frequently prevail.

The Southwest Monsoon seldom blows far into the strait. In the middle of the strait during this season, variable winds, chiefly those from SE and SW, prevail with long calms. On the Sumatra side, light winds and calms prevail, and heavy squalls from the land are experienced during the night. On the Malaya side there are fewer calms and seldom any squalls. Variable winds or land and sea breezes are experienced.

During the Southwest Monsoon the weather is generally cloudy and stormy, especially when the monsoon is at its height.

Sumatras or squalls from the SW are more common during the Southwest Monsoon than in the Northeast Monsoon. They generally blow during the first part of the night and are sometimes sudden and severe accompanied by thunder, lightning, and rain.

They are more frequently met with on the N coast of Sumatera and on the Malaya coast between Port Kelang and Karimum Island. They often blow for 6 to 8 hours at a time as a strong or moderate gale. Their characteristic is that of an arch squall.

Northwesters are not so frequently felt as the Sumatras; they are most common during the Southwest Monsoon and occur in the NW part of the strait between Ug Raya and North Sands, but sometimes blow through as far as Singapore Strait. These winds are sometimes severe at their commencement, but their strength soon abates. They are generally preceded by black cloud arch, which rises rapidly from the horizon toward the zenith. They are sometimes accompanied by lightning, thunder, and heavy rain.

The Northeast Monsoon prevails in the W entrance of the Strait of Malacca from November to April. The weather is more settled then and there are seldom any hard squalls. There is less thunder and lighting and much less rain than in the other seasons.

In November, the winds are variable, frequently from the NW and W, although occasionally the NE winds set in November. From this period to March the Northeast Monsoon is strongest, but at times NW and W winds of one or two days duration have been experienced in every month when the Northeast Monsoon should prevail. Late in March the NE and N winds become light and variable, with strong land breeze at night. On the Malayan side these breezes commence between 2000 and 2200 and may last 4 to 5 hours and sometimes all night.

The E coast between Tanjung Jambuair and Belawan is not so much under the influence of the prevailing monsoon as the direction of wind. The broad plains at the foot of the high mountains being most favorable to the regularity of land and sea breezes. The wind is generally NE by day and SW by night all the year round on the coast. During the Northeast Monsoon, NE winds are most prevalent in January, February and March.

Northwest winds sometimes occur at night in February and March but they are infrequent compared with the winds from W and SW.

Throughout the year NW and SW winds are observed at uncertain periods for several days at a times and generally accompanied by fine weather. Sumatras are more frequent here than on the N coast.

Rain occurs in every month of the year in Sumatra. The period of greater or less rainfall on the N half of the island does not correspond with the period of the monsoons. There is, however, a certain regularity in the increase and decrease of the proportion of wet days in the course of the year.

The greatest rainfall on the N coast of Sumatera and the off-lying island usually occurs in the months of October and November. The rainfall on the off-lying islands is about double that on the N coast.

Off the E coast of Sumatera, the rainfall is heaviest in November and December.

At Ko Phuket, in the N entrance to the Strait of Malacca, the monsoons are more regular than at the Straits Settlements. The Northeast Monsoon sets in December, with strong gales from the NE to NW, accompanied by lightning, and continues until March; this is the dry monsoon.

In March, the monsoon is reported to be considerably weak, with occasional squalls. April is the change to winds from W to N, with heavy squalls.

The burst of the Southwest Monsoon occurs early in May. It has fairly set in by June and heavy squalls and rain are frequent. It continues, with many days rain and as many days fine, until October. November is variable with heavy squalls from all quarters.

The maximum daily rain per month occurs in the month of August. In January and the early part of February there is little or no rain.

In Pulau Pinang, the prevailing winds from January to June are NE and NW. During the latter half of the year NW winds predominate.

Tides—Currents.—In the Strait of Malacca to the W of the islands N of the N Sumatera coast, there is a current setting in a W direction, often attaining a rate of 1.5 to 2 knots, and inclining N or SW by the action of the prevailing monsoon.

Between these islands and the Nicobars, during the strength even of the Southwest Monsoon, there is frequently a current that sets directly into the monsoon at a rate of 2 knots.

At the same period there is said to be a strong current between Pulau Weh and 6˚30'N, setting E as far as the meridian of Tanjung Jambuair. This current is said to continue all the year around, but with less strength during the Northeast Monsoon. It is to be regarded as a countercurrent with reference to the W current along the coast from the Strait of Malacca.

Through the Strait of Malacca there is a constant NW set, but near the S, where the strait is considerably narrower, it is only felt by its action on the tidal current, decreasing the velocity of the flood current and almost overcoming it during neaps, and increasing that of the ebb to the same extent.

In the NW portion the same effect is produced near the shore on the tidal currents, but out in the middle of the strait it is fairly constant and strongest during the Northeast Monsoon; it finally makes its way seaward along the coast and affects the tidal current there, as above mentioned.

The tidal action is not appreciable beyond the distance of about 8 miles off the Pedir coast and about 40 miles off the E coast of Sumatera.

The flood sets E on the N coast of Sumatera and the ebb W, rarely exceeding 2 knots at spring; at neaps they are sometimes imperceptible, except at the points or over banks and narrow channels.

The currents are also affected by the constant current out of the Strait of Malacca, which takes a W direction along the N coast, through the passages S of Pulau Weh, so that for the greater part of the year the ebb current is longer and stronger than the flood current.

The prevailing winds as a result of which, when the water is rising or falling during the Northeast Monsoon, there may be no E set for a day or more; conversely, the flood or E current runs long and stronger during the Southwest Monsoon.

The Strait of Malacca

1.2 The Strait of Malacca is defined as the area lying between the W coasts of Thailand and Malaysia on the NE and the coast of Sumatera on the SW side. Singapore Strait is the area lying between the S coasts of Malaysia and Singapore Island on the N side and the coast of Sumatera on the S side.

The Strait of Malacca and Singapore Strait together form the main seaway connecting the Indian Ocean with the South China Sea. The straits offer the shortest route for tankers between the Persian Gulf and Japan.

Winds—Weather.—The Strait of Malacca lies within the equatorial region of low atmospheric pressure and has a typical tropical climate. Typhoons are not experienced and gales are infrequent. The climate of the region is monotonous and the daily changes are more pronounced than seasonal variations. The temperature and humidity are high throughout the year. Waterspouts are common and when practicable a track well clear of them should be chosen.

The predominant winds over the Strait of Malacca are monsoon winds. The Northeast Monsoon blows from Novem-ber to March, reaching maximum strength and steadiness in January.

Normal wind strength is 5 to 10 knots, but may reach 20 to 25 knots for short periods in the N part of the strait. The sea area NE of Singapore Strait is exposed, while in Singapore Strait, it tends to be less pronounced with light and more variable winds. The area between Sumatera and Thailand is well sheltered by the high ground to the E. The Southwest Monsoon blows from May to September and reaches maximum strength and steadiness in July and August. Normal wind strength is about 10 knots, reaching 15 to 20 knots in the N approaches.

Squalls are common in the Strait of Malacca, the most significant of which occur between April and November and are referred to as Sumatras. These storms nearly always develop at night and usually last between 1 and 4 hours. These squalls are usually accompanied by thunderstorms and torrential rain. Winds mainly between SW and NW become strong and gusty, force 5 or 6, and may reach 7 to 8 for short periods. Southwesterly squalls occur in the N part of the Strait of Malacca during the Southwest Monsoon. These squalls usually last longer than Sumatras and occur during day or night.

Tides—Currents.—The overall set in the strait is to the NW, but from May to September there is a tendency for SE sets to prevail in some N and central parts but the predominance is very slight. On the average, between 50 and 60 per cent of all current observations in the strait are 0.5 knot or less. A small portion of these observations exceed 2 knots.

In the N part of the strait, the general directions of the tidal currents are SE and NW. The SE stream reaches maximum rate about 1 hour prior to HW and the NW current reaches maximum rate about 1 hour before LW.

In the main fairway, the spring rates are about 1.5 knots, but may reach 2.5 to 3 knots in the more restricted channels and inshore waters.

The tidal currents in the S end of the Strait of Malacca set SE and NW to and from **Selat Durian** (1˚00'N., 103˚35'E.); they

are not necessarily associated with any particular currents and may meet or separate from the latter S of **Tanjung Piai** (1˚16'N., 103˚31'E.), the S extremity of the Malay Peninsula.

Depths—Limitations.—The depths in the Strait of Malacca are generally irregular and a considerable portion of the bottom is of sandwave formation. Depths in the main shipping channels vary from 14.9 to over 100m.

Dangerous sand banks which can restrict navigation are located in both traffic separation scheme lanes of **One Fathom Bank** (2˚50'N., 100˚55'E.) and **Fair Channel Bank** (1˚28'N., 103˚08'E.).

Areas NW of One Fathom Bank and SW of **Tanjung Tuan** (Cape Rachado) (2˚24'N., 101˚51'E.) are subject to sand wave formation. Deep-draft vessels should, therefore, take particular note of the latest depths over shoals lying in or near the fairway.

The height of tides vary with the locality in the straits, as follows:

1. In the vicinity of One Fathom Bank—3.7m.
2. Off Melaka (2˚12'N., 102˚14'E.)—1.8m.
3. Off Pulau Iju Kecil (1˚11'N., 103˚21'E.)—2.6m.
4. In the vicinity of Horsburgh Light (1˚20'N., 104˚24'E.)—1.6m.

Between Melaka and Pulau Iju Kecil, the range is greater on the coast of Sumatera than on the Malaysian side. At the W entrance to the Strait of Malacca, the diurnal inequality is small, but it increases steadily E.

Since deep-draft vessels cannot avoid passing over certain shoal areas, an accurate prediction of the height of the tide is essential.

Regulations.—An IMO-approved routing system is in effect for the Strait of Malacca and Singapore Strait. It is comprised of Traffic Separation Schemes (TSS) and a Deep-Water Route, as well as specific rules for navigating through the straits.

Caution.—Navigational aids are often unreliable, especially in Indonesian waters. Risk of collision is appreciable due to heavy traffic using the through routes, frequent crossing traffic, and local fishing craft with nets.

Vessels are warned that local traffic, which could be unaware of the International Navigation Rules, may be encountered in or near the TSS. They should therefore take the necessary precautions which may be required by the ordinary practice of seaman or by the special circumstances of the case.

The above factors make navigation through the straits difficult, particularly for deep-draft vessels.

Additionally, reports continue to be received (2004) from vessels and authorities of attacks by armed thieves in the Strait of Malacca-Singapore Strait area, mainly in the vicinity of Philip Channel (1˚00'N., 103˚40'E.). The attacks are usually executed from fast power boats.

Navigation through the strait is affected by a number of factors which, when combined with the increasing density of traffic, the strength of the tidal currents, and the numerous shoals, makes navigation through the area difficult, particularly for deep-draft vessels.

Ko Phuket

1.3 The coast between Ko Phuket and Pulau Pinang, 180 miles SSE, is generally low with some hills near the mountainous island of Pulau Langkawi. Islands and islets project widely from the coast, fringed by a coastal bank covered by little water. The mouths of rivers are generally encumbered by bars.

Ko Phuket, which is part of Thailand, is separated from the W coast of the Malay Peninsula by the narrow channel **Chong Pak Phra** (8˚12'N., 98˚17'E.). Phuket Island is irregularly shaped, with a length of 26 miles N to S and an average width of 8 miles E to W. Pantong Bay is located on the W side of the island and Makham Bay is located on the SE side.

Chong Pak Phra has a length of 12 miles and a width of about 0.4 mile at its W entrance. The land on both sides is mostly low and wooded with several villages along both shores of the channel. North of the channel are hills of moderate elevation.

Tides—Currents.—The flood tide sets in from both ends of Chong Pak Phra and meets about 3 miles E of the W entrance.

The current is weak in the middle of the channel, but at the W entrance, it sometimes attains a rate of 6 knots, and a velocity of 3 knots in the E entrance.

Depths—Limitations.—The depth on the bar at the W entrance to Chong Pak Phra is subject to great changes, varying from 1.8 to 5.5m. During the Southwest Monsoon, the sea breaks across the W entrance, but during the Northeast Monsoon, the water is smooth. Chong Pak Phra should only be used with local knowledge and by small craft. In the E entrance of the strait there are several islets, with the innermost having a height of 92m.

Anchorage.—Good anchorage may be obtained by vessels with local knowledge, inside the bar at the W entrance, in a depth of about 9.1m.

1.4 The W side of Ko Phuket is indented by several bays with anchorage depths, but none of these bays afford shelter during the Southwest Monsoon. The N part of this coast except for the first 7 miles, is low and wooded, and the hills immediately within it attain a height of 140 to 258m. Along the S part of the W coast is a range of densely-wooded mountains, 305 to 559m high, sloping gradually at its N and S ends.

Ko Waeo (8˚02'N., 98˚16'E.), two islets lying close together, are located 0.75 mile W of the N entrance point of Ao Bang Thao; the bay is entered 10 miles S of Chong Pak Phra.

Ao Patong (7˚54'N., 98˚17'E.), a bay shaped like a horseshoe, is entered between two rocky peninsulas. Patong Bay offers excellent anchorage during the winter season which runs from November through April. A Fleet Landing is established at a temporary pier extending from the beach in the SE part of the bay. Several hotels exist along the bay's shores. A large hotel with a pier lies 2 miles E of the bay's S entrance point. No pilots are available.

Anchorage may be taken about 1 mile W of the bay's head, in depths of 17 to 19m, sand and mud bottom. The several bays on the W coast of Ko Phuket have suitable anchorage depths, but do not afford protection during the Southwest Monsoon.

Off-lying Islands South and East of Ko Phuket

1.5 **Ko Racha Yai** (7˚36'N., 98˚22'E.) is located 9 miles S from Ko Phuket and the NE end is low.

The cove located on the NW side of the island, has in its middle part a depth of 16.5m, sand. A small cove indents the N side of the island. Ko Racha Noi, located about 4 miles SSW of Ko Racha Yai, are two densely wooded steep-to islands nearly connected by a reef. The N island has a height of 176m. A reef extends 183m S from the S extremity of the S island.

Heavy overfalls are encountered in the passage between Ko Racha Yai and Ko Racha Noi. A group of small islands lies close S and SE of Ko Phuket. Ko Kaeo Yai is the island lying about 0.6 mile S of Lam Phra Chao, the S extremity of Ko Phuket. Ko Kaeo Noi, located 0.4 mile S of Ko Kaeo, is wooded and nearly as high as Ko Kaeo. A light is shown on Ko Kaeo Noi. Ko Hi, an island 186m high, lies 4 miles E of Ko Kaeo Noi.

About 0.7 mile NE of Ko Hi is **Ko Waeo** (7˚46'N., 98˚24'E.) and 1.7 miles WNW of Ko Hi is Ko Bon, 57m high.

In the channels between the islands off the S side of Ko Phuket, the tidal currents set E and W at a rate of 1 to 3 knots.

Ko Mai Thon (7˚45'N., 98˚29'E.), located 6 miles ENE of Ko Hi, is wooded and 91m high. The N extremity of the island is low and sandy. Ko Doakmai, about 3 miles ENE of Ko Mai Thon, is a small island rising perpendicularly to a height of 67m. This island is steep-to. Ko Kai, a small wooded island, is located 8 miles E of Ko Mai Thon. It is steep-to, except on its E side, where there is a depth of 14m.

Ao Chalong, a shallow bay indenting the S side of Ko Phuket, is 5 miles wide in the entrance. Ko Lon, an island with a height of 267m, lies in the middle of the entrance. The channel on either side of Ko Lon can be used only by small craft.

During the Southwest Monsoon, small vessels can obtain anchorage, in 6.9m, about 0.3 mile N of Ko Lon.

1.6 Laem Phan Wa (7˚48'N., 98˚25'E.), the SE point of Ko Phuket, lies about 2 miles ESE of the E entrance point of Ao Chalong. A light is shown about 0.2 mile SW of the point. Makham Bay lies just NE of the point.

Makham Bay (7˚49'N., 98˚25'E.) is located adjacent to the commercial port of Phuket and is used for anchorage during the Southwest Monsoon, which prevails during summer season that runs from April through November. Ships anchor, in 12m, with a soft bottom of unspecified holding quality. A Fleet Landing is established at the NW corner of Ocean Terminal Wharf.

Ko Taphao Yai (7˚50'N., 98˚25'E.), an island lying about 2 miles N of Laem Phan Wa, has a height of 112m.

A reef fringes the island, and a rock marks the SE extremity of this reef. Ko Taphao Noi, marked on its summit by a light shown from a white brick tower, lies 0.2 mile NE of Ko Taphao Yai.

Caution.—It was recently reported that the light on Ko Taphao Noi is obscured by trees and is difficult to see by day.

A 4.6m rocky patch, swept to a depth of 4.3m and marked on its NE side by a buoy, lies about 0.3 mile S of Ko Taphao Noi.

1.7 Phuket Harbor (7˚49'N., 98˚24'E.) (World Port Index No. 49770) includes the deep-water Thaisarco Pier and the new Ocean Terminal situated close N of **Laem Kluei** (7˚49'N., 98˚24'E.) and the Shell Oil depot off Leam To Khun, about 0.5 mile further NNE.

Phuket Wharf

Phuket Wharf

Phuket is a popular destination for cruise ships, debarking 450,000 passengers annually.

Winds—Weather.—The Northeast Monsoon occurs from November to March, while the Southwest Monsoon occurs from May to September.

Tides—Currents.—The maximum tidal rise is reported to be about 3.5m. Tidal currents rarely exceed 2.5 knots, although a rate of 3 knots was reported (1998). The ebb current sets SW and the flood current sets NE.

Depths—Limitations.—Thaisarco Pier extends E into the channel from Laem Kluei. The pier face is 60m long, with an alongside depth of 7.3m. The pier can accommodate a vessel with a maximum length of 113m and a maximum draft of 6.7m. The new Ocean Terminal lies immediately NNW of Thaisarco Pier. The terminal provides two berths, with a total length of 360m and a minimum depth alongside of 9m.

Both berthing areas are approached from the SE through a 120m wide buoyed channel which has been dredged to a depth of 9m. A turning basin, 360m in diameter and also dredged to a depth of 9m, lies close N of Ocean Terminal.

Vessels with a maximum length of 190m, a maximum beam of 25m, and a maximum draft of 9m can be accommodated.

Vessels are normally berth and unberth during daylight hours only. A one-way traffic system exists in the approach channel.

The Shell Oil Depot consists of two sets of mooring buoys lying between Laem To Khun and the W end of Ko Taphao Yai, about 0.1 mile E. The mooring buoys are 183m apart. The terminal is approached from the S on a range with a least depth of 7m; there is a least depth of 7m at the terminal.

Submarine pipelines extend from the berth to Laem To Khun. A channel marked by buoys and ranges extends NE from the oil depot, but the controlling depth in this channel is reported to be 4m.

Pilotage.—Pilotage is compulsory for vessels over 50m in length. Request for pilot should be sent 5 days in advance.

Vessels should contact Phuket Port Control 3 hours prior to ETA on VHF channel 16. Pilot boards close to the approach buoy. The pilots monitor VHF channels 13, 14, and 16. Messages can be sent through Pinang.

The pilot boards at Fairway Lighted Buoy.

Anchorage.—Anchorage can be obtained, in 5.4m, in Phuket Harbor approximately 0.7 mile NW of Ko Taphao Noi Light.

Working anchorages for larger vessels loading and unloading cargo for Phuket and other parts in the vicinity are situated during the Northeast Monsoon season, about 2 miles E of **Ko Lipi** (7˚57'N., 98˚31'E.), in a depth of 11m.

An outer anchorage for vessels awaiting berth lies 0.8 miles NE of Laem Phan Wa Light.

At other times, anchor about 2 miles NE of **Laem Phap Pha** (7˚52'N., 98˚26'E.), in a depth of about 16m. Vessels up to 30,000 dwt have used these anchorages. The bottom is reported to be sand and mud, good holding ground.

Caution.—Reports indicate that, due to inaccuracies in charted features, tangent bearings of Ko Taphao Yai, Ko Taphao Noi, and other points in the vicinity are unreliable.

1.8 **Tha Rua Phuket** (7˚51'N., 98˚25'E.) is a large bay entered between Laem Nam Bo and Laem Phap Pha, about 2.2 miles NE.

Phuket (7˚53'N., 98˚23'E.), the seat of the local government, is situated about 1 mile up a creek which discharges into the NW corner of the bay; the mouth of the creek is silted up. The town is a holiday resort with many hotels. A small dry dock, 91m long and 24m wide, used for the repair and construction of tin dredges is on the NE side of the bay.

Anchorage for small vessels, with a depth of 5.5m, mud, lies 0.7 mile NW of the light on Ko Taphao Noi.

Cargo is reported to be loaded and unloaded from lighter vessels. Slight surf is present during E and SE winds. The depths in Tha Rua Phuket are subject to frequent change.

Ao Tha Rua (7˚58'N., 98˚26'E.), a shallow bay indenting the E side of Ko Phuket, is located 5 miles N of Tha Rua Phuket. Ko Maphrao, a 193m island, is located in the S part of the bay. A 38m rock lies 1.25 miles SE of Ko Maphrao. Ko Rang Yai, an island 81m high, lies 0.7 mile NE of Ko Maphrao, and the channel between them has a depth of only 3.2m.

Ko Rang Noi, immediately N of Ko Rang Yai, has a height of 55m. To enter Ao Tha Rua, vessels should pass first 0.5 mile E of Ko Rang Noi and then 0.5 mile N of this island. The only deep water available for anchoring is N of Ko Rang Noi and Ko Rang Yai, as farther W, the bay shoals rapidly. Ko Nakha Noi, an island 65m high, lies 3 miles NE of Laem Yamu, the N entrance point of Ao Tha Rua.

Close N of Ko Nakha Noi is the much larger island of Ko Nakha Yai, 87m high; the channel between them is shallow. Between Ko Nakha Yai and Ko Phuket are several sunken rocks and a 64m islet. About 2 miles NW of this island are the islands lying in the E entrance of Chong Pak Phra. A 4.6m patch lies about 1.2 miles N of Ko Nakha Yai.

1.9 **Ko Yao Yai** (8˚00'N., 98˚36'E.), the S end of which is located about 9 miles E of the N entrance of Tha Rua Phuket, is a large island extending about 14 miles in a N and S direction. The island for its entire length is traversed by a range of mountains attaining a maximum height of 374m in its N part. The E coast of Ko Yao Yai is high and bold, and the NE coast of this island is low and sandy.

Foul ground with rocks above water, extends 1.5 miles E from the NE point of the island.

The S end of Ko Yao Yai is indented by a shallow bay. Laem Hua Lan, the E entrance point, is high, bold, and steep-to; a small island forms the W entrance point. Ko Khai Nok, a sandy island, 29m high, lies 4 miles W of the S end of Ko Yao Yai.

Two rocks, one 19.8m high, lies about 0.3 mile NNW of the island. They are connected by shallow depths, and 0.2 mile ESE of the island are two rocks above water. Ko Lipi, a conical 174m island, lies 3.5 miles N of Ko Khai.

Ao Labu, a bay about 3 miles wide in its entrance, indents the middle part of the W coast of Ko Yao Yai. The bay has depths of 9.1 to 2.7m, the greater depths being in the NW part of the bay. Hin Mu Sang Nua (Hin Musang Nua), a rock 2m high, marking a dangerous wreck 1 mile E, lies 3 miles NE of the S end of Ko Yao Yai and 2 miles off the E coast of the island.

Between Ko Yao Yai and Ko Phuket the tidal currents set N and S at a rate of 2 to 3 knots.

Off-lying Islands

1.10 Ko Yao Noi, a large wooded island with a height of 242m in its N part, lies N of Ko Yao Yai, from which it is separated by a passage with a minimum width of about 0.5 mile and a least depth of 1.4m. A rock which dries to 1m lies in the middle of the channel approximately 0.4 mile NNW of the NE extremity of Ko Yao Yai. About 4 miles SE of the S extremity of Ko Yao Noi lies the small island of Ko Ngang.

Between 1.5 and 5 miles N of Ko Ngang is a group of high and steep-to islands, with the southernmost being 158m high. Between this group of islands and Ko Yao Noi is a deep channel clear of dangers. About 1.7 miles E of the N end of Ko Yao Noi are two high vertical rocks and 1.25 miles farther E is a rock above-water.

Ko Phudu Yai (8˚11'N., 98˚39'E.) lies 0.3 mile NE of the N end of Ko Yai Noi. The depth between Ko Phudu Yai and Ko

Yao Noi is only 3.2m. Ko Rei, a 166m island, lies 1 mile W of Ko Phudu Yai, and 1.25 miles NW of Ko Rei is Ko Batang, 152m high.

About 0.6 mile NW of the W point of Ko Yao Noi is Ko Boi Yai, having a height of 197m. Ko Boi Noi, a 146m island, lies 0.75 mile N of Ko Boi Yai, and between them are two small islets. The entire area off the NW side of Ko Yao Noi is shallow and foul.

In the fairway E of Ko Yao Noi, the flood current sets N and the ebb current S, at rates of from 2 to 3 knots. The currents turn at about the time of H and LW by the shore.

1.11 **Ao Phangnga** (8˚10'N., 98˚35'E.), a large and shallow bay is 18 miles wide in its entrance between **Laem Som** (8˚08'N., 98˚26'E.), and a point on the mainland. On the W side of the bay are numerous islands extending up to 3 miles offshore. The area within is foul. Four rivers discharge at the head of the bay.

Islands in the West and East Parts of Ao Phangnga

1.12 Ko Phanak, located 4.25 miles ENE of Laem Som is the W entrance point of Ao Phangnga, has a height of 384m in its S part.

Ko Raya Ring (8˚17'N., 98˚30'E.), another large island, lies 4.5 miles N of Ko Phanak, and between them numerous islands. Khlong Krasom discharges about 1 mile NW of the N end of Ko Raya Ring. Ban Krasom, a village, is situated about 5 miles up this river. Khlong Phangnga discharges about 2 miles NE of the N extremity of Ko Raya Ring. A drying bank extends 2.25 miles SSE from the E entrance point of the river.

Two islands, the SW of which is named Ko Nom Sao Noi, lie close together in a position 0.75 mile S of the E entrance point; the fairway is close W of Ko Nom Sao Noi. On the W side of the fairway abreast Ko Nom Sao Noi is a drying shoal with a length of 0.8 mile in a SE and NW direction. On the W side of the fairway, abreast the E entrance point, is another drying shoal.

Phangnga (8˚28'N., 98˚32'E.) is situated 8 miles above the entrance of Khlong Phangnga.

Directions.—A vessel bound for Khlong Phangnga and having reached a position 1.5 miles E of Laem Phap Pha, the N entrance point of Tha Rua Phuket, should steer a mid-channel course between Ko Lipi and Ko Rong Yai, between **Ko Sup** (8˚01'N., 98˚32'E.) and Ko Nakha Noi, and between Ko Boi Yai and Ko Phanak. Only small vessels with local knowledge can proceed beyond Ko Phanak.

1.13 **Ko Mak** (8˚17'N., 98˚35'E.) is a wooded island, 49m high, in the E part of Ao Phangnga.

Ko Chong Lat (8˚16'N., 98˚38'E.), lies 1.25 miles E of Ko Mak.

About 0.1 mile N of Ko Chong Lat is the small islet of Ko Ngam, and close N of the islet commences a narrow drying sand bank trending 4 miles N to the common estuary of the Khlong Pak Lao and Khlong Bo Saen.

Ko Khlui (8˚14'N., 98˚39'E.), an island, 215m high, lies close S of Ko Chong Lat. Ko Pai, a 80m rock, and Ko Sum, a 65m rock, lie 1.5 miles W of Ko Khlui; these two high rocks are about 0.4 mile apart in a N and S direction.

Anchorage.—Anchorage, in 8.7m, is available 0.5 mile ENE of Ko Mak. Khlong Pak Lao and **Khlong Bo Saen** (8˚22'N., 98˚37'E.), flow respectively from E and N into a common estuary in the NE part of Ao Phangnga.

Two islands lie 1.5 miles SSW of the point separating the mouths of the two rivers. A bar with a depth of 2.4m encumbers the entrance of Khlong Pak Lao, but within, the depths increase to about 6m.

Directions.—Vessels bound for Khlong Pak Lao from the S should pass E of Ko Yao Yai and Ko Yao Noi, then between Ko Khlui Malong on the E and Ko Sum and Ko Pai on the W, and finally between Ko Chong Lat and Ko Mak to the anchorage NE of Ko Mak.

Southeast Coast

1.14 **Laem Sak** (8˚16'N., 98˚39'E.), on the E side of Ao Phangnag, is low, sandy, and covered with trees. **Ao Luk** (8˚14'N., 98˚41'E.) is a shallow bay SE of Laem Sak.

Laem Taeng (8˚13'N., 98˚43'E.), a bold point, is the SE entrance point of Ao Luk. From this bay the coast takes a S trend for 12 miles to Laem Hang Nak. Along the first 5 miles are several high rocky islets.

Laem Hang Nak (8˚01'N., 98˚46'E.), the NW entrance point of Ao Krabi which extends 14 miles SE to **Ko Pu** (7˚51'N., 98˚57'E.), is a rather low point.

Ao Krabi is a large bay with only its NW half of the entrance having depths of more than 9.1m. The greater part of the bay has depths of less than 5.5m.

Ko Bada, located from 3.5 to 6 miles SSE of Laem Hang Nak, is a large group of islands lying in the NW half of the entrance of Ao Krabi.

Khlong Krabi discharges through a common estuary in the NE part of Ao Krabi. All the estuaries are fronted by shallow and extensive sandbanks.

1.15 **Krabi** (8˚04'N., 98˚55'E.) (World Port Index No. 49780) is situated about 2 miles up the Khlong Krabi. Vessels with a draft of 4m can reach the town at HW. The town has a wharf and is a center for fish products.

Ko Pu, another large island, is located about 12 miles S of Krabi. The NW extremity of this island forms the SW entrance point of Ao Krabi.

Laem Plong (8˚05'N., 98˚45'E.) provides three deep-water berths for the town of Krabi situated 10 miles E. Two berths are used for the bulk export of gypsum;the other is used for petroleum. The depth alongside the gypsum berth is 12m. The depth alongside the oil berth is 7m. Pilotage is available during daylight hours only.

Off-lying Islands

1.16 **Hin Kong Nok** (7˚50'N., 98˚53'E.), a rocky patch with a depth of 4.1m, is located 3.5 miles W of the NW part of Ko Pu. Ko Mai Phi, a low islet, lies 8.5 miles W of Ko Pu, and 1 mile farther W is Ko Yung, 157m high.

Depths of less than 5.5m extend nearly about 0.7 mile NW and SW from Ko Mai Phai.

Ko Phiphi Don (7˚45'N., 98˚47'E.), the largest of the off-lying islands, is located 1.5 miles S of Ko Yung. This wooded island is about 335m high in the SW part. A bay is located in the S part of Ko Phiphi Don with a depth of 20m in the middle.

Ko Phraya Nak (7˚41'N., 98˚46'E.), a high and bold island, lies 1 mile S of Ko Phiphi Don and the passage between them has depths of 25.6 to 27.4m. Two high islets lie 1 mile S of Ko Phraya Nak. Hin Bida, a rock awash and Ko Ma, a small islet, lie 3 and 6.8 miles, respectively, SE of Ko Phraya Nak.

Ko Klang, a large island separated from the mainland by a shallow stream, is also separated from the E side of Ko Pu by a channel with a least depth of 6.9m.

Ko Lanta Yai (7˚35'N., 99˚04'E.) and Ko Lanta Noi, close NE, are separated from the S side of Ko Klang by a narrow shallow channel. From seaward these islands appear as one.

The N part of Ko Lanta Yai is mostly flat and low-lying with several isolated hills. The S part consists of a narrow ridge of steep hills which attain an elevation of 491m.

Tides—Currents.—In the channel E of Ko Lanta Yai, the tidal currents set N and S at a rate of 1 knot to 1.5 knots.

Anchorage.—During the Northeast Monsoon there is anchorage SE of the S end of Ko Lanta Yai, in depths from 15 to 20m, soft mud. During the Southwest Monsoon small craft with a light draft can anchor, in 4.8m, W of **Ko Po** (7˚32'N., 99˚07'E.), located 4 miles NNE of the S end of Ko Lanta Yai. Anchorage can be obtained, in 7.8m, about 2.2 miles ENE of the NE point of Ko Lanta Yai.

1.17 Ko Ha Yai (7˚26'N., 98˚54'E.), located 12 miles WSW of the S end of Ko Lanta Yai, is a group of five small islets. These islands are of a whitish color, bold and steep-to, and are difficult to distinguish at night. Ko Rok Nai and Ko Rok Nok, two islets close together, lie 14.5 miles S of the S end of Ko Lanta Yai. Both islets are wooded and steep-to. Ko Rok Nok, the SW islet, has a height of 238m. On the E side of this islet is a waterfall.

Hin Daeng, located 14 miles WSW of Ko Rok Nok, is a rocky patch of two rocks above water, one being about 3.9m high. These rocks are dangerous, hardly being visible during the Southwest Monsoon. There is often a strong tidal current in their vicinity.

A bank with a depth of 25.6m lies 1 mile S of Hin Daeng. Ko Ngai, lies about 7 miles ESE of the S end of Ko Lanta Yai. Ko Muk, an islet with a height of 362m in its W part, lies 4 miles ESE of Ko Ngai; it is on the edge of the bank extending from the mainland. Ko Kradan, lies 3.5 miles SW of Ko Muk, has a steep-to W side. Hin Nok, a rock awash, lies 3.75 miles SE of Ko Kradan.

1.18 Ko Talibong (7˚15'N., 99˚24'E.), a large island, 320m high, lies about 7 miles SE of Ko Muk and 3 miles W of the common estuary of the Mae Nam Trang and the Khlong Palian Hin Samphao Chom, two rocks awash, lies 2.75 miles SW of the SW end of Ko Talibong.

Anchorage.—During the Northeast Monsoon good anchorage can be obtained, in 11m, about 2 miles bearing 217˚ from the S end of Ko Talibong.

During the Southwest Monsoon vessels should not seek shelter E of the S end of this island.

Kantang (7˚24'N., 99˚31'E.) (World Port Index No. 49790) is situated about 8 miles up the Mae Nam Trang. It can be reached by small craft drawing up to 3m. The main exports are bags of cement, fish meal, and rubber pellets. The port is serviced mainly by LASH barges.

A concrete pier, 144m in length, has a depth of 5m along side and can accommodate vessels up to 1000 grt. One oil berth is also available. Small tankers limited to a draft of 4m can be accommodated.

Pilotage is not compulsory. Local pilots are available. Pilots will board in the anchorage.

Vessels anchor between Ko Talibong and Ko Liang Nua in approximate position 7˚08.7'N, 99˚21.5'E.

Directions.—Mae Nam Trang and Khlong Palian are two rivers discharging through a common estuary about 3 miles E of Ko Talibong.

Small craft with a light draft and local knowledge can approach the estuary either N or E of Ko Talibong. Both approaches have a least depth of 2.3m, and in the area E of Ko Talibong are numerous dangers, some awash.

Ko Nok, a small islet lies 1.75 miles ENE of the E end of Ko Talibong. The channel through the bay E of Ko Talibong is buoyed. A light is shown from Ko Nok.

South Coast

1.19 From the mouth of the Khlong Palian the coast trends S for about 22 miles, to **Laem Tanyong Lanai** (6˚58'N., 99˚41'E.) 94m high. It being higher than any in the vicinity, renders it conspicuous from seaward, presenting the appearance of an island. The coast being indented with several bights continues in a S direction, from Laem Tanyong Lanai to **Ko Khao Yai** (Tanjong Duri) (6˚50'N., 99˚42'E.).

The coast between Ko Talibong and **Pulau Langkawi** (6˚22'N., 99˚48'E.) should be approached with caution, as this area is mostly unsurveyed.

Off-lying Islands and Dangers

1.20 Ko Liang Nua (7˚07'N., 99˚25'E.) and Ko Laing Tai, forms the N extremity of the chain of islands, islets and rocks, 21 miles in length about 10 miles from the coast, which are almost continuous to **Ko Tarutao** (6˚43'N., 99˚38'E.).

Ko Liang Nua, the northernmost, is bold, precipitous and lies 6 miles S of Ko Talibong and forms the S side of the approach to Mae Nam Trang and Khlong Palian.

Ko Bulaobot (Goh Beng) (7˚05'N., 99˚42'E.) is a small islet located 3 miles SW of Ko Liang Tai. There is a light that is shown from Ko Bulaobot. Ko Phetra, the most conspicuous island in the vicinity, is located 5 miles SE of Ko Bulaobot.

The island is narrow, rocky and steep-to, except off the sandy beach on the E side. Ko Ta bai, 225m high is a steep islet lying 3 miles S of Ko Phetra.

Ko Bulon Le (6˚50'N., 99˚32'E.) is the outermost of the line of islands and rocks extending over 10 miles W from Ko Khao Yai. It is wooded, steep and rocky, except off the E side, from which shallow water extends 1.5 miles in a SE direction.

Ko Ahyum, 73m high, lies about 3 miles SW of Ko Bulon Le; two above-water rocks lie close W of the islet. To the SE

and E of Ko Bulon Le, many patches of 5.5m and less are located as the depths in the vicinity are irregular.

Ko Khao Yai (TanJong Duri), the largest of the group, is separated from the mainland by a channel about 0.1 mile wide.

Tides—Currents.—Between the mainland and the off-lying islands the tidal currents set towards and away from the coast at a maximum rate of less than one knot.

Off Ko Bulon Le they are similar in character, but the W current is the stronger, attaining a rate of over one knot. Off Ko Bulaobot the tidal current is rotary, changing direction regularly in a counterclockwise direction, its rate, less than 0.5 knot, remaining fairly constant.

Off Ko Phetra the NE current, setting toward Mae Nam Trang runs from 5 hours before to 30 minutes before HW and the SW current from 30 minutes after HW to 5 hours after.

The maximum rate is about 2 knots, but at neaps the currents are weak and irregular.

Directions.—Vessels without local knowledge should pass W of Ko Phetra and between Ko Bulaobot and Ko Liang in order to enter the approach to Khlong Palian and Mae Nam Trang, N of **Ko Liang Nua** (7˚07'N., 99˚25'E.).

Southeastern Coast

1.21 The coast SE of **Ko Bulan** (6˚50'N., 99˚41'E.), as far as **Ko Tammalang** (6˚35'N., 100˚00'E.), a distance of about 26 miles should be approached with caution. On the mainland, NE of Ko Khao Yai, there are a number of steep hills of moderate elevation. Two hilly points are located 4 miles E of the island.

Along the coast to **Tanjung Po** (6˚35'N., 99˚57'E.) the elevation of the coast is low and consists mostly of mangrove swamps, through which many small streams are reported to flow into the sea. The entrances to these are often obstructed by shifting sand bars.

Laem Mara (6˚44'N., 99˚39'E.), the N extremity of Ko Tarutao lies about 6 miles SSW of Ko Khao Yai. The island is densely wooded and hilly, attaining an elevation of 721m in the middle part. Close off the E side of Ko Tarutao is a channel through which a depth of not less than 8.0m may be found.

Talo Wao (Wanderer Bay) (6˚36'N., 99˚41'E.) is located on the E side of Ko Tarutao and is entered between Ko Pulao Na and Ko Klang, lying 1.5 miles to the S. The bay is exposed to the Northeast Monsoon.

Tides—Currents.—Between Ko Tarutao and the mainland, the tidal current sets NW from 1 hour after until 6 hours before HW at Pinang (Penang). At neaps, the tidal current is almost negligible.

Anchorage.—Good anchorage can be taken in Talo Wao, in 5m, about 0.1 to 0.2 mile NW of the N extremity of Ko Klang. The anchorage should be approached with a prominent rock, 59m high, with white patches on the seaward side, on a line bearing 250˚ and anchorage taken when the N extremity of Ko Klang bears 130˚.

The Butang Group

1.22 The **Butang Group** (6˚32'N., 99˚15'E.) is wooded and appears as one large island from a distance. The group is uninhabited, except for a small fishing village at the E end of Ko Nipit, the southernmost island. It is reported that the group was a good radar target up to 25 miles distance.

A light is shown from an island located about 1 mile S of the E extremity of Ko Butang.

Ko Adang, the easternmost of the two large islands, has a long sandy beach on the W side, fronted by a coral reef which extends 183m off. A mountain on the S side of the island is conspicuous from all directions.

Anchorage.—During the Northeast Monsoon, the best anchorage is in about 27m, sand, 0.5 mile W of the SW end of Ko Adang.

During the Southwest Monsoon, the only protected anchorage is NE of Ko Butang, in a depth of about 22m, approximately 0.4 mile offshore.

Ko Tanga (6˚34'N., 99˚27'E.), 198m high, lies about midway between the Butang Group and Ko Tarutao, and is formed by two portions connected at LW by a reef. The island is thickly wooded and steep-to, except on the E side, which is fringed by a narrow reef. A light is shown about 0.3 mile E of the S extremity of Ko Tanga.

Pulau Langkawi (6˚22'N., 99˚48'E.), about 15 miles wide, is mountainous, densely wooded, and formed and flanked by towering masses of limestone.

1.23 Langkawi Port**,** at **Teluk Ewa** (6˚26'N., 99˚46'E.), is a new port situated on the N side of Pulau Langkawi. It is designed to handle petroleum products, coal, and general cargo. The major exports include cement and clinker.

Aspect.—The port is entered through a channel marked with buoys and lighted buoys. The seaward end of the channel is marked with a lighted buoy.

Depths—Limitations.—From W to E the port offers 4 berths, which are the Petronas Jetty, Main Jetty, Sub Jetty, and Lada's Barter Trade Jetty. The depths and limitations of the port are described in the table below.

Langkawi Port—Berthing Information

Type of cargo	Pier length	Depth alongside	Max. vessel size
Bulk (cement)	144m	9m	10,000 dwt
Bulk (iron ore)	144m	9m	10,000 dwt
Oil tanker	124m	8m	6,000 dwt
General cargo	124m	8m	6,000 dwt
Coasters	150m	3m	1,000 dwt

Pilotage.—Pilotage is compulsory and available 24 hours. The pilot boarding station, best seen on chart, is situated about 1 mile WNW of Pulau Dangli.

Regulations.—The vessel's ETA should be sent as soon as possible advising arrival draft, date, and time. Further ETAs should be sent 10 days, 5 days, 3 days, 2 days, and 1 day prior to arrival.

Anchorage.—Vessels calling on the port may request to use the designated anchorage areas situated E of the pilot station.

1.24 Selat Chinchin (Langkawi Sound) (6˚28'N., 99˚40'E.) is the channel 4 miles wide between the S end of Ko

Tarutao and the N coast of Pulau Langkawi. The channel trends SE around the NE side of Pulau Langkawi and is bounded on the NE side by the coastal bank off the coast of Thailand.

The E coast of Pulau Langkawi is rocky, but there are a few sandy beaches. A chain of islets lies SW of **Pulau Chorong** (6˚19'N., 99˚56'E.), the easternmost island of the group.

The W coast of Palau Langkawi S of Tanjung Chinchin to Tongung Belua, 4.5 miles S, is rocky and steep-to, with a few sandy beaches, backed by precipitous hills covered with jungle.

The bay SE of Tanjung Belua to **Pulau Borau** (6˚18'N., 99˚42'E.) is fronted by a long sandy beach, backed by low lying land and small hills.

Tides—Currents.—The tidal currents in Selat Chinchin are irregular and influenced by the monsoons. During the Northeast Monsoon rates of 2 knots setting WSW have been experienced.

Depths in the channel are regular, shoaling gradually ENE and towards each side, with depths of over 18m in the fairway.

Anchorage.—Sheltered anchorage exists in the middle of **Teluk Datai** (6˚26'N., 99˚40'E.), in depths of 5m, mud. The bay is free of dangers and is backed by a sandy beach. A good anchorage exists 1.5 miles SW of Tanjung Kemarong, in a depth of 11m, mud.

1.25 Pelabuhan Bass (Bass Harbor) (6˚19'N., 99˚50'E.) (World Port Index No. 49830) formed between the S coast of Pulau Langkawi and the N coast of Pulau Dayang Bunting, is 7 miles in length with an average breadth of 1.5 miles and a general depth of 5.5 to 7.5m, mud bottom.

From **Tanjong Sawa** (6˚16'N., 99˚44'E.), the coast trends NE for 6.5 miles to a long sandy beach, being a succession of rocky points with sandy bays between them, and backed by hills.

Along this coast are few villages; the principal being Kuah, on the E side of the head of the harbor.

The limits of the port comprise the water area between 6˚19'40"N, and 6˚13'30"N, and between 99˚52'52"E, and 99˚46'22"E.

Tides—Currents.—It is HW, full and change, in Selat Dayang Bunting (Tyson Strait), at 0 hour; springs rise 2.4m.

The flood tide runs to the S out of Pelabuhan Bass (Bass Harbor) from 0.5 to 1 knot, and the ebb current the reverse way.

In the offing, the currents generally set to the N during the Southwest Monsoon and to the S during the Northeast Monsoon. Caution is advised as cross sets are usually experienced off the entrances of the various channels.

Aspect.—The E entrance of the harbor is known as Selat Kuah. The W entrances, Selat Dayang Bunting and that N of Pulau Kentot Besar (Pulau Singha Kintut) have apparently not less than 7.3m, which is found on the bar stretching E of Tanjong Sawa. They are available for craft with local knowledge.

Anchorage.—Small vessels can anchor, in 7.3m, of water in Pelabuhan Bass. Deep-draft vessels may anchor N of **Pulau Singa Kechil** (6˚15'N., 99˚45'E.), 97m high, about 0.2 mile E of an islet which is almost connected with the N extremity of Pulau Singa Kechil bearing 178˚, distance 0.5 mile is a good anchorage, in a depth of 17.4m, mud.

Caution.—The following dangers lie on the W entrance of Pelabuhan Bass (Bass Harbor): A reef, about 0.1 mile in extent and drying in places at half ebb, N of the fairway of the SW entrance of Pelabuhan Bass, with the E extremity of Pulau Kentot Besar (Pulau Singha Kintut), bearing 242˚, distance about 2 miles. A small reef with a depth of about 0.6m at LWS, is located 018˚ from the above reef at a distance of about 0.4 mile. Vessels should pass S of these dangers.

It has been reported (1995) that uncharted obstructions and depths less than charted exist within 2 miles of the coasts of Pulau Langkawi.

1.26 Paknam Satul (Pak Nam Satun) (6˚30'N., 100˚05'E.) lies about 10 miles NE of Pulau Langkawi and is well sheltered by the islands from the Southwest Monsoon. Kuala Perlis (Sungai Perils) lies about 7 miles SSE of Paknam Satul; coasting vessels anchor off it, in 5.5m, SW of a group of four islands. A mud flat fronts the coast.

The **Sungai Kedah** (6˚06'N., 100˚17'E.), the river entrance which is about 20 miles S of Kuala Perlis, is shallow. The N entrance point of the Sungai Kedah is marked by a light.

There is an outer anchorage, in about 7m, 3 miles off the Sungai Kedah entrance.

Alor Setar (Alor Star) (6˚07'N., 100˚20'E.) (World Port Index No. 49840), the capital of Kedah State, is situated approximately 7 miles above the mouth of the Sungai Kedah. A ferry wharf, 55m in length with a depth of 1.2m alongside, is situated at Alor Setar. There are no deep-water berthing facilities reported in this port.

Gunong Keriang, 213m high, is an isolated and conspicuous mass of limestone, honey-combed with caves, located about 5 miles NE of the Sungai Kedah entrance; it is a good mark for making that river.

Off-lying Islands

1.27 Pulau Segantang (6˚03'N., 99˚56'E.), consisting of two rocky islets, 25m high, lies about 22 miles W of the Sungai Kedah and 10 miles SE from the S extremity of Pulau Dayang Bunting.

There are depths of 29.3m close to its N and E sides and 34.7m about 2 miles SW.

Caution.—A dangerous wreck, best seen on chart, lies 10 miles SW of Pulau Segantang.

1.28 Pulau Paya (6˚04'N., 100˚02'E.) lies 6.5 miles E from Pulau Segantang, 88m high, is densely wooded and steep-to, except for part of the NE side. The Pulau Paya Marine Park has been established and special regulations may apply. Pulau Lembu, 73m high, lies 0.5 mile NE of Pulau Paya. A rock awash lies about 0.1 mile to the N.

In the channel between these two islands lies Pulau Kaca, a rock, 26m high. Near the islands of Pulau Paya and Pulau Lembu there are, with the exceptions mentioned, depths of 23.8 to 29.3m within 0.5 mile of the islands.

Pulau Perak (5˚41'N., 98˚56'E.) is a barren white rock, 115m high. The rock lies nearly midway in the Strait of Malacca, between Sumatera (Sumatra) and the Sungai Kedah. It is steep-to, with depths of from 73.1m to 91.4m within a short distance. Pulau Perak is often taken as a point of departure and,

when the weather is cloudy during the Southwest Monsoon, it is frequently the first land seen after entering the Strait of Malacca from the N.

South Coast

1.29 From the Sungai Kedah the coast, with an adjoining mud flat, extends in a S direction for a distance of about 26 miles to the entrance of the Sungai Merbok (Merbau River), and continues low and wooded until within 8 or 9 miles of that river, where the conspicuous Gunong Jerai, 1,212m high, is located at a distance of 4 miles from the coast, in 5˚47'N, 100˚26'E.

The Bunting Islands, consisting of four small islands located about 14 to 21 miles S of the Sungai Kedah entrance, lie 1 to 4 miles off the mainland.

The Sungai Merbok (Merbau River), the entrance to which is formed between the low coast on the N and the hills to the S, is fronted by the coast mud flat, which has depths under 5.5m, and extends nearly 3 miles to seaward. There is a depth of 2m on the bar, with depths of 5m within. Small craft drawing 2m can proceed about 3 miles upstream at HW.

The **Sungai Muda** (5˚34'N., 100˚21'E.) is located about 6 miles S of the Sungai Merbok entrance. It is obstructed by a sandy bar which dries from 0.6 to 1.2m at LW.

Small craft, drawing 1m, can enter at half tide and proceed about 4 miles upstream.

Caution.—In passing between the Sungai Kedah and Pulau Pinang (Penang Island) during the night, care must be taken to keep clear of the numerous fishing stakes which are fixed in places on the banks, some 6 or 7 miles from the coast.

Pulau Pinang

1.30 The island of Pulau Pinang is separated from the mainland by a strait 1.5 to 7 miles wide, which affords sheltered anchorage. The N part of Pulau Pinang is mountainous, and through the center of the island runs a range of hills, declining in height as it approaches the SW extremity.

Western Hill (5˚26'N., 100˚15'E.), the highest point of the island, is 834m high, a short distance to the E is Government Hill. The W side of the island is low and wooded.

The N side of Pulau Pinang is much indented, except near its NE extremity, and is fringed by a shoal area with depths of less than 5.5m extending as far as 2 miles offshore.

Pinang Harbor (Penang) (5˚25'N., 100˚21'E.)

World Port Index No. 49850

1.31 Pinang Harbor is one of Malaysia's largest ports and handles most of the trade for the cultural, industrial, and agricultural regions of Northern Peninsular Malaysia.The port complex includes facilities on Pulau Pinang at Georgetown and on the mainland at Butterworth and Perai (Prai). Pinang Harbor has ample, modern, alongside berthing facilities for all classes of vessels.

Penang Port Commission

http://www.penangport.gov.my/about/location/

Penang Port Sdn. Bhd.

http://www.penangport.com.my

Winds—Weather.—Pinang Harbor is subject to both the Northeast Monsoon and the Southwest Monsoon, with high temperature, humidity, and rainfall throughout the year. Winds are generally light or moderate in both seasons. The usual weather pattern is for partly cloudy mornings inland with showers and thunderstorms by the middle of the afternoon and dispersing at night. Sumatras, which are nighttime squalls with violent thunder, lightning, and rain, can be expected from April to November with an average occurrence of about 3 to 4 per month.

Tides—Currents.—At springs, the tidal currents run at a rate of from 2 to 3 knots through the harbor anchorages (although rates of up to 5 knots have been observed), but less in the approaches, and continue to flow N or S for about 1 hour to 1 hour 30 minutes after LW or HW.

During the Northeast Monsoon, the tidal currents are regular; the S current runs from about 4 hours before to about 2 hours after HW by the shore, with the N current running during the remaining period. Off the entrance to North Channel a S current of 0.5 knot has been experienced. In November, the current sets round **Muka Head** (5˚ 29'N., 100˚ 11'E.) and overcomes the outgoing current, sometimes for 2 or 3 days.

The main ship channel into Pinang Harbor is via North Channel, which is 10 miles in length, has a width of 183m, and a least depth of 10.2m. Approaches to the harbor are well marked by navigational aids. Approach depths gradually increase from 11 to 22m in the area S of Buoy Tokong.

Depths—Limitations.—Shoaling to a least depth of 9.7m has been reported in some areas of North Channel. The approach to Pinang Harbor via South Channel is restricted to vessels with a 6m draft and a height of 28m due to the vertical clearance of the Pinang Bridge. A least depth over the bar of South Channel is 5.8m.

Pinang is equipped with modern wharves, piers, and basins to handle practically any cargo that can be transported on water. These include facilities for container, ro-ro, dry and liquid bulk carriers, general cargo, and passenger vessels.

Swettenham Pier is situated on Pinang Island. The T-berth has a total length of 366m, with a depth alongside of 10m. A berth of 46m, depth 3m alongside, is situated on the W side of the S end of Swettenham Pier and is use by lighters and fishing vessels. This area is referred to as the Lighter Basin. Swettenham Pier handles break-bulk cargo, as well as passenger and naval vessels. Just S of Swettenham Pier is the Church Street Pier; further S is the ferry terminal.

Perai—Bulk Cargo Terminal

Less than 1 mile E of Swettenham Pier, across the Selat Utara, is the North Butterworth Container Terminal. The T-shaped pier is 600m in length, with a depth of 12m alongside.

Less than 1 mile S of the North Butterworth Container Terminal are the Luar Shell Pier, the Bagan Luar Esso Pier, and the Butterworth Deep Water Wharves. A ferry terminal is situated between the Esso Pier and the Butterworth Deep Water Wharves.

The Butterworth Deep Water Wharves are made up of six numbered berths. Berth 1 through Berth 3, used for conventional cargo, have a length of 549m and depths of 9m alongside. Container facilities are situated at Berth 4 through Berth 6, with a total length of 497m. Berth 6 is also equipped with a ro-ro ramp of 8m wide and 28m long.

The Palm Oil Tanker Berth (Berth 9) with a depth of 8.9m is situated just S of Butterworth Pier No. 1; vessels up to 167m in length can be accommodated.

The entrance to the Sungai Perai is located S of Berth 9. On the S bank of the river entrance is the Perai Wharf. This wharf is 840m in length and suitable for coasters and lighters carrying bulk cargo. The wharf is connected to railways.

The Caltex Pier (Berth 10) consists of a mooring pontoon and berthing dolphins 0.5 mile offshore. The berth has a depth of 10m and is connected to the prominent oil tanks to the NE by an underwater pipeline.

A Bulk Cargo Terminal, for both liquid and solid cargoes, is situated at Perai. The terminal consists of two main berths 338m long with a depth of 10m alongside and one inner berth with 154m long with a depth of 7m.

Vessels of more than 5m in height or 30m in length must obtain written permission from the Port Officer, Pinang, before entering the restricted area, the limits of which are shown on the chart.

Aspect.—The coast of the mainland being low does not show up well from North Channel as that from Pinang Island, consequently the latter will usually appear nearer when in the fairway between them. Within the harbor limits of Pulau Pinang, Fort Cornwallis, with a conspicuous flagstaff, 5.7m high lies on the NW entrance to the harbor. On the mainland, two conspicuous radio masts lie on the E entrance of the harbor. Numerous other prominent buildings and masts stand on the island and mainland.

Pilotage.—Pilotage is compulsory for vessels 200 grt and over when berthing and unberthing in the harbor, except fishing vessels. Vessels should send their ETA 3 hours in advance to Pilots Pinang, stating their ETA at North Channel Light Float or, in the case of South Channel, their ETA at Pulau Rimau.

The maximum draft of the vessel should also be included. Pilot should be contacted on VHF channel 12.

For vessels entering the harbor through North Channel, the pilot boarding area is NW of the North Channel Light Float. For entry through South Channel, the pilot will be embarked in the vicinity of Rimau Buoy.

Anchorage.—Anchoring is prohibited within the indicated cable area on the NE side of North Channel.

Numerous anchorages including Naval Anchorage, Petroleum Anchorage, Quarantine Anchorage, Local Anchorage, Small Craft Anchorage, and Explosives Anchorage exist within harbor limits and are best seen on the chart.

An outer anchorage is charted about 2 miles SSW of North Channel Light Float.

Caution.—Fishing stakes extend all around Pulau Pinang and the mainland coast within the 10m contour line. Bamboo poles, singly or in groups, marking fishing nets or pots may be encountered in this area. Large numbers of fishing boats may be encountered in the vicinity of, and NW of **Muka Head** (5˚28'N., 100˚11'E.).

1.32 Great Kra Flat forms the E side of South Channel, it fronts the shore at various distances from the Sungai Perai, 18 miles N. It encumbers much of South Channel. Pulau Rimau is nearly 5 miles in breadth, it is dry in places at LW, and tapers to a point off the Sungai Perai.

A channel, with depths of 5.8 to 15.5m, lies E of this extremity, leading to the Sungai Perai, the Sungai Juru, and the Sungai Jajawi.

Outer Kra Bank lies SW of Great Kra Flat, the N end lies about 9 miles WNW of **Tanjong Piandang** (5˚05'N., 100˚22'E.). A dangerous wreck lies about 5.2 miles, bearing 239˚ from the N portion of Outer Kra Bank.

Pulau Jerejak on the W side of South Channel is located about 4 miles NNE of Pulau Rimau. A 6.7m shoal lies about 0.7 mile NE of the S end of Pulau Jerejak. Between the W side of Pulau Jerejak and Pulau Pinang, there is a least depth of 4m in the fairway.

Middle Bank extends N from Pulau Jerejak for a distance of 4.75 miles. Its N end tapering to a point with depths under 5.5m to abreast Pinang.

Between Middle Bank and the mud bank fronting Pulau Pinang, is the narrow Western Channel with a depth of about 5.5m. The channel is reduced to about 114m in width abreast the W side of Pulau Jerejak.

A curved spit, with a least depth of 4m, extends from the shore into the channel.

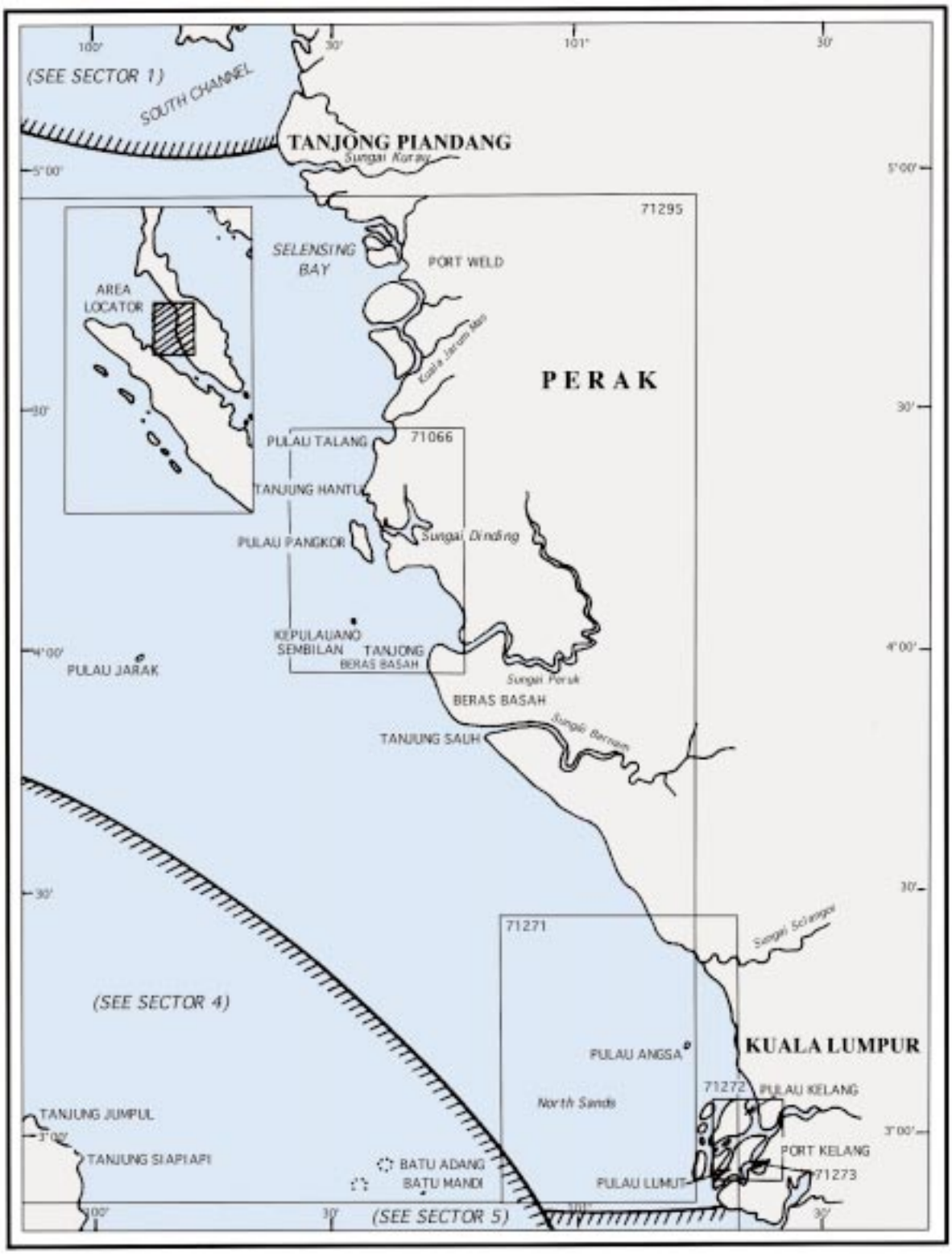
Syrang Bank lies E of Middle Bank, a portion of which dries. Fronting Middle Bank, it forms the W side of South Channel for a short distance.

East and SE of Syrang Bank, and in the channel are several detached patches with from 3.7 to 5.5m. The Sungai Perai is located 2.5 miles SE of Pinang, and E of the N end of Great Kra Flat.

The Sungai Perai, the Sungai Juru, the Sungai Jajawi, and Kuala Tengah exit on the coast abreast Pulau Pinang.

Caution.—Less water than charted has been reported (1996) on Outer Kra Bank.

Care must be taken to avoid the wrecks off the W side of Outer Kra Bank and not to confuse the various lighted beacons on the N part of Great Kra Flat.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **2** — CHART INFORMATION

SECTOR 2

THE STRAIT OF MALACCA—TANJUNG PIANDANG TO PORT KELANG

Plan.—This sector describes the E coast of the Strait of Malacca from Tangung Piandang to Port Kelang including the various islands lying close offshore. The arrangement is S from Tanjong Piandang.

General Remarks

2.1 There is a practically continuous strip of mangrove forest, which varies in width from 0.5 mile to 8 miles between Tanjung Piandang and **Tanjung Batu** (4˚26'N., 100˚36'E.), about 41 miles S. These mangroves are generally creeping seaward as the deposits from the muddy creeks increase.

Extensive mud banks fringe the coast between Tanjung Piandang and Tanjung Batu.

Ships on passage from Tanjung Piandang to **Tanjung Hantu** (4˚19'N., 100˚33'E.) normally keep outside the 20m contour line. Along this track the hills some 10 to 15 miles inshore of the seaward edge of the mangroves are frequently visible and are the only reliable navigational aids between the two points.

Coastal Features

2.2 From **Tanjong Piandang** (5˚05'N., 100˚21'E.) the coast takes a SSE direction to **Selinsing Bay** (4˚50'N., 100˚27'E.), forming several bights fronted by flats with depths of less than 5.5m in places. On the flats between **Pulau Pinang** (5˚25'N., 100˚15'E.) and **Kuala Larut** (4˚47'N., 100˚34'E.) there are numerous fishing stakes.

The **Sungai Kurau** (5˚00'N., 100˚25'E.) enters the sea about 5 miles SSE of Tanjong Piandang. The Sungai Kurau is navigable at HW by craft drawing 1.8m, about 15 miles upstream.

Selinsing Bay is shallow and forms the entrance to the Sungai Sangga Besar, the main approach to Port Weld, and the Sungai Selinsing. The bay is bounded by **Tanjong Pasir** (4˚52'N., 100˚30'E.) to the N, and a point about 3 miles SW. Tanjong Pasir may be recognized by the sandy beaches on the N and S sides of it. The shores of the bay are fringed with wide, drying mud banks which reduce the width of the channels into the two rivers to 0.75 mile and the two separate river channels to 0.25 mile. The extent and shape of these banks are subject to frequent change.

The main bar at the entrance to Selinsing Bay lies close S of Tanjong Pasir with depths of from 0.3 to 0.6m.

2.3 **Port Weld** (Kuala Sepetang) (4˚50'N., 100˚38'E.) (World Port Index No. 49870) is the port for Taiping the former capital city of Perak. Port Weld is situated about 5 miles above the entrance of the Sungai Sangga Besar, and is connected by rail and a good road. The port is now only used by native craft. The port has two concrete T-headed jetties. The northernmost jetty is the Customs Jetty, which is 27m in length. The Government Jetty is 12m in length. This jetty is mainly used by fishing vessels.

The coast S of Tanjong Pasir to **Tanjong Kerang** (Tanjong Krang) (4˚48'N., 100˚34'E.) is a mangrove jungle, covered for some distance inland at HWS tide.

Tanjong Kerang is the N entrance point of **Kuala Larut** (4˚47'N., 100˚34'E.), a wide estuary leading E, used only by small craft.

From Kuala Larut to **Kuala Jarum Mas** (4˚32'N., 100˚37'E.), the coast is fronted by a mud bank extending from 5 to 9 miles offshore.

A group of powerful white lights, visible for about 50 miles, is occasionally shown from Gunong Kledang, a summit located about 23 miles E of Kuala Jarum Mas.

It was reported that **Pulau Talang** (4˚25'N., 100˚35'E.), a small island off the mainland, is a good radar target up to 18 miles distance.

Caution.—Numerous fish traps and stakes are situated within the 10m contour line from W of Pulau Terung to Tanjung Hantu.

2.4 **Tanjong Hantu** (4˚19'N., 100˚33'E.), about 8 miles SSW of **Tanjong Batu** (4˚26'N., 100˚36'E.) is a sloping point, the summit of which is 203m in height.

The coast from Tanjong Hantu to **Motts Point** (4˚15'N., 100˚35'E.), the N entrance point of Dinding River, is skirted by a shallow bank having depths of less than 5.5m.

The bank extends a distance from about 0.6 to 0.8 mile, gradually diminishing its distance from the shore as Motts Point, on the N shore of the entrance of Dinding River, is approached.

Bukit Sigari, 493m high, is the S peak of the Saddle which is sometimes known as False Dining. This is good landmark from the SW and W.

2.5 **Pulau Pangkor** (4˚13'N., 100˚34'E.) is separated from the mainland by Selat Dinding (Dinding Channel), about 1 mile wide but navigable only over a reported width of about 0.2 mile. The island is very hilly and densely wooded.

The W coast of Pulau Pangkor is deeply indented, forming several bights, with the largest being on the SW side.

Telak Belanga (4˚15'N., 100˚32'E.), the NNW bight, affords an anchorage in the center, in a depth of 8m, shoaling gradually to the shore.

Western Anchorage is entered between **Tanjong Nipah** (4˚15'N., 100˚32'E.) and the W extremity of **Pulau Mentangor** (4˚14'N., 100˚32'E.), about 1 mile SSW; near the middle of this bay, about 0.1 mile from its head, is Pulau Giam, a steep wooded islet. A good anchorage may be obtained in Western Anchorage, in a depth of about 10m, 0.25 mile WNW of Pulau Giam.

The E coast of Pulau Pangkor trends S from **Batu Jambol** (4˚14'N., 100˚35'E.) to the shallow bay in which lies **Port Pangkor** (4˚13'N., 100˚35'E.) (World Port Index No. 49890).

The settlement at Pangkor has a small jetty, with a depth of 6.1m alongside.

Tides—Currents.—The flood runs S, and the ebb N along the W coast of Pulau Pangkor. taking the direction between Pulau Pangkor and **Pulau Pangkor Laut** (4˚12'N., 100˚32'E.).

In the narrow passage between the two, the current has a rate of 2 to 3.5 knots at springs.

Anchorage.—Abreast of Port Pangkor village, there is secure anchorage for vessels of deep draft, and sufficient space for several vessels to moor. A good anchorage may be obtained, in depths over 16m, mud, with the W edge of East Bank about 0.2 mile E. East Bank trends parallel to, and fronts the coast of the mainland.

Caution.—Lesser depths than charted have been reported in the dredged part of North West Entrance.

2.6 Lumut (4˚14'N., 100˚38'E.) (World Port Index No. 51615) is approached through River Passage and the Sungai Dinding. The principal functions of the port are the Lumut Naval Base, the Malayan Flour Mill, and the small pier at the town of Lumut used by coasters at high tide. Fishing boats and ferries dominate the area's traffic.

Lumutport

http://www.lumutport.com/default.asp

Tides—Currents.—The current through Selat Dinding sets S at a rate of 2 to 3 knots during spring tides. In the Sungai Dinding, both the incoming and outgoing currents have a rate of 2 knots during neap tides and 3.5 knots during spring tides.

Depths—Limitations.—The three channels leading to the main fairway of the Sungai Dinding and then to Lumut are, North Channel, North West Entrance, and Selat Dinding.

North Channel leads from Tanjong Hantu to Motts Point.

North West Entrance leads S of Beting Batu Malang and the N coast of Pulau Pangkor.

Selat Dinding leads from South Entrance close to the E coast of Pulau Pangkor. Selat Dinding is the channel most used by deep draft vessels calling at Lumut. A least depth of 11m is charted 0.5 mile NNE from South East Point Light.

All three channels meet at River Passage, 0.75 mile W of Motts Point.

Lumut Naval Base (4˚14'N., 100˚37'E.) is surrounded by a hilly region and is protected from high winds and seas. The base is contained within two breakwaters, with lighted beacons on each end and a dredged basin with numbered berths inside.

Reclamation work was in progress (2002) just S of Lumut Naval Base.

Flour Mill Wharf (4˚16'N., 100˚38'E.) has 167m of berthing space, with a depth alongside of 9.3m at MLWS. On the S side of the dock is a berth, 97m long, with a depth alongside of 6m, used by coastal tankers.

Lumut Maritime Terminal (4˚15.3'N., 100˚39.6'E,.) situated on the Dinding River, is a common-user terminal. Dry bulk, bulk liquids, containers, and general cargo are handled here. The South Berths are 200m in length, with a depth of 10m alongside. The North Berths are 280m in length, withe a depth of 12m alongside. A barge berth can accommodate two barges up to 8,000 dwt each.

Lekir Bulk Terminal (4˚08.7'N., 100˚37.3'E.), completed in 2002, handles bulk liquids and dry bulk cargo. The S berth is 530m in length. The N berth is 250m in length. Both berths have a depth of 20m alongside.

Pilotage.—Pilotage is compulsory and is available 24 hours. The pilot boards S of Pulau Pangkor in position 4˚10.5'N, 100˚35.0'E. A notice of arrival should be sent through the agent 72 hours in advance.

Regulations.—Entry is prohibited in the area centered on position 4˚13.8'N, 100˚35.3'E, as shown on the chart, where there is a degaussing range.

Entry is prohibited in the charted area E of Dinding Light, on the S side of the river to the N of the Lumut Naval Base to a position close W of Lumut.

Anchorage.—Anchorage may be obtained approximately 0.7 mile S of Southeast Point Light, in about 22m.

There are several submarine cable areas in the passage through Selat Dinding and the Sungai Dinding which can be best seen on the chart. Anchoring is prohibited.

Directions.—A vessel bound for Lumut using Selat Dinding should steer to pass 0.2 mile E of South East Point of Pulau Pangkor, with Tanjong Hantu open E of **Batu Jambol** (4˚14'N., 100˚35'E.). The fairway channel (Selat Dinding) is indicated by a lighted range, which may best be seen on the chart.

Continue N, maintaining the same distance off Tomb Point, Hospital Rock, and Batu Jambol. Then alter course to cross the bar of River Passage, keeping River Passage Buoy close to port on the inbound leg and close to starboard on the outbound leg.

Caution.—Vessels are advised not to use Northwest Entrance without local knowledge due to the numerous dangers.

Pulau Tukun Perak (Fairway Rock) (4˚08'N., 100˚33'E.) 5.5m high lies about 4 miles SSW of Southeast Point on Pulau Pangkor. A wreck, with a depth of 9.5m, lies 1.75 miles ENE of Pulau Tukum Perak.

Kepulauan Sembilan

2.7 Pulau Agas (4˚04'N., 100˚35'E.), the N of Kepulauan Sembilan, lies about 7 miles S of Southeast Point.

The N group consists of four islets and a rock; the S group consists of six islands and two off-lying rocks, all within a 6 mile radius.

White Rock (4˚00'N., 100˚30'E.) was reported to be a good radar target up to 13 miles. A light is shown from White Rock.

A dangerous wreck lies about 9 miles, bearing 260˚ from White Rock; a racon is situated at the light.

Caution.—If approaching from S at night between the mainland and Kepulauan Sembilan, it is advisable to give Pulau Agas a wide berth. This is due to the tidal currents around the islands being strong and irregular.

2.8 Pulau Jarak (3˚59'N., 100˚06'E.), lying near the middle of the Strait of Malacca about 25 miles W of Kepulauan Sembilan (Sembilan Islands), is a precipitous thickly-wooded island. Pulau Jarak was reported to be a good radar target.

The flood current sets SE and the ebb NW, at a rate of about 1.5 knots, in the vicinity of the island. Tidal rips have been observed E of the island.

Tanjong Katak to Tanjong Beras Basah

2.9 **Tanjong Katak** (4˚09'N., 100˚37'E.) is low and continues to the entrance of the Sungai Perak (Perak River), located about 14 miles SSE of Pulau Pangkor.

The Sungai Perak is approached through Kuala Perak, a wide shallow estuary and a buoyed channel leading E from the fairway lighted buoy.

Tanjong Beras Basah (4˚00'N., 100˚43'E.), the S point of the approach to the Sungai Perak, is fronted by sand banks, partly dry at LW, to a distance of 3.5 miles in a NW direction. The Sungai Perak is navigable to Tuluk Intan, 30 miles inland for those vessels able to clear the shallow depth in the approach.

2.10 **Bagan Datoh** (Datok) (3˚59'N., 100˚47'E.) (World Port Index No. 49911) is situated on the S bank of the Sungai Perak, about 4 miles E of Tanjong Beras Basah. Bagan Datoh and Teluk Intan are no longer ports of any significance. Most of the traffic is confined to a few coastal tankers transporting oil supplies from Port Dickson, which will cease when the planned bridge is constructed across the Sungai Perak.

Tides—Currents.—At the mouth of the Sungai Perak, the currents attain a rate of 3 to 4 knots at springs, and 1.5 knots at neaps.

The current changes about 1 hour before HW and LW at Bagan Datoh. In the channel E of the sea buoy, the currents set across the channel NW with a falling tide at Bagan Datoh, and SE with a rising tide.

Depths—Limitations.—River and local fishing vessels use a T-shaped concrete pier, witha depth of 3m alongside.

Pilotage.—There are no regular pilots; however the marine department of Teluk Intan will arrange a pilot with a 24-hour notice. The pilot boards at the fairway lighted buoy.

Anchorage.—Anchorage may be taken about 0.3 mile from the shore off the pier at Bagan Datoh, in about 6.4m, mud.

2.11 **Teluk Intan** (Anson) (4˚01'N., 101˚01'E.) (World Port Index No. 49910) is on the right bank of the river about 30 miles from the entrance. Above Telok Anson, the river shoals rapidly and is used only by small craft.

The Shell Oil Company Jetty is situated 1.3 miles below the town. The jetty is T headed with a length of 20m and a depth of 5m alongside. North of the Shell Jetty is the Railway Pontoon Jetty.The jetty consists of two pontoons 50m in length and us used by local vessels. The Harbormaster's Jetty is situated in town and has a depth of 3m alongside.

The **Sungai Bernam** (Bernam River) (3˚51'N., 100˚49'E.) is located about 12 miles SSE of Tanjong Beras Basah. Tidal currents are strong in the river and only small craft with local knowledge should attempt to enter.

Between **Kuala Bernam** (3˚50'N., 100˚47'E.) and **Kuala Selangor** (3˚20'N., 101˚14'E.), about 39 miles SE, the coast is low and fringed with mangroves. The mud banks fronting the coast extend for less than 0.5 mile until within 5 miles of Kuala Selangor where they extend for a distance of 2 miles.

A chain of shoals with depths of less than 5.5m lies 5 to 7 miles offshore about midway between **Tanjong Sauh** (3˚47'N., 100˚49'E.) and Kuala Selangor. A spit with depths of less than 5.5m, bank off Kuala Selangor, extending towards the chain of shoals described above.

Enclosures for catching fish are situated off and along the coast a few miles apart. They are generally found in depths up to 11m and are therefore useful in defining the shallow water.

Kuala Selangor has an entrance depth of 1.2m. A light is shown from the S side of the entrance. The depths within the entrance are from 2.1 to 5.8m but the anchorage is indifferent, the holding ground being of soft mud and the tidal currents strong. The Sungai Selangor is usually navigable for small craft up to 1.8m draft for about 5 miles.

Kuala Selangor (3˚21'N., 101˚15'E.) (World Port Index No. 49920) is conspicuous by the light structure and various small buildings at the foot of a hill.

Caution.—The banks off the mouth of the Sungai Selangor are reported to be extending seaward.

Kuala Selangor to Port Kelang

2.12 From Kuala Selangor to abreast the N end of Selat Kelang Utara (Kelang Strait), about 18 miles S, the coast is low, densely wooded, and flooded in most parts at HW. It is fringed by a mud bank, which dries, extending about 1 mile offshore, gradually closing the coast at the S end.

Offshore Dangers

2.13 **North Sands** (3˚05'N., 101˚01'E.) comprises various sand banks and spits lying in a general NW and SE direction between Angsa Bank and One Fathom Bank. The ports within these sand banks are Batu Kineing, Blenhiem Shoal, and Goldfish Bank. These three areas can be best seen on the chart; a 1.8m wreck lies about 6 miles NW of Blen-heim Shoal.

One Fathom Bank (2˚53'N., 100˚59'E.) is a detached patch, with depths from 3 to 10m, which extends 5 miles in a NW direction reaching 1 mile in width. One Fathom Bank Light is situated 0.6 mile from the SE extremity of the bank. A stranded wreck is situated about 0.7 mile NW of the light.

Caution.—Vessels are advised not to navigate within 0.5 mile of One Fathom Bank Light due to unlit obstructions.

Amazon Mara Shoal, with a least depth of 8.4m, lies about 2.2 miles S of One Fathom Bank Light.

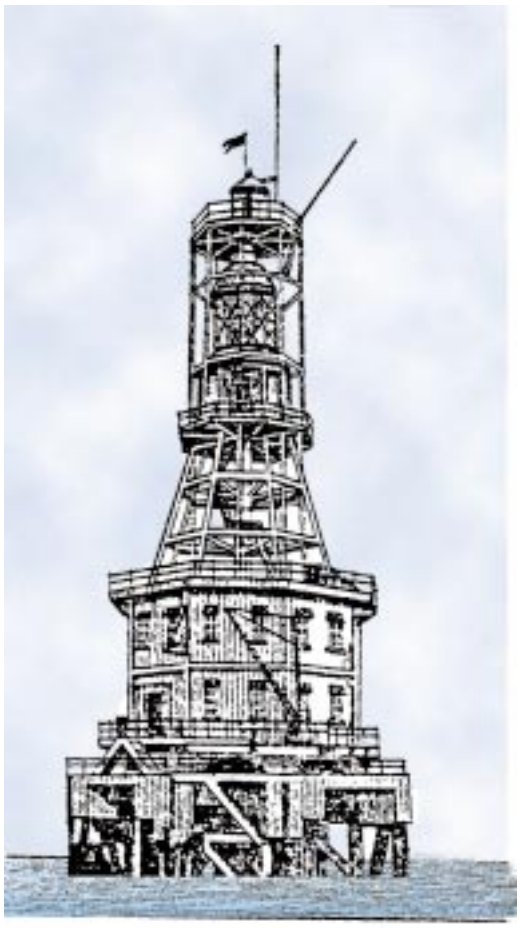
An IMO-adopted Traffic Separation Scheme (TSS) has been established in the vicinity of the One Fathom Bank in conjunction with the adoption of the Strait of Malacca and Singapore Routing System.

A dangerous wreck, marked by a lighted buoy (2˚16.1'N., 101˚47.8'E.), lies in the southeastbound lane of the Traffic Separation Scheme.

Selat Kelang Utara—North Approach

2.14 The N approach is bounded on the W side by Angsa Bank, which extends 25 miles in a NW direction from Pulau Kelang (3˚04'N., 101˚19'E.), and on the E by the extensive mud bank with rocks above water in places, fronting the coast S of the Sungai Selangor. Discolored water marks the edges of these banks.

Approaching Selat Kelang Utara for Port Kelang from the N, a vessel should keep well clear of the N extremity of Angsa Bank.



One Fathom Bank Light

Angsa Bank North Cardinal Light Float (3˚20'N., 101˚00'E.) is moored off the NW end of Angsa Bank, about 15 miles W of Kuala Selangor Light. The bottom is soft and not likely to damage a vessel touching, and the water is invariably smooth. From a position about 12 miles W of Kuala Selangor light, a vessel should steer SE into the strait.

Upon sighting **Pulau Angsa** (3˚11'N., 101˚13'E.), the vessel should steer for it, bearing 154˚ until about 4 miles from it.

Bukit Jugra (2˚50'N., 101˚26'E.), a hill, just open E of Pulau Angsa, bearing 150˚, will lead between the W mudbank and **Batu Penyu** (3˚14'N., 101˚13'E.). A light is shown from Bukit Jugra, Pulau Angsa, and Batu Penyu.

When abreast of Pulau Angsa, the course should be altered to about 130˚ to pass through the dredged channel of which ahs a depth of 11.1m.

The lighthouse at Pulau Angsa is linked by VHF with the Harbormaster's office at Port Kelang.

Fishing stakes extend into deep water on either side of the strait but are generally within the 10m curve. They are continually being shifted, but do not extend into the main channel. Fishing boats at times frequent the approach to Selat Kelang Utara (North Kelang Strait) in great numbers and lay their drift nets across the channel. These nets are marked by wooden floats and have a boat at each end of the net.

Caution.—Uncharted drying banks lie from 2.75 miles SW to 4.5 miles W of the E entrance point to **Kuala Selangor** (3˚20'N., 101˚14'E.).

Selat Kelang Utara—South Approach

2.15 Selat Kelang Selatan (2˚57'N., 101˚18'E.), the S entrance to Selat Kelang Utara, lies between Pulau Lumut on the E side and Pulau Pintu Gedung, Pulau Che Mat Zin, and Pulau Kelang on the W. Its narrowest part is under 0.5 mile wide abreast of **Pulau Che Mat Zin** (2˚55'N., 101˚16'E.). The S approach has a dredged to a depth of 15m.

The channel is 366m wide and can accommodate two-way traffic. Range lights have been established at **Tanjong Mahang** (2˚55'N., 101˚16'E.). The lights in line bear 011˚.

Caution.—A dangerous wreck is reported to lie in approximate position 2˚51'00"N, 101˚11'23"E.

Port Kelang (Klang) (3˚00'N., 101˚24'E.)

World Port Index No. 49930

2.16 Port Kelang (Klang) is the principal port of Malaysia and the nearest port to the capital of Kuala Lumpar, which lies 40 miles to the E. The port is situated on the W coast of the Malaysian Peninsula at the N end of the Strait of Malacca. It is well sheltered by surrounding islands and forms a natural enclosure. Port Kelang is the 12th largest container port in the world (2002). The port consists of North Port, South Point, and West Port.

Port Klang Authority

http://www.pka.gov.my

http://www.lpk.gov.my

Northport (Malaysia) Bhd.

http://www.northport.com.my

Westport Malaysia

http://www.westportmalaysia.com.my

Winds—Weather.—Fog is rare although haze is present in the Strait of Malacca from March through August.

Visibility is reduced in dense rains, the heaviest of which occur in October and November. Severe weather at Port Kelang is rare and both the south and N ports are protected by the natural configuration of land.

The tidal currents run with considerable strength, but were found not to exceed, as a general rule, 3 knots, the maximum velocity being attained about 2 hours before HW and LW. They generally set parallel to the shore in both straits.

Care must be taken when passing the various creeks and channels. This is especially important when off Pulau Che Mat Zin.

Off the S extremity of Pulau Pintu Gedong, at springs and neaps, the N currents begin 2 hours 30 minutes after HW at Port Kelang (South Port); at springs this S current starts 3 hours before, and at neaps 3 hours 30 minutes before HW at Port Kelang (South Port). There is a period of slack water for 45 minutes at springs and 1 hour at neaps.

Off Pulau Angsa at springs the N current commences 1 hour 45 minutes after and at neaps 1 hour 15 minutes after HW at Pulau Angsa; at springs the S current starts 5 hours 15 minutes before and at neaps 4 hours 45 minutes before HW at Pulau Angsa. There is a period of slack water for about 1 hour at springs and about 1 hour 30 minutes at neaps.

At Port Kelang (South Port) the tidal currents attain a velocity of from 2.5 to 3 knots at springs, the E and S current being stronger than the W and N current. They attain their maximum velocity about 2 hours before HW and LW by the shore.

Tides—Currents.—The direction of the tidal current at the wharves at Port Kelang (South Port) is denoted by a white ball at the signal station, at the S yardarm for the flood current, at the N yardarm for the ebb current, and in the center for slack water. The current at the buoys where the ocean-going vessels lie, changes a little later, and captains of vessels when going alongside the wharves should be guided by the signals.

Depths—Limitations.—Entry into Port Kelang is via a N approach channel and a S approach channel. The N channel is dredged to 11.1m over a maximum width of 152m. The S channel is dredged to a depth of 15m over a maximum width of 366m. Both channels and the fairways leading to North Port and South Port are well marked by navigational aids.

There are entry restrictions for vessels calling on South Port. Dry cargo vessels cannot exceed 183m in length and tank vessels 170m in length. The maximum draft allowable for these vessels is 9.8m.

Tidal conditions govern movements of all vessels that are over 91m long. At the N extension wharves, container ships up to 289m long can berth.

The accompanying tables provides details on the facilities at Port Kelang.

Port Kelang—Port Facilities—North Port

Berth	Length	Depth	Type of cargo
8	213m	10.5m	Containers
9	320m	13.2m	Containers
10	320m	13.2m	Containers
11	226m	13.2m	Containers
12	176m	9.1m	General cargo
13	176m	9.1m	General cargo
14	176m	9.1m	General cargo
15	213m	11.5m	General cargo
16	213m	11.5m	General cargo
17	213m	13.0m	Containers
18	213m	13.0m	Containers
19	213m	13.0m	Containers

Port Kelang—Port Facilities—North Port

Berth	Length	Depth	Type of cargo
20	213m	13.0m	Containers
21	213m	13.0m	Containers
22	213m	11.6m	Bulk liquid
23	213m	11.6m	Bulk liquid
24	213m	11.0m	Dry Bulk
25	213m	11.0m	Dry Bulk

Port Kelang—Port Facilities—South Point

Berth	Length	Depth	Type of cargo
1	176m	10.5m	Bulk liquid
2	176m	10.5m	Bulk liquid
3	167m	10.0m	Bulk liquid
4	146m	9.1m	Bulk grain
5	106m	6.1m	Coastal
6	91m	5.5m	Coastal
7	94m	5.5m	Coastal
7A	94m	5.5m	Coastal

Port Kelang—Port Facilities—West Port

Berth	Length	Depth	Type of cargo
DB1	200m	15.0m	Dry Bulk
DB2	250m	13.5m	Slag Terminal
Cement	285m	11.0m	Cement Term
B03	200m	15.0m	Breakbulk
B04	200m	15.0m	Breakbulk
B05	200m	15.0m	Breakbulk
B06	200m	15.0m	Breakbulk
B07	300m	15.0m	Containers
B08	300m	15.0m	Containers
B09	300m	15.0m	Containers
B10	300m	15.0m	Containers
B11	300m	15.0m	Containers
B12	300m	15.0m	Containers
LB1	305m	15.0m	Bulk liquid
LB2	320m	15.0m	Bulk liquid
LB3	193m	10.0m	Bulk liquid

Pilotage.—Pilotage is compulsory for all vessels 28m long and over and is available 24 hours. The vessel's ETA should be sent 7 days in advance. The vessel's agent orders pilots 2 hours before the vessel's arrival, stating:

1. Vessel's ETA.
2. Length.
3. Draft.
4. Point of entry.
5. Time pilot service is required.

Pilots board, as follows:

1. Northern Approach—0.8 mile N of Pulau Angsa Light.
2. Southern Approach—0.8 mile S of Pintu Gedong Lighted Buoy.

Regulations.—The following regulations are in effect within the limits of Port Kelang:

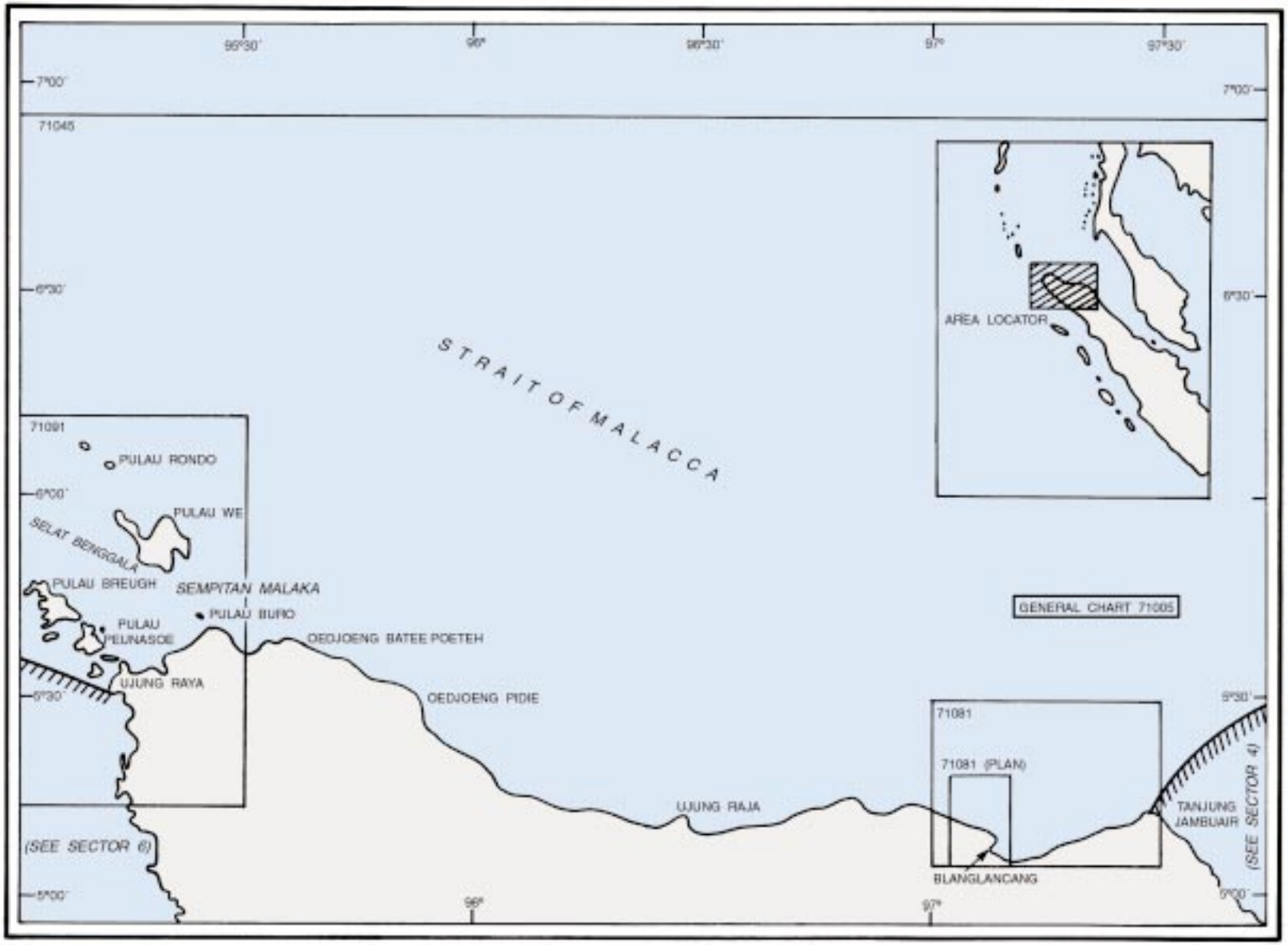
1. No vessel or small craft shall anchor in the fairway of the mouth of the Sungai Kelang.
2. All vessels equipped with VHF radio are required to maintain a continuous listening watch on VHF channel 12 when navigating or at anchor within the harbor.
3. No vessel shall move at an excessive speed within port limits. Every vessel shall, when approaching or passing any other vessel, reduce speed in sufficient time to prevent her wash or low wave from causing any danger, damage or inconvenience.
4. No vessel shall proceed to or depart from any wharf or buoy owned by the Government or Port Authority unless a licensed pilot is aboard.
5. The master of a vessel of less than 75 tons may, on application to the Harbormaster, be granted an exception to this regulation.
6. When two vessels are approaching the port, the one by Selat Kelang Utara, and the other by Selat Kelang Selatan, so that both may arrive off **Tanjong Gila** (3˚00'N., 101˚22'E.) at the same time, the vessel stemming the tide shall give way to the vessel with the following tide and allow it to enter Port Kelang (South Port) first.

Anchorage.—Anchorages can be obtained over all parts of the N approach in convenient depths, the bottom being of mud and sand. Five special purpose anchorages, best seen on the chart, have been established and include areas for explosives, LASH Operations, container vessels and ro-ro ships awaiting berths, and foreign tugs and barges. Vessels awaiting a pilot, may anchor 1 mile E of Pulau Angsa, or in the S approach, 0.5 mile S of Seaward Bar Buoy. Within the harbor limits, anchor as instructed by the Harbormaster.

The Sungai Kelang, the mouth of which is located about 0.2 mile NNW of Port Kelang (South Port), extends 30 or 40 miles inland. The river, which is narrow and tortuous, is used only by small craft with a draft of 1.8m at HW, as far as the town of Kelang.

2.17 Selat Lumut (2˚53'N., 101˚17'E.) separates the E side of Pulau Lumut from the mainland. It has a least width of about 0.1 mile, with both sides of the S entrance fringed by mud banks. Selat Lumut has not been surveyed in detail, but appears to be navigable by vessels of not more than 3m draft.

From **Tanjong Selat Lumut** (2˚52'N., 101˚17'E.), the S entrance point for Selat Lumut, the coast trends S and SE.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **3** — CHART INFORMATION

SECTOR 3

THE STRAIT OF MALACCA—NORTH COAST OF SUMATERA

Plan.—This sector describes the N coast of Sumatera (Sumatra) including the islands N. The arrangement is N to S from the N island of Pulau Rondo to the coast, thence E from the W extremity of the N coast.

General Remarks

3.1 Winds—Weather.—At the N and NE portion of Sumatera, during the Northeast Monsoon, there is generally a swell on the coast, which gives rise to a considerable sea in the after-noon if accompanied by a stiff sea breeze. Both subside quickly, so that the water is generally smooth at night. At times the monsoon blows strongly for some days, at which times communication with the shore is impracticable.

December and January are considered to be the worst months. The Southwest Monsoon is the best for landing on this portion of Sumatera.

Rain occurs throughout the year in Sumatera. The period of the greater or less rainfall on the N half of the island does not correspond with the periods of the monsoons.

The greatest rainfall on the N coast of **Ujung Masam Muka** (5˚34'N., 95˚13'E.) and the off-lying islands usually occurs in the months of October and November, the months preceding the change to the Northeast Monsoon. The least rainfall occurs in February and March, the months preceding the change to the Southwest Monsoon. The rainfall on the off-lying islands is about double that on the N coast.

The climate of the N coast of Sumatera (NW extremity) is damp. The temperature ranges from 25˚ to 35˚C. It is subject to great and sudden changes, which may vary in different localities. On the N and NW coast the months of March and April are hot.

Tides—Currents.—The flood sets E on the N coast of Sumatera and the ebb W, rarely exceeding 2 knots at springs.

At neaps, they are sometimes imperceptible, except at the points or over banks and narrow channels.

The currents are affected by the constant current out of the Strait of Malacca, which takes a W direction along the N coast through Sempitan Malaka (Malacca Passage). The currents pass through Selat Benggala (Bengal Passage); for the greater part of the year the ebb current is longer and stronger than the flood current.

Pilotage.—Pilotage is compulsory for all the ports of the Republic of Indonesia where pilots are available. Signals for a pilot are in accordance with the International Code of Signals.

Regulations.—An extensive prohibited area, in which fishing and other activities not associated with the innocent passage of foreign vessels are prohibited, has been established off the coastline of NW Sumatera and is bound by lines joining the following positions:

a. 5˚43.2'N, 94˚46.5'E.
b. 5˚51.0'N, 94˚46.7'E.
c. 6˚13.5'N, 94˚59.5'E.
d. 6˚16.0'N, 95˚10.1'E.
e. 5˚40.4'N, 96˚00.5'E.
f. 5˚29.0'N, 96˚49.4'E.
g. 5˚29.2'N, 97˚33.5'E.
h. 5˚01.0'N, 98˚03.4'E.
i. 4˚33.8'N, 98˚25.9'E.

This prohibited area does not apply to foreign vessels supporting offshore terminals. Mariners should consult with local authorities for further information.

Caution.—Indonesia has implemented the IALA Maritime Buoyage System. In some areas, however, obsolete systems may still exist.

Islands off the North Coast of Sumatera

3.2 Pulau Rondo (6˚05'N., 95˚07'E.) is the northwesternmost of the islands lying off Ujung Masam Muka, the NW point of Sumatera.

The island is 153m high, wooded, steep-to on its N side, and about 30 miles offshore. It appears from all sides as a flattened half sphere. Rocky islets lie on a reef which extends about 1 mile S from the islands SW side and is steep-to on its outer edge. Ocean-going vessels bound E pass N of Pulau Rondo.

An off-lying bank, with a least depth of 51m, coral rock and sand, lies with its center located about 13 miles NW of Pulau Rondo.

Anchorage may be obtained, in a depth of about 14m, during the Northeast Monsoon, with the SW extremity of Pulau Rondo bearing 103˚ and the NW extremity bearing 044˚. There are strong tide rips off the island and up to 20 miles WNW.

3.3 Pulau Beueh (Pulau Brouch) (5˚45'N., 95˚04'E.), about 20 miles S of Pulau Rondo, is the largest of the westernmost islands off Ujung Masam Muka. It attains a height of 685m at Ceumo (Tjeumo), a summit in the middle of the island. This is a rugged island, with several bays affording anchorage according to the prevailing monsoon. A light is shown from the N extremity of the island.

The coast is generally steep and craggy from the sea, but in a few places ledges and rocks extend 0.25 mile offshore; there are sandy beaches within the bays and along almost all the S coast. Vessels approaching Pulau Beueh (Pulau Breueh) from the W are cautioned to give it a wide berth, because of the tide rips and strong currents off **Northwest Island** (Pulau Benggala) (5˚48'N., 94˚58'E.).

Lho Leuen Bale, on the NE side of Pulau Breueh, is nearly 1.5 miles wide between its entrance points, with a depth of about 33m on a line joining them. Ujung Puneus (Ujung Peuneu) the N entrance point, is precipitous, with a depth of 34.7m close-to. A strong tidal current usually sets N past Ujung Puneus.

3.4 Fleurs Rock (5˚45'N., 94˚59'E.), a rock awash, lies 2 miles NW of the W point of Pulau Breueh. The water in the vicinity of Fleurs Rock is discolored, and breaks at times.

Anchorage.—Depths of 27.4 to 36.6m will generally be found within about 1 mile off Pulau Breueh. Vessels may find temporary anchorage during fine weather, however, the bottom is foul in most places, consisting of coral or rock. In the bay the bottom is mostly sand.

Good anchorage may be obtained during the Southwest Monsoon, in a depth of 12.8m, in Lho Leuen Bale, close SW of Ujung Puneus. Squalls from the hills are sometimes violent, the water is smooth, but a considerable sea sets in during the Northeast Monsoon.

A safe anchorage may be obtained during the Northeast Monsoon in **Balken Bay** (5˚43'N., 95˚02'E.), in depths of from 14.6 to 16.5m, fine sand; in the Southwest Monsoon there is a considerable swell and sea.

3.5 Lho Lam Baro (5˚40'N., 95˚03'E.), S of Balken Bay, affords anchorage during the Northeast Monsoon. A good position, in a depth of 16.5m, is with the NW point of the bay bearing 292˚, and the S point 190˚.

The bays on the W side of Pulau Breueh are not available during the Southwest Monsoon.

The passage between the N entrance point of Lhok Lam Baro and the W side of Pulau (Poelau) Klappa is not recommended even though it has adequate depths because of its seas and currents.

Pulau Benggala (Northwest Island), bearing 295˚, distance about 5.7 miles from the light on Pulau Breueh, is a small, rocky island fringed by a narrow reef of rocks.

Three small, rocky islands lie off the N coast of Pulau Breueh. The westernmost islands, known as the Hoog Islands, fairly close together, are located about 2.7 miles 274˚ from the light on Pulau Breueh.

Pulau Lheeblah (Kegel Island), the N island, lies about 2 miles 305˚ from the same light. The sea will break on these islands even in moderate weather.

There is a passage between Pulau Benggala (Northwest Island) and the inner islands but it is recommended to pass outside them all.

A depth of 34.7m was reported to lie about 13 miles WNW of the light on the N extremity of Pulau Breueh.

Pulau Keureuse lies about 0.6 mile off the SW end of Pulau Breueh. A sand bank, with depths of less than 5.5m, extends NE for a distance of about 0.3 mile from the NE coast.

Aroih Keureuse is the passage between Pulau Breueh and Pulau Keureuse. The passage has a least depth of 12.8m with a least width of about 0.4 mile and is navigable. The tidal currents are strong, attaining a maximum velocity of 5 knots.

3.6 Pulau Gepon (5˚37'N., 95˚03'E.) is a group of four islands 0.5 mile in length, lying about 0.5 mile off the S side of Pulau Keureuse. The area has not been closely surveyed. The islands may be approached close-to as all the rocks dry and are located near the shore. The tidal currents are weak between Pulau Gepon and Pulau Kereuse.

Pulau Nasi (Peunasoe) (5˚37'N., 95˚09'E.) nearly joins the SE point of Pulau Breueh, being separated by Aroih Lam Puyang. The coast line is rocky in places with sandy beaches chiefly on the W side.

3.7 Aroih Lam Puyang (5˚40'N., 95˚09'E.) is a rocky channel about 183m wide, with a fairway depth of 20.1m. The passage should only be used by small vessels as the tidal currents are uncertain and the shoals bordering the fairway are unmarked.

Lhok Pasi Janing is on the W side of Pulau Nasi. During the Northeast Monsoon, there is good anchorage, in depths of 11 to 14.6m, fine sand. It is not available to anchor during the Southwest Monsoon.

On the S side, **Lhok Alur Ajeum** (5˚36'N., 95˚08'E.) is available for temporary anchorage, in depths of about 12.8 to 18.3m. During W winds, the anchorage is not tenable.

On the NE side of Pulau Nasi sunken rocks extend out to the 10m curve. Vessels without local knowledge should not go inside this line.

Aroih Raya (Cedar Passage) (5˚35'N., 95˚09'E.) lies between Pulau Nasi on the N, and Pulau Bunta (Boenta) and Pulau Batee on the S, and is about 1.7 miles wide.

Ujung Naleueng (Ujung Batte), the SW extremity of Pulau Nasi, is the NW point of the W entrance.

Pulau Bunta (Pulau Boenta) lies between Aroih Raya and **Aroih Cut** (Aroih Tjoet) (5˚32'N., 95˚09'E.).

A shoal, with a depth of 3m, lies about 4 miles SW of Pulau Nasi. A shoal with a depth of 8.5m, lies about 2 miles S of Pulau Bunta.

Pulau Batee, lying about 1 mile NE of the E end of Pulau Bunta, is mostly wooded, and rises to 129m. The island is long and narrow. The mountain range runs along its NE side.

A rock, awash, with sunken rocks N of it, lies about midway between the entrances to Cedar Passage. A sunken wreck, dangerous to surface navigation, lies 1 mile NW of Pulau Usamlakoh and can best be seen on the chart.

Tides—Currents.—The flood sets E from about LW to about HW at rates of from 3.5 to 4 knots and the ebb W at rates of 4.5 to 5 knots. The ebb is usually of longer duration than the flood and there is but little slack water. At neap tides and also during the Northeast Monsoon there is little or no or flood or ebb current.

In Aroih Raya, the current reaches its greatest strength along the N coast of Pulau Batee. Vessels must beware of an eddy at ebb tide flowing due S of the SE point of Pulau Peunasoe and a strong current setting in between the W point of Pulau Batee.

Tides rips, at times appearing almost like breakers, form in Aroih Raya and Aroih Cut. They are most violent during the ebb current in the Southwest Monsoon and during the flood in the Northeast Monsoon, that is, with the wind against the current. In the latter season they are comparatively moderate. They are sometimes dangerous to small vessels at anchor in the passages.

A dangerous eddy is off Lumpat; when combined with the tidal current between Pulau Bunta and Pulau Batee, it can cause a confused sea. Sometimes this assumes the character of a whirlpool.

Aroih Cut (Aroih Tjoet) is funnel-shaped and narrows from about 2 miles in its W entrance to less than 0.2 mile at **Ujung Masam Muka** (5˚34'N., 95˚11'E.), with depths of 16.5 to 49.3m.The flood current sets NE directly through the passage, and the ebb in the opposite direction, at rates of 5 to 6 knots at springs. In the narrowest part, abreast of **Lumpat** (5˚35'N., 95˚13'E.), the eddies make steering difficult.

Depths—Limitations.—Depths from 33 to 59m were reported to lie about 3 miles N of Ujung Bau.

Directions.—Aroih Raya should be used only by power vessels because of the strong tidal currents.

A vessel approaching from the S should give the W point of Pulau Bunta a berth of at least 1 mile. When the N point of that island bears 090˚, pass N, and then NE.

Aroih Cut (Aroih Tjoet) may be used by small vessels with a speed of not less than 8 knots. A vessel approaching from S should steer for Ujung Raya, which is difficult to identify from a distance.

After rounding this point steer for the NE entrance of the strait. A good speed must be maintained when passing through this narrow passage.

A vessel bound W through Aroih Cut (Aroih Tjoet) should steer for the summit of Pulau Bunta, bearing about 247˚, passing midway between Ujung Masam Muka and **Lumpat** (5˚35'N., 95˚13'E.), then closing the SE shore of the passage, especially during the W currents.

3.8 **Pulau We** (5˚50'N., 95˚19'E.), the NE and largest of the islands off the N coast of Sumatera, is separated from the coast by **Sempitan Malaka** (Malacca Passage) (5˚45'N., 95˚23'E.), about 9 miles wide.

Kulam, the highest point of the island, is 657m high and is located 2 miles N of the SW point of the island.

Except in a few places the coast is rocky, with the exception of **Karang Berduri** (5˚46'N., 95˚20'E.) located off the S extremity of the island. Vessels can approach the island fairly close at any point. The E and W coasts are fairly straight, with deep water generally close to the N coast is indented by Lhok Perialakot and Teluk Sabang, and the S coast by Teluk Balohan.

Safe anchorage can only be obtained in the innermost portion of the large bays near the shore.

Ujung Bau, the NW extremity of Pulau We descends from the mountain to the sea. A rock, over which there is very little water, is reported to lie about 0.3 mile off the W coast in the vicinity of Ujung Bau. The W coast is bold, except for a sandy bay near its center. There is an explosive dumping ground centered 7 miles WNW of Ujung Bau.

3.9 Karang Berduri, a rock small and awash, lies about 0.3 mile S of the S extremity of the island. A rock with a depth of 5.5m lies about 0.2 mile SE of the same point. There are usually strong tide rips or overfalls near these rocks and frequently they have been observed as breakers.

Teluk Balohan, on the SE side of Pulau We, is nearly 2 miles in length, and 1.5 miles in breadth across the entrance, with depths of from 54.9 to 128m in the outer part. A reef fringes the E and W shores of the bay for a distance of 91m. A narrow coral bank fringes the shores of the bay.

Anchorage may be obtained, in not less than 29.3m, about 91m off the sandy shore at the head of the bay. It can be used in both monsoons, but most shelter is afforded during the Southwest Monsoon.

Ujung Tapagajah, the NE point of the island, is marked by a light, from which a radiobeacon transmits.

Teluk Sabang (5˚53'N., 95˚18'E.) is nearly 1 mile in length, the entrance being about 0.4 mile wide and the depths from 20 to 40m, with a bottom of sand, coral, and gravel. A light is shown from the N side of the entrance of Teluk Sabang.

To the S of **Pulau Klah** (5˚53'N., 95˚18'E.) near the head of Teluk Sabang, is Lho Krueng Raja, a small bay about 0.5 mile long and 0.25 mile wide.

It is approached by a channel less than 183m in width to the E of Pulau Klah, with depths of about 5 to 6.9m, but inside it deepens to 18.3m over mud.

The E side of Teluk Sabang is fronted by a bank with depths under 5.5m to a distance of 183m.

3.10 **Sabang** (5˚53'N., 95˚19'E.) (World Port Index No. 50610) is situated at the N end of the bay and offers good shelter year round. Sabang is a free port. A small commercial port and naval base are situated here.

Depths—Limitations.—A general quay, 328m in length, with a depth of 8m alongside, lies at the N end of the harbor. A tanker berth, 15m in length, with a depth of 9m alongside, is situated on the SE side of Tanjung Lhok Me. The naval base has 180m of berthing, with 9m alongside. The PBS Quay is 50m in length, with 8m alongside.

Tides—Currents.—The range of the tide is 1.4m. No currents are experienced in Teluk Sabang or at the entrance. However, there is always a strong E current directly N of the entrance off **Ujung Masam** (5˚54'N., 95˚18'E.).

Pilotage.—Pilotage is compulsory. The signal station is on **Peunimpun Hill** (5˚54'N., 95˚19'E.). Pilots act as harbormasters for anchoring and berthing. Vessels should request the service of a pilot as early as possible. A small tug is available if ordered in advance.

Communications with the Peunimpun Hill Signal Station can be carried out by signal flag during daylight and by flashing light at night.

Anchorage.—Anchorage may be obtained in Teluk Sabang, about 0.3 mile E of Ujung Lho Me, on the N side of the bay. A depth of 36.6m, good holding ground, mud, is available.

Directions.—Vessels approaching Teluk Sabang from the N should steer for Pulau Klah, keeping at least 1 mile offshore, especially in the vicinity of Ujung Masam, in order to allow for the E current, until the bay is well open.

3.11 Lhok Perialakot is the head of the bay lying between Ujung Bau and Ujung Tapagajah, (Tapa Gadjah), 6.5 miles apart, between which points the bay extends S for about 4 miles, with Teluk Sabang on its E shore. Lhok Perialakot is about 2 miles in length and breadth, with good anchorage near its head, in 16.5 to 21.9m.

Ujung Batu Meurunrun (5˚52'N., 95˚16'E.), the E extremity of the bight in which Pulau Rubiah is located, has above-water rocks on the reef which extends about 0.1 mile NNE.

Pulau Rubiah (5˚53'N., 95˚15'E.), nearly 0.9 mile in length, in a NNW and SSE direction, consists of small wooded hillocks, the highest being 40m in height.

Tides—Currents.—The flood, or SE current, increased by the E current which prevails N of Pulau We, sets into the strait between Pulau Rubiah and the main island at the rate of 3 knots at springs; the ebb current is much weaker.

Selat Benggala (Bengalen Passage), formed between Pulau Breueh and Pulau We, is about 10 miles wide and deep. It is the best approach for coastal vessels with local knowledge to the

Strait of Malacca from W. Southwest or NE winds, according to the time of year, always prevail, and are fairly steady.

Vessels should approach the passage from E of Pulau Benggala (Northwest Island) to avoid the dangers between it and Pulau Breueh. There is generally a NW current of from 1 to 2 knots through the fairway of Selat Benggala.

Caution.—A small area located between the SW side of Pulau Rubiah and the main island is reported to be dangerous due to the presence mines.

North Coast of Sumatera

3.12 The coast between **Ujung Masam Muka** (5˚34'N., 95˚13'E.) and Tanjung Jambuair is about 140 miles in length.

At various distances inland there are several mountain ranges. Vessels can fix their positions by using these mountain peaks. Many of these peaks are within 12 miles of the coast.

Ujung Masam Muka, with Ujung Raya (Ujung Raja) located 3.5 miles to the SSW of it, form the extremity of the island of Sumatera. Between Ujung Masam Muka and **Ujung Baka,** (5˚39'N., 95˚26'E.) about 14 miles ENE, the coast is rocky and steep for about 1 mile SE of the former, then it is sandy.

Except off Ujung Masam Muka, the depths decrease gradually towards the coast. The bottom is composed of black sand for about 3 miles offshore, and white sand and shells beyond that. The mouth of a shallow lagoon lies close E of Ujung Pantu (Ujung Pantjoe), located about 1 mile ESE of Ujung Masam Muka.

3.13 Uleelheue (Oelee Lheue) (5˚34'N., 95˚17'E.) (World Port Index No. 50600) is situated on a narrow spit of land separating a lagoon from the sea.

Winds—Weather.—During the Southwest Monsoon, violent gusts blow from the valley S of Ujung Masam Muka. During the Northeast Monsoon the sea and swell are heavy. The sea almost breaks in 5.5m. Land and sea breezes often blow during both seasons.

Tides—Currents.—The flood setting against the prevailing W current is weak. The ebb or W current runs longer and with greater strength than the flood. The mean rate of the flood is 0.5 knot; the ebb rate is 0.75 knot. During the Southwest Monsoon, the currents are weak.

Depths—Limitations.—A wharf 61m in length with a depth of 5m alongside is situated here. Vessels of not more than 500 grt can be accommodated.

Pilotage.—Pilotage is not available.

Anchorage.—Uleelheue Road affords a good anchorage, in depths of 7 to 9m, black sand and good holding ground, off the pier. A long scope of chain is necessary, and vessels of deep draft should anchor farther out, a second anchor should be ready. There is a heavy sea at times in both monsoons, and smooth water can only be depended on for a week or two at the change of the monsoons.

Directions.—Approaching Uleelheue roadstead from NE a vessel should keep **Pulau Tuan** (5˚34'N., 95˚15'E.) in line with **Gle Layang** (Lajang) (5˚33'N., 95˚13'E.), about 2 miles S of Ujung Masam Muka, bearing 235˚, which leads through in a least depth of 9m.

From the NW, the approach is from Selat Benggala (Bengalen Passage). The mouth of the Krueng Aceh (Acheh River) is nearly 3 miles NE of Uleelheue. The mouth of the river is barred and it breaks at LW.

Caution.—In order to avoid two dangerous wrecks, vessels should not anchor E of the bearing of 320˚ from the head of the pier.

3.14 Pulau Buro (Boero) (5˚41'N., 95˚23'E.), a rocky cone-shaped island, lies in Sempitan Malaka (Malacca Passage), about 4 miles WNW of Ujung Baka (Pedropunt).

Caution is necessary when approaching the island during light winds, as the tidal currents set strongly over the surrounding reef. A light is shown from the island.

Ujung Baka (5˚39'N., 95˚26'E.), is the N point of Sumatera. The appearance of the coast has changes at Ujung Baka. W of it the coast is flat, but eastward it is hilly.

Ujung Pidie is about 29 miles E of Ujung Baka (Pedropunt).

The hills are reported to approach the coast nearly the entire distance. The flat swamp shore only attains any considerable breadth on the W and S sides of **Teluk Kruengraya** (Krung Raya Bay) (5˚37'N., 95˚30'E.).

3.15 Kruengraya (Malahayati Port) (5˚36'N., 95˚30'E.) has one concrete jetty in good condition.

Depths—Limitations.—The T-head jetty is 100m long and15m wide, with a depth of 6.7m alongside. There is a mooring dolphin on each side of the jetty head. A connecting bridge extends 100m from the shore to the T-head. One vessel up to 10,000 dwt, with a length of 80m and a draft of 8m, can be accommodated.

Aspect.—Gunung Silaw Aihagam (Seulawaih Agam) (5˚27'N., 95˚39'E.), a cone shaped peak 1,810m high, may be sighted at a considerable distance in clear weather.

Gunung Silaw Aihinong (Seulawaih Inong), 893m in height, is located about 7 miles E of Gunung Silaw Aihagam and about 8 miles SW of Ujung Pidie. It is easily recognized by its flattened cone, which has a slight depression in the middle.

Kruengraya Light (Malahayati Port Light) is shown, 1 mile SW of the Krueng Raya entrance.

Pilotage.—Pilotage is compulsory. The pilot may be contacted on VHF channel 12.

Anchorage.—Anchorage is not recommended off the coast between Ujung Baka and Ujung Pidie, in depths of less than about 15m. The bottom is mostly rocky especially off the headlands.

Teluk Kruengraya is deep for anchorage and the bottom on the W side of the bay is foul. However, Teluk Kruengraya does provide the only anchorage on the N coast of Sumatera that is usually free from swell in both monsoons.

The recommended position is at the head of the bay, 0.3 mile offshore, in a depth of 32m. Temporary anchorage may be obtained on the 10m coral patch.

Good anchorage for small vessels exist E of Pulau Kapal, in a depth of 11m, on the alignment of the S extremity of Pulau Kapal and Pulau Buro, in line bearing 296˚.

3.16 Ujung Bateeputeh (Batu Putih) lying 10.5 miles E of Ujung Baka, is formed of chalk and sandstone, falls steeply to the sea and is easily recognized by a large white patch showing up on green land.

Lampanaih (Lam Panaih) (5˚36'N., 95˚40'E.), a village, has a white building conspicuous from seaward. The village is situated on the coast 4.5 miles SE of Ujung Bateeputeh.

About 10 miles SE of Lampanaih is Blangraya (Blang Raja), a village off which, within the 5m curve, are three detached rocks, with a depth of about 0.5m, on which the sea always breaks. Landing may be made on the E side of Blangraya.

Ujung Pidie (5˚30'N., 95˚53'E.) being the extremity of a range of hills sloping steeply to the sea, is easily recognized; the coral reef fronting it is steep-to, extending 91m off it, and at a distance of 0.5 mile the depths are about 32.9m.

Ujung Pidie to **Ujung Raja** (Raja Point) (5˚14'N., 96˚28'E.), is about 38 miles. The coast consists of a narrow strip of sandy coast covered by brushwood. Small fishing villages are scattered along this coast.

Krueng Baro (5˚23'N., 95˚58'E.), which flows into the sea about 9 miles SE of Ujung Pidie, is the principal river on this part of the coast.

Between it and Kuala Njong, about 12 miles farther SE, and from about 0.5 to 1 mile inland, is a series of dense coconut forests, seaward of which the land is reported to be comparatively bare.

Sigli (5˚23'N., 95˚58'E.) (World Port Index No. 50620) is situated at the SE mouth of Krueng Baro. The port is used only by small craft.

Good, but open anchorage may be obtained, in depths of 13 to 14.5m, mud, about 0.8 mile off Sigli, with Ujung Pidie bearing 323˚ and the flagstaff at Sigli bearing 243˚.

3.17 **Kuala Njong** (5˚16'N., 96˚08'E.) (World Port Index No. 50630) is situated about 10 miles SE of Sigli. Its entrance has a depth of about 1m at LW.

There is a least depth of 1.2m to Njong village situated about 2 miles within the entrance. At about 0.5 mile offshore, depths increase to about 18.3 to 21.9m.

Krueng Samalanga (5˚13'N., 96˚22'E.) is situated about 34 miles ESE of Ujung Pidie. It has very little water and is used by small craft as far as **Samalanga Village** (5˚12'N., 96˚22'E.) (World Port Index No. 50640) 1 mile inside the entrance.

The anchorage for Samalanga is in depths of 22 to 27m, 1 mile offshore. There are heavy breakers off the entrance during the Northeast Monsoon.

Ujung Raja (5˚14'N., 96˚28'E.), a low promontory, may be recognized at some distant by a grove of high trees near its extremity. There is a fringing reef off Ujung Raja; it should not be approached in depths less than 15m.

Gunung Geureudong (4˚49'N., 96˚49'E.) is a ring-shaped mountain range of which the N part has crumbled away. The ends of the part still standing, being closet to the coast, appear higher than the rest of the range; they give the appearance of being two peaks of the same mountain range, which is not the case.

The range attains a height of 2,873m at its W end. This range is quite visible along this part of the coast of Sumatera to Tanjung Jambuair, 49 miles to the NE.

The range to the E attains a height of 1,924m, but has no conspicuous summit.

3.18 **Ujung Peusangan** (5˚16'N., 96˚50'E.), located 22 miles E of Ujung Raja, is low and sandy.

Agam Agam is a very slight projection of the coast 8 miles E of Ujung Peusangan.

Nearly 0.75 mile off are two reefs with a depth of 1.8m. They are steep-to on the seaward side.

In the bight between Ujung Peusangan and Agam Agam good anchorage may be obtained, with local knowledge, in depths from 9 to 13m.

Kuala Geukueh (5˚15'N., 97˚02'E.) to Tanjung Jambuair, a distance of 27 miles, forms a deep bight, the W part of which is known as **Teluk Lhokseumawe** (5˚11'N., 97˚10'E.).

Lhokseumawe (5˚15'N., 97˚07'E.)

World Port Index No. 50650

3.19 Port Lhokseumawe is situated on the N coast of Indonesia on the Strait of Malacca. Lhokseumawe consists of several different harbors and loading areas; from W to E these are Kruenggeukueh, Blanglancang (Arun), Ug Hago Oil Terminal, and the Old Lhokseumawe Harbor.

Tides—Currents.—The range of the tide is 2.1m. Strong crossing currents towards the SE have been reported at the mouth of the breakwater at Blanglancang Harbor.

Depths—Limitations.—Five berths in **Kruenggeukueh Harbor** (5˚15'N., 97˚02'E.) handle bulk fertilizers and general cargo. These berths are described counter clockwise, beginning at the fertilizer plant situated on the W side of the harbor, as follows:

1. Berth A is 200m long, with a depth of 10m alongside. The berth can accommodate a vessel up to 10,000 dwt, with a length of 169m and a maximum draft of 9.5m. This berth is used for fertilizer.
2. Berth B handles general cargo and is 300m long, with an alongside depth of 10m. Vessels up to 10,000 dwt, with a maximum length of 175m and a maximum draft 9.5m, can be accommodated.
3. PIM I Berth handles fertilizer; it is 200m in length, with a depth of 10m alongside.
4. PIM II berth is only 105m in length. This berth has a depth of 10m alongside.
5. Public Berth is 80m long, with an alongside depth of 10m, and handles general cargo. Vessels up to 150m in length, with a draft of 9.5m, can be accommodated.

Arun Marine Terminal (5˚13N., 97˚06'E.) is situated at Blanglancang Harbor. The refinery is serviced by two offshore mooring areas, as well as berthing facilities inside the harbor. LNG Dock No. 1 (North) and LNG Dock No. 2 (South) both have a length of 400m and a depth of 14m alongside; vessels with a maximum draft of 13m and a maximum length of 300m, can be accommodated.

A General Cargo Berth is situated along the W side of the basin between the two LNG berths. This berth is 400m long, with a depth of 6m alongside.

The LPG Dock, situated on the E side of the basin, is 270m long, with a depth of 14m alongside. It can accommodate a vessel up to 65,000 dwt, with a length of 255m and a draft of 13m.

The offshore oil-loading berths consist of a Multiple Buoy Mooring (MBM) and a Single Point Mooring (SPM), lying 0.5 mile and 1.5 miles offshore. The MBM can accommodate

tankers up to 100,000 dwt, with a maximum length of 275m. The SPM will accept vessels of up to 280,000 dwt.

Ug Hago consist of a single quay with a length of 20m, a width of 5m, and a depth alongside of 7m.

Old Lhokseumawe Harbor has a small pier 60m long, with a 2.4m depth alongside. Only barges and small vessels under 500 dwt can berth there.

Aspect.—In the approach to Blanglancang Terminal there are eight prominent storage tanks. About 0.8 mile to the SW of the terminal there are four conspicuous flares.

Old Lhokseumawe Harbor can be readily identified by a ridge of hills, 152m high, clear of trees and grass covered.

Pilotage.—Pilotage is compulsory for vessels over 88 grt and is available 24 hours. Requests for a pilot should be sent 6 hours before arrival and 3 hours before departure.

The vessel's ETA should be sent 72 hours, 48 hours, and 24 hours in advance through Jakarta and Lhokseumawe. Vessels carrying LNG should send their ETA 96 hours, 48 hours, 24 hours, and 5 hours in advance. Contact the terminal directly when within VHF range, giving the precise ETA.

Several pilot boarding stations are reported below, as follows:

1. For Lhokseumawe Harbor and Ug Hago Oil Terminal—in the anchorage area.
2. For Blanglancang Harbor—at the Sea Buoy or in the LNG and Condensate Waiting Anchorages.
3. For Kruenggeukueh Harbor—in the anchorage area or 1 mile from harbor entrance at the breakwaters.

Regulations.—Vessels are restricted from berthing during night time at Lhokseumawe/Ug Hago Wharf or Blanglancang SBM/MBM. Blanglancang Harbor is open for 24 hour service. Kruenggeukueh Harbor is open during daylight hours only.

Vessels are not allowed to proceed to the Blanglancang MBM restricted area without permission.

Anchorage.—The anchorage area for Old Lhokseumawe and Ug Hago is situated in position 5˚10.5'N, 97˚09.3'E, with Lhokseumawe Pier Head Light bearing 280˚, in a depth of 20m.

The LPG and LNG Tanker Anchorage area is situated in position 5˚15.3'N, 97˚07.8'E.

A Condensate Tanker Anchorage lies about l.2 miles NE of the refinery centered in position 5˚15.3'N, 97˚05.4'E. Both anchorages offer depths exceeding 60m with good holding ground.

Caution.—Numerous bamboo poles, that are secured by long lengths of rope, used for marking fish pots, may be encountered within about 3 miles of the shore between Teluk Lhokseumawe and Tanjung Jambuair.

It is strongly recommended that ships give a wide berth to the reefs between Teluk Lhokseumawe and Tanjung Jambuair, as there is a constant W set.

Lhokseumawe extends up to 0.2 mile seaward of its charted position. Shallower depths than charted extend up to 1 mile offshore from Lhokseumawe to a position about 10 miles NW.

It has been reported (1993) that the limiting depth at the LNG and LPG facilities is 13.7m.

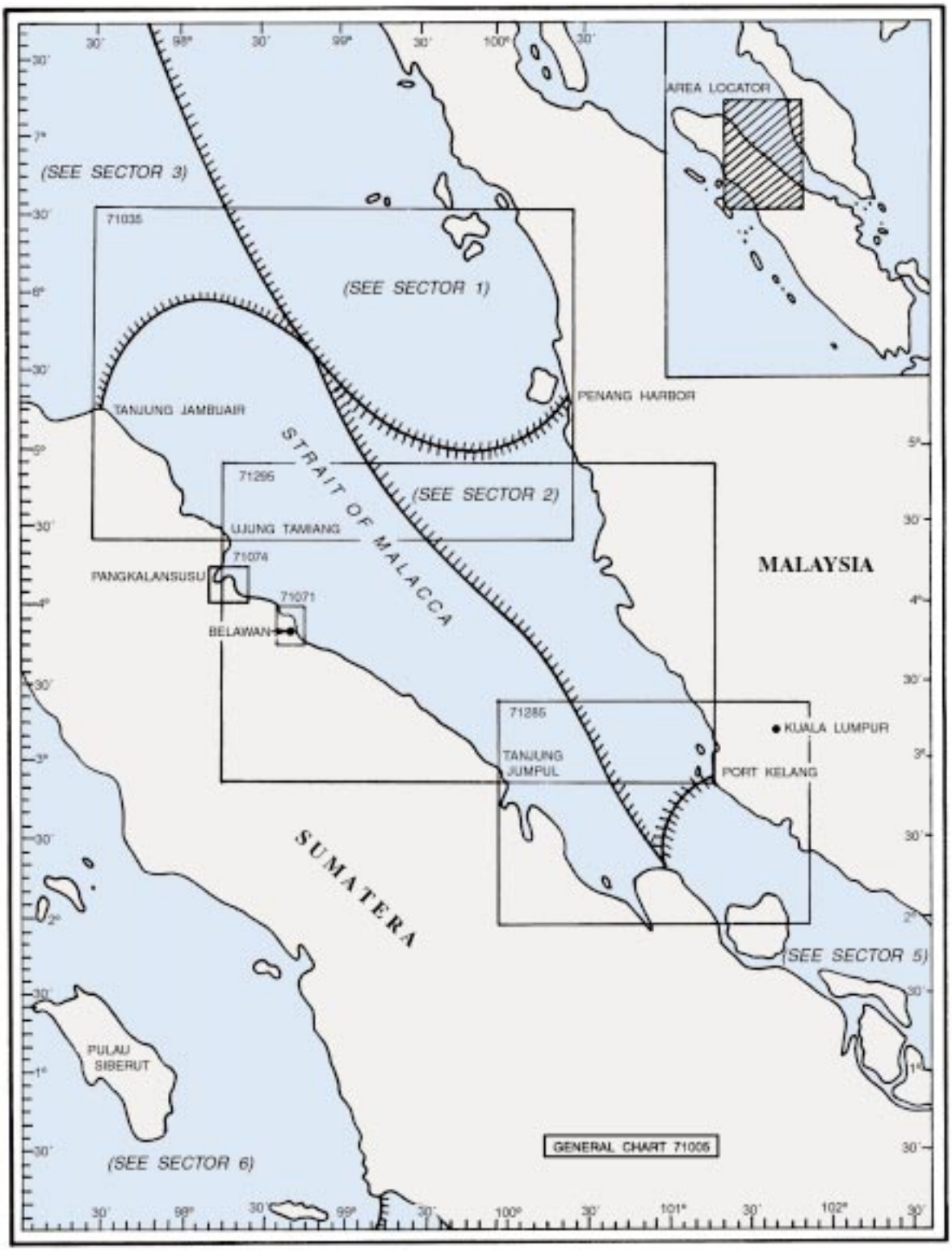
Significant ground swells originating in the Andaman Sea periodically effect sea conditions in the vicinity of Lhokseumawe.

Lhokseumawe to Tanjung Jambuair

3.20 From Lhokseumawe to **Tanjung Jambuair** (5˚15'N., 97˚30'E.) the coast is fringed by a sandbank, with depths of less than 5.5m, extending about 1 mile offshore, except off Krueng Piada about 10 miles E of Lhokseumawe, where it extends about 3 miles.

Tengah, a coral reef, has a least depth of 7.5m and depths from 21.9 to 25.6m around it. The reef lies 5 miles offshore, with Tanjung Jambuair bearing 100˚, distance 7.3 miles. Minyak, a 16.5m patch, lies 2 mile NNW of Tengah.

Krueng Jambuair (Djambo Aje) (5˚15'N., 97˚29'E.) flows into the sea about 1 mile WSW of Tanjung Jambuair. The sea usually breaks over the bar at LW, with discolored water from the river sometimes extending as much as 4 miles from the mouth.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **4** — CHART INFORMATION

SECTOR 4

THE STRAIT OF MALACCA—TANJUNG JAMBUAIR TO TANJUNG SINABOI

Plan.—This sector describes the W shore of the Strait of Malacca between Tanjung Jambuair and Tanjung Sinaboi. The descriptive sequence is SE.

General Remarks

4.1 The coast between Tanjung Jambuair and Ujung Tamiang about 69 miles SE, is plain, with few prominent features. From February through May the high mountains in the interior are occasionally visible. During the rest of the year they can usually be seen in the morning. Many of the peaks of the ranges are prominent, and serve as useful landmarks.

Several small rivers flow into the strait along this section of coast. Small, shallow draft coastal vessels use these small rivers.

Between Ujung Tamiang and Tanjung Tanjung, about 96 miles SE, and then to Tanjung Sinaboi, about 115 miles farther SE, the low, swampy coast is intersected by numerous small rivers, few of which are navigable. High mountain ridges rise in the interior and are clearly visible.

The depth curves generally follow the contour of the coast with the 10m curve lying about 1 to 5 miles offshore, except in the bays and inlets.

The SE part of the Strait of Malacca constricts to a width of 37 miles between Pulau Sinaboi and **Tanjong Ru** (2˚50'N., 101˚17'E.), on the Malaysian coast. The fairway is fouled by a series of narrow detached banks with depths of 11m and less.

Winds—Weather.—Although the Strait of Malacca is within the limits of the Northeast Monsoon and Southwest Monsoon of the Indian Ocean, the winds are variable because of the high land on both sides. Land and sea breezes are regular on both coasts. In the offing, the monsoons are only regular when they are at their height in the adjacent sea area. However, the wind is moderate in the strait and only lasts for part of the day. The monsoons become more regular near Singapore.

Between Acheh Head and Ko Phuket, the Southwest Monsoon commences in the latter part of April or the early part of May, and ceases in October. Calms and variable winds frequently prevail in November.

The Southwest Monsoon seldom blows far into the strait. During this season, variable winds, chiefly from the SE and SW, prevail in the middle of the strait, with periods of long calms.

On the Sumatera side, light winds and calms prevail, and heavy squalls from the land are experienced during the night.

Fewer calms are experienced on the Malayan side and there are seldom any squalls. Variable land and sea breezes are usually experienced.

During the Southwest Monsoon, the weather is generally cloudy and stormy especially when the monsoon is at its peak.

Sumatras, or squalls from the SW, are more common during the Southwest Monsoon than during the Northeast Monsoon.

They generally occur during the first part of the night and are accompanied by sudden severe winds, with thunder and lightning. They are more frequent on the N coast of Sumatera and along the Malaysian coast between Parcelar Hill and the Karimum Islands. Here they usually blow for 6 to 8 hours at a time as a strong, or moderate gale. Their characteristic is that of an arch squall.

Northwesters are not as frequent as the Sumatras. They are most common during the Southwest Monsoon and occur in the NW part of the strait but sometimes are felt as far SE as Singapore Strait. Severe high winds blow at the beginning of the storm but their strength soon abates. They are generally preceded by a black cloud arch, which rises rapidly from the horizon toward the zenith and are usually accompanied by thunder, lightning, and heavy rain.

The Northeast Monsoon prevails in the W entrance of the Strait of Malacca from November to April, which is considered the fair season. The weather is more settled at this time. There are seldom severe squalls and there is less thunder, lightning, and much less rain than in the other season.

In November, the winds are variable, frequently from the NW and W, although occasionally the NE winds set in November. From this period to March, the Northeast Monsoon is the strongest, but at times NW and W winds of 1 or 2 days duration have been experienced in every month when the Northeast Monsoon should prevail.

Late in March, the NE and N winds become light and variable, with strong land breezes at night. On the Malaysian side these breezes commence between 2000 and 2200 and last for 4 or 5 hours, sometimes blowing all night.

This is generally the case between Mount Formosa and Cape Rachado. Calm winds are less likely to exist on the Malaysian side than on the Sumatera side of the strait.

Tides—Currents.—The Strait of Malacca is relatively shallow, with the greater part of the area having depths of less than 73m. The main movement of water is from tidal influ-ences. Throughout the year, there is a residual predominantly NW current in the strait.

During the NW monsoon, part of the S current in the South China Sea rounds the S extremity of the Malay Peninsula and sets NW through the Strait of Malacca. During the period of the Southwest Monsoon, part of the current which flows through Karimata Strait and into the South China Sea, branches off to the NW into the Strait of Malacca. This NW current is also present during the transition months of April and October although at these times it becomes weaker and less constant.

As the NW monsoon becomes well established there is some evidence in some of the winter months for an counterclockwise circulation in the N parts of the strait, N of about 3˚N. This circulation weakens during the April transition.

When the Southwest Monsoon becomes established, a clockwise circulation probably results over the same area during the period June to October, with a maximum effect in August.

Though the predominant direction in the strait is NW, currents from all directions have been reported and the percentage frequency of the predominant flow is never high.

The current is most constant during the period January to April and is least constant from May to August. A number of observations, report rates of less than 1 knot.

Some have been reported more than one knot and no currents have been reported in excess of 2 knots.

The tides on the coast of Sumatera covered by this sector are chiefly semi-diurnal in character. However, on the N and NE coasts the diurnal tidal system of the South China Sea is felt at times, and when the highs and lows of both systems coincident springs, greater highs and lows are experienced.

The flood tidal current sets E on the N coast of Sumatera; the ebb tidal current sets W. At springs the current rarely exceeds 2 knots; at neaps they are sometimes imperceptible, except at the points or over banks and narrow channels.

The currents are also affected by the constant current out of the Strait of Malacca, which takes a W direction along the N coast, through Malacca Passage, and out through Bengal Passage, so that for the greater part of the year the ebb current is longer and stronger than the flood current.

As a result of the prevailing wind, when the water is rising or falling during the NW monsoon, there may be no E set for a day or more; conversely, the flood or E current runs longer and stronger during the Southwest Monsoon.

Off-lying Islands

4.2 **Gosong Deli** (Deli Bank) (3˚54'N., 98˚57'E.), 12 miles N of Tanjung Si Bunga, has a least depth of 7m.

Gosong Bunga (Bunga Banks) (3˚45'N., 99˚03'E.), which lie near the SE end of Gosong Deli consists of two detached parallel sandy ridges, lying between 6 and 9 miles NE of Tanjung Si Bunga. The outer ridge has a least depth of 1.5m, mud, sand, and shells and is steep-to on its outer side. The inner ridge has a least depth 2m.

Both ridges are usually marked by tide rips over their shallowest parts and with any swell the sea breaks. Between the inner ridge and the coastal bank, tide rips and discoloration of the water are frequently observed.

Gosong Berhala (Berhala Bank) (3˚55'N., 99˚26'E.), a narrow shoal about 7 miles long with a least depth of 11m, lies centered about 31 miles NE of Tanjung Si Bunga. Good anchorage is provided on this shoal. During the strength of the current the water is discolored and tide rips occur.

Pulau Berhala (3˚47'N., 99˚30'E.), 177m high and thickly covered with vegetation, stands about 25 miles N of Tanjung Tanjung and is an excellent landmark. By day, the island can be seen for a distance of up to 30 miles during clear weather.

By night, with good visibility, it can be seen at a fairly safe distance. The NE and SW sides of the island are steep-to. A light is shown from the island.

A wooded islet, 48m high, stands 137m from the SE side of the island and is connected to it by a drying coral ridge. A similar rocky island, 43m high, stands about 0.5 mile NW of the island. This islet appears white in places. Between Pulau Berhala and this islet there are depths of 9 to 13m.

A rectangular area, with its center on Pulau Berhala, has been designated as a prohibited area. An ammunition dumping site lies in the SW part of this prohibited area.

Anchorage can be taken on a ridge extending SE from Pulau Berhala, in a depth of about 16m, with the summit of the island bearing 302˚, distant a little over 0.3 mile.

A bank, which has a least depth of 16m, lies with its NW end about 4 miles SW of Pulau Berhala. Discolored water marks this bank during the strength of the current. Occasionally tide rips occur.

Outer Mati Bank (3˚28'N., 99˚35'E.), about 15 miles long in a NW and SE direction, lies with its NW end about 11 miles NNW of Tanjung Tanjung. A depth of 8.2m lies near the center of the bank. Some discoloration exists over this bank when the current is strong.

An explosive dumping ground is situated approximately 5 miles NE of Outer Mati Bank.

Pulau Pandang and Pulau Salahnama, also known as The Brothers, are two rocky islands, 64m and 89m high, respectively, which stand about 17 miles ENE and 14 miles E of Tanjung Tanjung.

Pulau Pandang (3˚25'N., 99˚45'E.) is almost entirely surrounded by a coral reef with some above-water rocks. A foul area was reported to lie about 9 miles E of the island. A light is shown from Pulau Pandang.

Palau Salahnama (3˚20'N., 99˚43'E.) is densely wooded; its rocky sides rise steeply from the sea. An above-water rock lies close N of the island and a similar rock lies about 0.5 mile S of the island.

Anchorage can be taken about 1 mile from the NW and SE sides of Pulau Pandang and Pulau Salahnama.

4.3 **Pulau-Pulau Aruah** (Aruah Islands) (2˚52'N., 100˚36'E.) is composed of two groups of small islands and some off-lying rocks which are located on a bank with depths of less than 20m. The S end of the bank joins an extensive mud bank lying adjacent to the Sumatera coast.

Batu Utara (2˚55'N., 100˚36'E.), the northernmost islet of the group, is about 4.6m high and has a reef extending N.

Batu Byms (Byms Rock) (2˚54'N., 100˚35'E.), awash, lies about 2 miles SSW of Batu Utara. The charted position is approximate.

Pulau Jemur (2˚53'N., 100˚34'E.), 22m high, flat, and tree-covered, stands about 3 miles SSW of Batu Utara. Kalironggo Islet stands on a reef about 0.3 mile NE of Pulau Jemur, and a drying reef lies about 0.5 mile farther NE.

A round islet, about 50m in diameter and surrounded by a reef about the same distance in width, stands 0.3 mile SE of Pulau Jemur Light.

A group of five islets lie on a bank, with depths of less than 10m, which lies a little over 0.5 mile WSW of Pulau Jemur and extends in a NNW and SSE direction.

Tokong Mas (2˚53'N., 100˚33'E.), the northernmost of the group, is 31m high, several drying reefs lie within 0.4 mile N of Tokong Mas. Pasir Pandan, 20m high, and Sarong Alang, 27m high, stand on the same reef S of Tokong Mas. Labuan Bilik, 20m high, stands about 137m SE of Sarong Alang. Tokong Sipotjong lies about 0.3 mile SSE of Labuan Bilik. A drying reef lies between the two.

Batu Berlayer (2˚52'N., 100˚38'E.), a group of six low rocks, surrounded by a reef, lies about 3 miles E of Pulau Jemur.

Half Tide Rock (2˚52'N., 100˚40'E.), which dries 2.4m and is steep-to, lies about 2 miles E of Batu Berlayer.

Batu Mandi (2˚52'N., 100˚41'E.), 2m high and steep-to, lies 7 miles E of Pulau Jemur.

4.4 **Tokong Simbang** (2˚48'N., 100˚38'E.), 38m high to the tops of the trees, is precipitous and the highest of the Kepulauan Aruah Group. This islet lies about 6 miles SE of Pulau Jemur and can be seen on a clear day for a distance of 15 miles. There are several rocky islets around it. Tokong, 9m high, stands 1.5 miles SSW of Tokong Simbang.

The large shoal area which extends about 30 miles N from the entrance of the Sungai Rokan to within 2.5 miles S of Tokong.

Tides—Currents.—The SE current off Pulau-Pulau Aruah begins about 4 to 5 hours before HW along the coast and runs from 1 to 2 hours after, at a rate of about 2 knots at springs.

The NW current has a rate of about 3 knots. At neaps, the SE current being opposed by the prevailing NW current results in a very weak set in either direction.

Tanjung Jambuair to Ujung Tamiang

4.5 **Tanjung Jambuair** (Diamond Point) (5˚15'N., 97˚30'E.) consists of a sandy point, just above water, which is marked by some casuarina trees. The coast in the vicinity appears to be receding to the W.

A light, from which a racon transmits, is shown from a 44m high white framework tower situated about 0.5 mile WSW of the point. A white framework water tower stands on the W bank of Tangung Jambuair, about 1 mile SW of the light.

A spit, with depths of less than 5m, extends about 2.7 miles NW from the point and is fairly steep-to on its NE side, over which the sea breaks in places. Discolored water has been reported about 2 miles N of the lighthouse and vessels are advised not to approach in depths of less than 20m especially during the Northwest Monsoon, when there is a heavy swell.

Tides—Currents.—The tidal currents set SE and NW. The NW set, being increased by the prevailing NW current, is stronger and of longer duration than the SE set. At springs the current sometimes attains a rate of 3 knots, but in the offing it seldom exceeds l.5 knots.

The tidal currents are weak near the coast W of Tanjung Jambuair.

4.6 Between Tanjung Jambuair and Ujung Tjuram, 12 miles SE, there are several rivers and creeks.

A sandy mud bank, which dries in places, extends from 0.5 to 1.5 miles offshore between Tanjung Jambuair and Ujung Tjuram.

The coast between Tanjung Jambuair and Ujung Tamiang, about 69 miles SE, is a low, with a few prominent features.

From February through May, the higher mountains are occasionally visible. During the remainder of the year they can usually be seen, especially in the morning. Some of the peaks are good landmarks and can best be seen on the chart.

Several small rivers flow into the strait along this section of coast.

4.7 **Ujung Tjuram** (Steile Hoek) (5˚06'N., 97˚38'E.) is a point that has been reported to be radar conspicuous. A tall chimney, marked by obstruction lights, stands about 8 miles SSW of the point.

The mouths of the rivers between Tanjung Jambuair and Teluk Langsa, about 50 miles to the SW, are difficult to approach and have constantly shifting channels. Local knowledge is required to enter these channels safely.

Between Tanjung Jambuair and Ujung Tjuram, during the NW setting current, there is a distinct division between the muddy water from the rivers and the clearer water of the strait, extending out to the 40m curve.

Idi Village (4˚58'N., 97˚46'E.) stands on the right bank at the mouth of the Krueng Idi, which flows into the strait about 13 miles SE of Ujung Tjuram. The river is available only to small local craft. A light is shown from Idi.

Anchorage can be taken, in a depth of 9m, with the SE side of the river entrance bearing 236˚ or, in a depth of 7.5m, with the entrance bearing 224˚ and Ujung Peureulak bearing 131˚.

Vessels generally ride comfortably here and during the NW monsoon they frequently are unable to communicate with the shore.

Ujung Peureulak (Tanjung Peureulak) (4˚54'N., 97˚54'E.), located about 9 miles SE of Idi Village, is a low sandy point covered with high trees. Bukit Brangkat, 130m high, about 4 miles WSW of the point makes it easy to identify.

4.8 **Gosong Peureula** (Peureulak Bank) (4˚56'N., 97˚53'E.) extends about 4 miles N and 1.5 miles E from Ujung Peureulak. A drying patch lies close N of the point and a 0.7m patch lies 1.25 miles N of the point. The sea usually breaks over this bank.

Krueng Peureulak flows into the strait close W of Ujung Peureulak and is approached over Gosong Peureulak. In the channel at its mouth there is a depth of 0.5m and a depth of 3.5m inside the river. The large village of Peureulak stands about 5 miles S of the entrance. Small shallow draft boats can reach the village through Kuala Leugo Rajeu about 8 miles S of Ujung Peureulak.

It is advisable to anchor as near as possible to the river mouth, steering in on a W course for Ujung Peureulak.

4.9 **Kuala Beukah Oil Terminal** (4˚53.4'N., 97˚56.8'E.) consists of a conventional mooring buoy situated 3 miles E of Ujung Peureulak. Tankers of between 60,000 and 90,000 dwt, with a maximum length of 240m, can be accommodated in a depth of 17.5m. Berthing is restricted to daylight hours only. Unberthing may occur at any time. Pilot services are available.

There is a medical clinic available for vessels calling at this terminal.

The coast between Ujung Peureulak and Ujung Tamiang, about 36 miles SE, continues low and is covered by fairly high trees. Numerous unimportant creeks intersect this stretch of coast. The coast is fringed by a mud bank, with depths of less than 5.5m, which extends from 1 to 2 miles offshore. In the vicinity of Ujung Perolin, where the bank is steep-to, about 19 miles SSE of Ujung Peureulakit extends 3.7 miles offshore.

Bugak Village stands on the left bank of Krueng Bugak about 3 miles S of Ujung Peureulak. A white house stands on the S side of the entrance of this creek. Both Krueng Djeungki and the Sungai Raja, which flow into the strait about 9.5 and 13 miles SSE of Ujung Peureulak, are navigable only by boats.

Teluk Langsa (Langsa Bay) (4˚34'N., 98˚103'E.) entered between Ujung Perolin and Tanjung Langsa, about 5 miles SE, is fouled by numerous shoals which are intersected by narrow channels. The bay is easily identified by the rising ground SW of it against which the island of Pulau Telagatujoh, close NW of Telagatujoh, stands out clearly.

Ujung Perolin (4˚37'N., 98˚01'E.), the W entrance point of the bay, is low, sandy, covered with casuarina trees, and easily identified.

4.10 Telaga Tujoh (Telagatujoh) (4˚33'N., 98˚04'E.), the SE entrance point of the bay, is easy to identify from the E by its sandy beach.

There are three channels of approach into Teluk Langsa, which is otherwise encumbered by numerous shoals, between which there are narrow boat channels, as follows:

1. Alur Pelayaran Birim leads from NE to the mouth of Krueng Birim. The channel is not buoyed. There are depths of 2.7 to 3m in the fairway.
2. Alur Pelayaran Telukdalam, formerly the principal channel to Pelabuhan Kualalangsa, leads close along the W side of Pulau Teleagatujoh. Apart from a fairway approach buoy, the channel is unmarked. There are least depths of 2.4m on the outer and inner bars.
3. Kuala Langsa, the principal channel, leads on the SE side of Pulau Telagatujoh through Krueng Langsa to Pelabuhan Kualalangsa.

This channel is marked by buoys and lighted range beacons. There is a reported least depth of 1.5m close SE of range line. Vessels up to 100 dwt can reach Kualalangsa.

The tidal currents run with considerable strength in the mouths of the various rivers and generally set in the direction of the channels. The strength of the currents is sometimes felt well outside the 10m curve.

Kuala Langsa (4˚32'N., 98˚01'E.), which is the port for the town of Langsa, stands on the left bank of the Krueng Langsa about 4 miles SW of Tanjung Langsa.

Ujung Tamiang to Tanjung Si Bungabunga

4.11 Ujung Tamiang (4˚25'N., 98˚17'E.) may be identified from all directions by the groups of casuarina trees standing on either side of the Sungai Tamiang, and which are visible from a considerable distance. From the NW and SE the point appears as an islet from any distance. A light is shown from Ujung Tamiang.

The Sungai Tamiang, which discharges about 0.5 mile W of Ujung Tamiang, has no commercial value to shipping.

The coast between Ujung Tamiang and Tanjung Tanjung, about 97 miles SE, is low, thickly covered with vegetation, and marshy. The numerous rivers which discharge along this stretch of coast are available only to small craft with but few exceptions.

The appearance of the coast is very monotonous and it is not always easy to fix a position without local knowledge.

At certain times of the year and in the early morning, many of the mountain peaks in the interior are usually visible and serve as valuable aids to the navigator. The positions of these various peaks may best be seen on the chart.

4.12 Teluk Aru (Teluk Ara) (4˚14'N., 98˚20'E.) is entered between Ujung Tamiang and Tanjung Bedukang about 21 miles SSE, is fronted by mud flats with the 2m contour line extending to almost 5 miles offshore.

Two islands, Pulau Kampai and Pulau Sembilan, lie on the N and S sides. Both islands are low but have tall trees which may be seen from a distance of about 16 miles. The settlement of Kumpai stands on the S end of Pulau Kampai. Several small islands stand at the head of the bay. Tanjung Bedukang, the S entrance point of the bay, is difficult to identify.

There are three buoyed channels leading into Teluk Aru across shallow bars to rivers, waterways, and berths, as follows:

1. Alur Pelayaran Kampai leads to the river entrances on the W side of the bay. This channel has a least depth of 2.1m on the bar.
2. Alur Pelayaran Sembilan, the main channel, leads to the oil loading station at the Port of Pangkalonsusu. This channel is reported to have a least depth of 3m at the bar.
3. Alur Pelayaran Babalan leads to the oil-loading station at Pangkalanbrandan. The least depth in the channel is 0.6m on the bar.

Caution.—The buoyage of these channels is subject to alteration due to changes in the fairways.

A prohibited area extends W from Pulau Sembilan. A restricted area extends W from Pulau Sembilan across Alur Pelayaran Kumpai and SW to Panjang. Both areas are best seen on the chart.

4.13 Pangkalan Oil Terminal (4˚13'N., 98˚24.6'E.) is situated 9.5 miles offshore in the outer approaches to Teluk Aru. The terminal consists of a SPM, connected to the shore by a submarine pipeline, which is marked by several special purpose buoys.

Winds—Weather.—The weather is normally fair with moderate variable winds. During the Northeast Monsoon, there are often strong NE winds with heavy rain, showers, and thunderstorms.

Tides—Currents.—The tidal currents in Teluk Aru set generally in the direction of the channels and attain a rate of 2 knots at springs. Outside the outer bar of Alur Pelayaran Sembilan, the flood sets SW and the ebb ets NNE. The ebb often continues to run over the outer bar for some time after the flood has ceased in the Strait of Malacca outside the shoals.

Depths—Limitations.—The SPM can accommodate tankers up to 150,000 dwt, with a length of 275m. Depths in the vicinity vary from 18 to 25m.

Aspect.—Pulau Kumpai (4˚13'N., 98˚14'E.) and Pulau Sembilan are low but have tall trees visible for a distance of 15 miles from seaward.

Platte Hovel (4˚16'N., 98˚09'E.), 154m high, stands 8 miles inland and is the highest hill in the vicinity.

Pilotage.—Pilotage is compulsory and reported available 24 hours.

Vessels are required to send their ETA 72 hours, 48 hours, and 24 hours in advance, with the first message to include the type of cargo required.

Regulations.—Berthing may only take place during daylight; unmooring is permitted 24 hours. A restricted area encloses the SPM and undersea pipeline.

Anchorage.—The tanker anchorage area is situated approximately 2 miles E of the SPM. It is also reported that a tanker anchorage exists in position 4˚16'N, 98˚25'E where vessels await the arrival of the pilot. At this anchorage the pilot boards with the Loading Master and the crew. Dry cargo vessels may anchor in position 4˚16'N, 98˚22.3'E to await the pilot.

Directions.—Tankers approaching the SPM from the NW or NE can pass on either side of the buoy situated approximately 1.5 miles N of the SPM. It is reported that the approach to the SPM is not difficult to identify as Teluk Aru presents a very good radar picture. The SPM, however, may be difficult to identify ue to the presence of fishing huts and boats in the vicinity.

4.14 Pangkalan (Pangkalansusu) (4˚07'N., 98˚13'E.) (World Port Index No. 50700) consists of several small oil jetties, a general cargo wharf, and the offshore SPM. The port is used primarily by small tankers operating between the port and the SPM offshore. Tankers up to 5,000 dwt, with a length of 142m and a draft of 6m,can be accommodated.

A vessel approaching the entrance of Alur Pelayaran Sembilian should keep outside the 20m curve until the lighted fairway buoy is sighted.

As the distance between the outer and inner bars is about 10 miles and HW is about 30 minutes earlier on the inner bar than on the outer bar, vessels are advised to cross the outer bar on a flood tide, leaving the lighted fairway buoy at least 30 minutes before HW. The bottom generally is soft mud except on the inner bar.

4.15 The **Sungai Gebang** (4˚02'N., 98˚26'E.) and the Sungai Serapuh, two shallow rivers, flow into the strait about 3.5 and 4 miles SE of Tanjung Bedukang. The coast between the mouths of the two rivers consists of dark mud with mangroves, and close E of the mouth of the Sungai Serapuh are several tall casuarina trees standing close to the sandy beach that extends about 2.2 miles E to the entrance of the Sungai Langkat. High trees stand behind this beach.

Between Tanjung Bedukang and the entrance of the Sungai Langkat, a bank with depths of less than 5.5m, extends about 4 to 5 miles offshore.

The **Sungai Serapuh** (4˚02'N., 98˚27'E.), which has a least depth of 0.9m at its entrance, extends inland to the settlement at Tanjungpura. Only small vessels with local knowledge can enter this river.

A white wooden rectangular beacon stands near the W side of the entrance of the Sungai Serapuh.

Small craft with local knowledge can enter the Sungai Langkat but the depths are shallow. A remarkable tree stands on the E entrance point of this river. The approach channel leading to the river is marked by fishing stakes.

4.16 Kuala Tapak Kuda (3˚59'N., 98˚33'E.), entered about 4 miles E of the Sungai Langkat, may be identified by Kuda Pusung which lies on the E side of the entrance. A depth of 1.8m exists on the outer bar but inside the river there is a depth of 3m as far as the village of Tapak Kuda.

Only small craft with local knowledge can enter the river.

The entrance of the river has been reported to be a good radar target at distances up to 12 miles.

Ujung Ahu (Og Ahoe) (3˚55'N., 98˚39'E.), about 8 miles SE of Kuda Pusung, can only be identified from the E by the casuarina trees.

Karang Gading (3˚56'N., 98˚39'E.), which has a least depth of 4.6m, is a hard bottom ridge which extends NNW from the coastal bank in the vicinity of Ujung Ahu. Its outer end lies about 7 miles NNW of that point.

The entrance of the Sungai Karang Gading and the Sungai Nipah Larangan lies about 0.5 mile SE of Ujung Ahu. A prominent clump of trees stands on the E entrance point of the rivers.

Tanjung Beting Tjamar, which is tree-covered, stands 1.2 miles SE of this point. The coast between this point and Tanjung Belawan, about 6.2 miles SSE, has been reported to be radar conspicuous.

Between Tanjung Beting Tjamar and Tanjung Perling, about 10 miles SSE, the coast is fronted by an extensive shoal area which extends up to 5 miles offshore. The inner part of this shoal is bordered by mudbanks.

The entrance of the dredged channel leading to the Sungai Deli leads through these shoals to Pulau Belawan which has the port of Belawan on its N side.

The Sungai Deli has two entrances separated by Pulau Belawan.The Sungai Belawan, the N channel, has the port of Belawan along its S side; the Sungai Deli, the S channel, leads S of Pulau Belawan. The S channel is no longer in use.

Numerous fishing stakes stand on the shoal area in the approach to Belawan.

Belawan (3˚47'N., 98˚41'E.)

World Port Index No. 50730

4.17 Belawan, the most important port in Sumatera, lies at the confluence of the Sungai Belawan and the Sungai Deli about 8 miles S of the lighted approach buoy. Ample, modern alongside berthing facilities are available for handling all classes of ocean-going vessels capable of transiting the dredged entrance channel. Belawan is a first port of entry.

Belawan Container Terminal

http://www.utpkbelawan.co.id/english/

Tides—Currents.—The tidal rise at Belawan is 2.4m at MHWS, and 1.2m at MHWN. The highest level of water is reached in about the middle of May and November. There is a tide gauge near the W end of Ocean Quay.

Outside the entrance of the dredged channel to Belawan, the flood sets to the SE and the ebb to the NNW, both at a maximum rate of 2 knots.

At neaps there are periods with no currents at all. At the outer entrance of the dredged channel the current sets in the direction of the fairway, the ebb attaining a rate of 3 knots at springs and the flood a rate of less than 2 knots.

It has been reported that the tidal current at Ocean Quay turns about 1 hour later than at the entrance of the dredged channel.

Depths—Limitations.—The approach channel to Belawan is approximately 9 miles in length, 100m in width and has a depth of 8.5m at LWS. The channel is well marked by navigational aids and is free of dangers.

The channel is subject to continuous silting and therefore the channel depths may be subject to frequent changes.

The port can accommodate vessels up to 200m in length, with a maximum draft of 10m. Pier information is listed in the table below.

An offshore oil loading area is marked by a group of four mooring buoys. The facility is connected to the coast by a submarine pipeline 3 miles SSE of Nipah Larangan Light. It lies within a charted pipeline area 0.5 mile wide across Belawan Channel.

Belawan—Port Facilities

Berth	Depth	Length	Max. size
Gabion Container Wharf	8.1-9.8m	850m	45,000 dwt
Conventional Wharf	8.0-9.1m	350m	45,000 dwt
Ocean Quay	8.0-9.8m	1,557m	45,000 dwt
Citra Unjung Baru	7.0m	625m	45,000 dwt
Pelabuhan Lama	5.0-8.2m	567m	
Pertamina Oil Jetty	10.0m	75m	20,000 dwt

Aspect.—Tanjung Perling, the SE entrance point of the river, can only be identified from the SE. Under favorable conditions Gunung Gulu and the adjacent mountains and the Van Heutsz range, SE and S of Belawan, can be distinguished.

When approaching from the NE, a vessel should steer for the valley between the two ranges.

Other good landmarks are a group of oil tanks (3˚47'N., 98˚41'E.), two chimneys with red and white bands E of Belawan, and an adjacent orange painted building SW of the town which is reported to be conspicuous from seaward in the afternoon.

A silo on the cement wharf on the W side of the basin (Citra Ujung Boru) is reported to be the most prominent object in the port area.

Pilotage.—Pilotage for vessels over 150 grt is compulsory and is available 24 hours. Send the vessel's ETA 48 hours in advance.

The pilot should be ordered through the vessel's agent at least 8 hours in advance, stating the ETA, cargo, length, and draft. The pilot boards near Lighted Buoy No. 2.

Regulations.—Vessels leaving Belawan have priority over those entering. Large vessels are not permitted to pass in the channel. An underkeel clearance of 1m is required when transiting the approach channel.

Signals.—Traffic signals for controlling movement for the port may be shown from the pilot vessel, the **Harbor Office Flagstaff** (3˚47.3'N., 98˚41.5'E.), and the entrance to the **Sungai Nunang** (3˚47.5'N., 98˚41.2'E.).

Signals prohibiting movement by vessels from 1,050 to 3,500 grt are, as follows:

1. By day—A black ball between two black cones points up.

Belawan Container Terminal

2. At night—White, red, white lights shown vertically signifies vessels are not to enter the harbor and that no vessel in the anchorage is to shift its berth without the harbormaster's approval.
3. By day—A black cone (point up) over two black balls, signifies that vessels may enter the harbor if their draft does not exceed 4m.

Suction dredges are at work in the entrance channel and will display the following signals in addition to the prescribed lights and marks:

1. By day, if the dredges are at work, a cone at the yardarm indicates that vessels should keep to the E side of the channel.
2. Two cones at the yardarm indicate that vessels should keep to the W side of the channel.
3. If the dredges are anchored with the suction apparatus on the bottom, an anchor at the yardarm indicates that vessels should pass on the side on which the anchor is shown.
4. By night, if the suction apparatus is on the bottom, a green light at the yardarm indicates that vessels should keep to the E side of the channel.
5. A red light at the yardarm indicates that vessels should keep to the W side of the channel.
6. When the suction apparatus is not on the bottom, no special signals will be made.

When two dredges are working at a distance of not more than 0.25 mile apart, in the event of a vessel approaching, the dredge farthest away from the approaching vessel will cross over to the same side of the channel as the dredge nearest the approaching vessel.

Off-lying anchors of dredges working in the channel are marked by drums. Vessels are prohibited from passing between the drums and the dredge.

Great care must be exercised in passing a dredge on the bar, as the narrowness of the channel permits very little maneuvering room.

Anchorage.—The outer anchorage for Belawan is situated in position 3˚55'N, 98˚46'E and is also designated as the pilot boarding station.

Anchorage is prohibited in the following areas:

1. Within about 0.3 mile on either side of the axis of the dredged channel leading to Belawan, S of 3˚55'N.
2. Within the pipeline area extending from the coast to the loading area in position 3˚51'N, 98˚47'E.
3. In Pelabuhan Belawan, E of 98˚41'E.

Caution.—Numerous wrecks, best seen on the chart, lie in the approaches and adjacent waters of Belawan.

The coast between Tanjung Perling and the mouth of the Sungai Serdang, about 8 miles SE, consists of mud and mangroves but from there to Teluk Mengkudu, about 18 miles farther SE, there is a considerable amount of sandy beach and high casuarina trees.

Rantau Pandjang (3˚42'N., 98˚50'E.), at the mouth of the Sungai Serdang, may be identified by high trees standing about 3 miles E.

Tanjung Si Bunga to Tanjung Siapiapi

4.18 **Tanjung Si Bunga** (3˚39'N., 99˚00'E.), which stands about 17 miles SE of Tanjung Perling, may be identified by a dense group of casuarina trees.

The Sungai Perbaungan flows into the strait close E of the above point. A large shed on a pier and a white house in the vicinity, are prominent when viewed from the E.

The Sungai Bedagai, which discharges about 17 miles SE of Tanjung Si Bunga, can be identified by a clump of high trees at its mouth with several detached clumps of trees to the E.

A small pier stands at the river mouth; the village of Kuala stands on the left bank.

Between the mouth of the Sungai Bedagai and Telok-baru, about 11 miles SE, the coast is bordered by fishing enclosures which extend out to the 10m curve.

At Telok-baru, there are shallow depths in the channel leading inland.

The river which flows into the strait at Tanjung Tanjung has a narrow entrance and shallow depths. Anchorage can be taken off the river mouth, in depths of about 11.9 to 18.3m, with a clump of casuarina trees bearing 169˚.

Tanjung Tanjung (3˚21'N., 99˚29'E.) is low but can be identified by its white sandy beach and high trees. A strong current sometimes sets here along the coastal bank. Vessels when crossing the mouth of the river, should not shoal to a depth of less 16.5m.

Kuala Tanjung is a minor port of Kualanjung close N of Tanjung Tanjung. There is a pier that projects out about 2 miles from the point; its termination is marked by a light.

Depths—Limitations.—Vessels up to 11,000 dwt, with a maximum draft of 9m and a maximum length of 160m, can be accommodated. The pier has three berths, as follows:

1. Berth A is 200m long, with an alongside depth of 11.5m.. It is used for shipping aluminum.
2. Berth B is 150m long, with an alongside depth of 11.6m. It is used for shipping aluminum.
3. Berth C is 80m long, with an alongside depth of 7.1m. It is used for general cargo.

Aspect.—A racon transmits from the light. The approach to the port is marked by a lighted beacon, standing 10m high, 2.5 miles N of the point, and by lighted buoys marking Buiten Mati Bank. Pilotage, which is available through Belawan, is compulsory.

Anchorage.—An anchorage area has been established and centered about 1.3 miles W of the lighted beacon. The area has a radius of 500m.

4.19 Between Tanjung Tanjung and Tanjung Tiram, about 9 miles SE, the coast is bordered by a white sandy beach except for a bank of mud and mangroves about 2 miles S of Tanjung Tanjung. A light is shown from Tanjung Tiram.

The **Sungai Kuala Batubara** (3˚15'N., 99˚36'E.), which discharges on the E side of Tanjung Tiram, has shallow depths. Fish enclosures extend up to 4 miles offshore in this vicinity.

The tidal currents set SE and NW and turn about 1 hour after HW and LW at Tanjung Tiram.

Tanjung Tambuntulang (3˚10'N., 99˚45'E.), about 11 miles ESE of Tanjung Tiram, is a low overgrown point.

The Sungai Tambuntulang discharges close W of the point and is marked by the village of the same name.

4.20 **Tambuntulang Bank** (3˚12'N., 99˚47'E.), with depths of from 1.8 to 5.5m and fairly steep-to, extends about 4 miles NE from Tanjung Tambuntulang. Numerous fishing stakes are reported to lie near the edge of this bank.

The **Sungai Asahan** (3˚02'N., 99˚52'E.) is entered between Tanjung Napal, 10 miles SE of Tanjung Tambuntulang, and Tanjung Jumpul, about 2 miles to the SE. These points and the coast in the vicinity are low, muddy and overgrown with mangroves. The channel is marked by buoys and beacons.

Jumpul Bank (3˚04'N., 99˚56'E.) extends about 7 miles N from Tanjung Jumpul to the 10m curve. The bank dries up to 2 miles N from the point. The NE and E edges of the bank are steep-to. From the SE, the bank can be picked up by soundings but not from the NW. Fishing enclosures are erected on the bank.

The channel in the approach to the river runs along the edge of the drying bank extending offshore NW of Tanjung Napal and has a least depth of 0.6m on the bar.

Above Baganasahan about 2 miles S of Tanjung Napal, the least depth in the channel to the wharf at Teluk Nibung is about 0.9m at LW and 4m at HWS.

Tides—Currents.—Springs rise about 3m and neaps about 1m. Outside the bar the flood sets from SE to SSE at a rate of about 1.5 knots and the ebb NNW, but more to the N, at a rate of about 2 knots.

During neaps, the currents are weak and irregular and overcome by the river current. Near the outer buoy, the ebb sets NW and the flood sets SE.

The flood begins in the entrance about 5 hours before HW; the ebb begins about 6 hours later. The flood attains a rate of 1.5 knots and the ebb a rate of 3 knots at springs. During freshets, the rate is increased on the ebb.

Directions.—A vessel approaching the Sungai Asahan should obtain an accurate fix by the bearings of The Brothers and Tanjung Tambuntulang, and then steer for the outer bar buoy.

The channels are continually changing, only vessels with local knowledge should attempt to enter the river.

4.21 **Tanjung Balai** (2˚58'N., 99˚48'E.), the chief town of the district, stands about 7 miles above the river entrance. It has a 70m pier with a least depth of 0.8m alongside.

The berth at Teluknibung, about 2 miles below Tanjungbali, an iron jetty 160m in length with a reported depth of 2m alongside. A pier 42m long lies close W of the jetty.

The coast between Tanjung Jumpul and Tanjung Siapiapi, about 9 miles SE, is bordered by a mudbank with depths of less than 1.8m. This bank extends up to 5.75 miles off the former point and 2.5 miles off the latter point.

There are some fishing huts but few objects for identifying the low, mangrove covered coast. The mountain ranges inland are usually visible in clear weather.

Tanjung Siapiapi to Tanjung Sinaboi

4.22 **Tanjung Siapiapi** (2˚56'N., 99˚59'E.) is a low, well-defined point overgrown with mangroves of moderate height and is clearly visible up to a distance of 10 miles on SE and NW bearings. The mudbank S of the point extends about 2.2 miles offshore and is steep-to.

The coast between Tanjung Siapiapi and Tanjung Pertandangan, about 20 miles SE, is indented by a large bay fouled by shoals.

Several navigable channels lead through these shoals to the mouths of the Sungai Kuala Kualu and the Sungai Panai.

The coast forming the W side of Kualu Geul, which leads to the Sungai Kualu, has no distinctive marks, except a customs station on piles close off the village of Simendulang, about 7 miles S of Tanjung Siapiapa and some houses on piles off Tanjung Sibabi, about 1.7 miles farther S.

The settlement at Ledung is difficult to make out by day, but at night the lights of the houses can be seen and distinguished from those on the fish stakes on the banks of the Sungai Ledung which lies S of the settlement.

A buoy is moored about 7 miles ESE of Tanjung Siapiapi.

There are four channels leading to the entrance of the Sungai Panai but Teluk Piai Geul, which has a depth of 2.4m is the only one now in regular use. It lies close W of the outer buoy and close E of the mudbank extending N from Tanjung Prapat, the W entrance point of the Sungai Panai. The channel is buoyed on its W side.

Kualu Geul, the westernmost channel, passes W of the outer buoy and leads to the settlement at Ledung on the W side of the entrance to the Sungai Kualu, about 3 miles S of Tanjung Sibabi; this channel, which is not buoyed, has depths of 1.8 to 2.7m over the bar, about 1.2 miles E of the settlement. These channels are subject to change in depth and direction.

In the inner approaches to the Sungai Kualu and the Sungai Panai, there is a swept channel best seen on the chart. It is 198m wide and marked by buoys on its W end.

Tanjung Ledung, about 0.5 mile S of the S entrance of the Sungai Ledung, stands out distinctly. A customs station with a pier extending from it stands at Ledung. This pier has a depth of 0.6m in its approach. Between Tanjung Kluang, about 3 miles S of Tanjung Ledung and Tanjung Mengedar, about 9 miles farther up, there are depths of about 1.2m.

Anchorage can be taken by vessels with local knowledge in a depth of about 3m off Ledung. The ebb off the mouth of the Sungai Ledung is strong, especially near the time of LW.

Vessels with local knowledge can also anchor off the settlement at Tanjung Mengedar, in a depth of about 3m.

A vessel approaching Ledung from the N should pass from 0.75 to 1 mile E of the steep-to mudbank extending SE from Tanjung Siapiapi, and keep Tanjung Ledung well open of Tanjung Sibabi.

When Tanjung Ledung bears 211˚, it should be steered for on that bearing, until Simendulang Customs Station bears 270˚. The course should then be altered to 197˚ and altered as required for the anchorage. This channel is not buoyed and passes between shoals on either side, only vessels with local knowledge should use it.

4.23 The **Sungai Panai** (2˚45'N., 100˚06'E.) is entered between **Tanjung Datu** (2˚41'N., 100˚06'E.) and Tanjung Bangsi, a low mangrove point, about 4.2 miles NE, about 10 miles within the entrance the river is joined by the Sungai Bilah. The settlement of Labuhanbilik stands on the right bank of the Sungai Panai, about 2 miles above the junction of these rivers.

Tanjung Datu has been reported to be a good radar target at distances up to 20 miles.

There is a Customs Station and jetty at Njiri, about 3 miles S of Tanjung Datu.

The shores of the river are mangrove covered as far as Tanjung Berembang about 7 miles SSW of Tanjung Bangsi and in the bight N of Tanjung Berombangtunggal, the NW entrance point of the Sungai Bila. Tanjung Berembang, an islet lying in the middle of the Sungai Panai, about 7 miles S of Tanjung Datu, is covered with high trees.

An overhead cable, with a vertical clearance of 13m, spans the Sungai Barumun about 2 miles SW of Labuhanbilik.

Anchorage can be taken by vessels with local knowledge off Berembang, about 0.5 mile N of Tanjung Berembang, in depths of 2.4 to 3.4m, and off Labuhanbilik, in depths of 4 to 4.5m, about 193m off the E shore.

Vessels intending to use the Teluk Piai Geul should keep a good lookout for fishing stakes near its entrance and having passed between the two outer lines of fishing stakes NE of Tanjung Prapat, should follow the directions given above.

Only vessels with local knowledge should attempt to proceed to Labuhanbilik.

Tides—Currents.—Between Tanjung Siapiapi and the drying banks off the mouth of the Sungai Panai, the flood sets into Teluk Piai Geul and follows the direction of the channel.

The ebb sets on to Tanjung Siapiapi. Off Tanjung Pertandangan, the ebb sets to the E.

Both off and within the river mouths, for some time after the flood begins, the surface water continues to run out while an undercurrent sets inward. Outside the 10m curve N of the banks, the flood sets SE. The greatest rate of the current outside the 10m curve is 2 knots; in the channels and rivers, the greatest rate is 3 to 4 knots. There is very little slack water at springs.

Outside, each current runs for about 6 hours, but farther in the ebb runs for 7 hours and the flood for 5 hours. The currents turn about 45 minutes after HW and 30 minutes after LW.

Off Tanjung Prapat and Tanjung Datu the flood sets towards the coast while the ebb sets strongly to the NW.

Between Tanjung Pertandangan and Tanjung Sinaboi, about 56 miles ESE, the only points of identification are the river mouths. The mangrove covered coast is mostly muddy and low lying. The coastal bank, as far out as the 10m curve, is marked by fishing stakes and enclosures. Fishing boats range well offshore and at night display no lights. At times they work as far out as close S of the Kepulauan Aruah group of islands.

Caution.—A former mined danger area exists in the approaches to the Sungai Kualoh and the Sungai Panai in which it is reported to be dangerous to anchor, trawl, or engage in any seabed activity. The area is best seen on the chart.

A dangerous wreck lies approximately 15 miles NNE of Tanjung Pertandangar.

4.24 Tanjung Pertandangan (2˚42'N., 100˚13'E.) is low but shows up well from the N because of its high trees. From Tanjung Pejudian, about 11 miles SSE of Tanjung Pertandangan, a spit with depths of less than 10m extends about 11 miles N almost parallel with the coast. The S end of the spit is fairly steep-to. Fishing stakes were reported to stand in the vicinity of this spit.

Tanjung Pecudian (2˚31'N., 100˚20'E.) is fringed by mangroves and may be easily identified by the high trees behind it, decreasing very rapidly in elevation upon closer approach. Panipahan Village stands 4 miles S of this point.

Between Panipahan Village and the entrance of the Sungai Rokan, about 27 miles SE, the coast is broken by several creeks and bordered by shoals.

Pulau Alang-besar, about 25 miles SE of Tanjung Pejudian, lies in the entrance of the **Sungai Rokan** (2˚18'N., 100˚36'E.).

The approach to this river is fouled by mudbanks. Off Tanjung Belanda, the E entrance point, and Tanjung Sinaboi about 16 miles ENE, the coastal bank dries out from 2.5 to 6 miles.

A shoal, with depths of less than 10m, then extends about 26 miles NW from this section of coast and about 25 miles N from Pulau Alang-besar.

4.25 Pulau Halang (2˚11'N., 100˚39'E.) is low and thickly covered with vegetation. The channel between this islet and the coast to the SW is suitable only for small craft.

The passage across the banks from NE of Tanjung Pertandangan to **Bagansiapipi** (2˚09'N., 100˚48'E.), at the N entrance to the Sungai Rokan, is encumbered by numerous fishing stakes and enclosures which should be given a wide berth.

There is no definite channel as depths are constantly changing. Only small craft with local knowledge should attempt to navigate this estuary.

Tides—Currents.—Outside the bank extending from the mouth of the Sungai Rokan, the flood sets SE and the ebb sets NW.

Near the 10m curve, the currents set along the shoals at a rate of 3 to 4 knots at springs.

The flood runs from about 3 hours before HW at Bagansiapipi to about 3 hours after HW.

Except for a short period of slack water, the current over the bank's middle is rotatory in a counterclockwise direction.

About the time of HW at Bagansiapipi the current sets E, 3 hours after HW it sets N, at LW sets W, and 3 hours after LW, S at a rate of 3 to 4 knots.

At neaps, the N and S currents predominate. The E and W currents are hardly perceptible; the N current runs the longer and at its greatest rate.

Off Bagansiapipi, both the flood and ebb follow the direction of the mouth of the river and run at their greatest rate immediately after the turn of the tide. The maximum rate at springs being 3 to 4 knots.

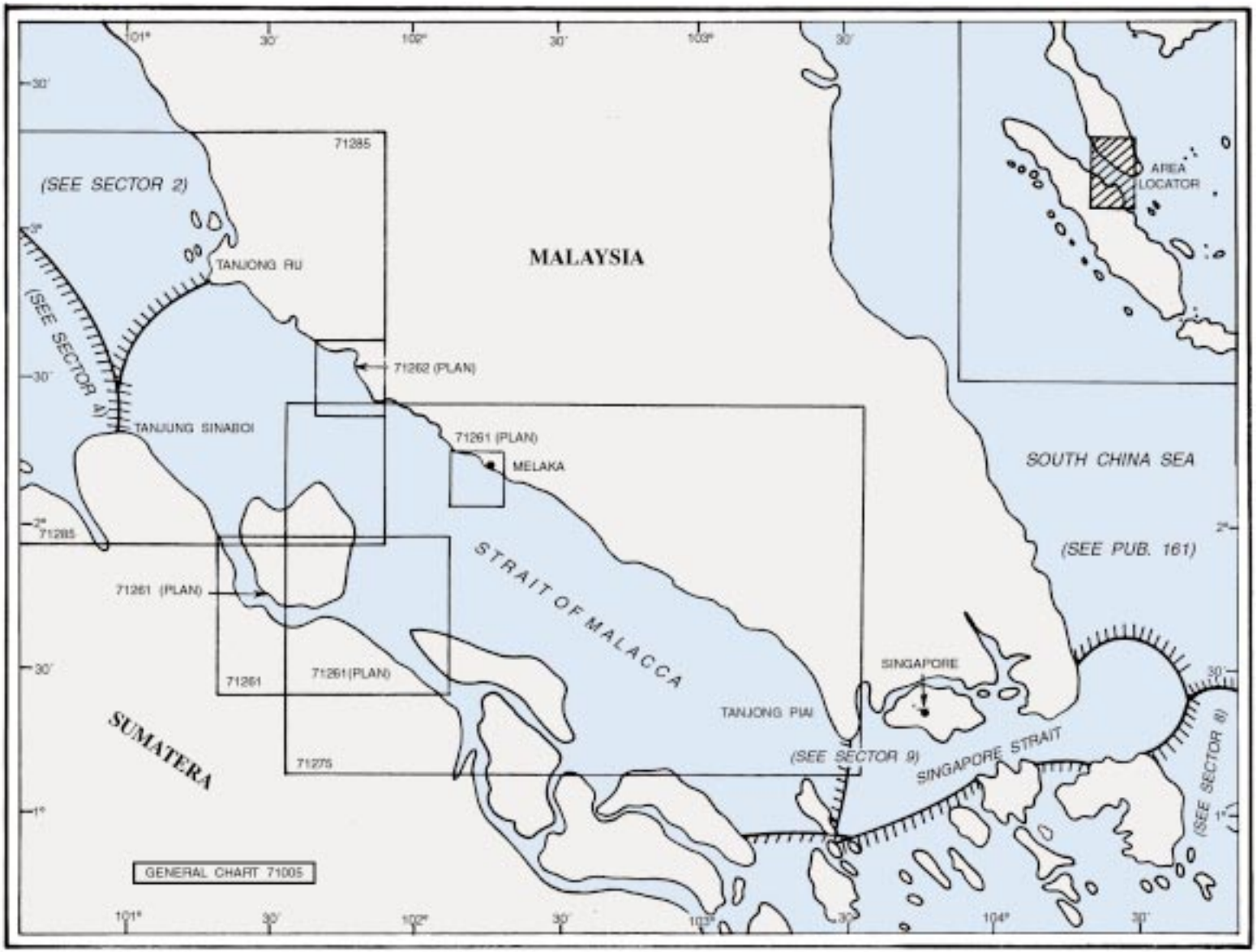
4.26 Bagansiapipi (2˚10'N., 100˚48'E.) fronts the E shore of the mouth of the Sungai Rokan. A pier, with a flagstaff at its head, fronts the town. This pier is 75m long with a depth of 1m alongside. Vessels berthed alongside ground at LW on the soft mud which extends about 25m from the head of the pier.

From Bagansiapipi, the coast curves N and E for about 20 miles to Tanjung Sinaboi. This section of coast is bordered by mud banks and shoals which extend up to 12 miles offshore.

Caution.—It is not advisable for vessels without local knowledge to approach Bagansiapipi or the Sungai Rokan by the passage W of Pulau Alang-besar, or to proceed inside the 10m curve because of the numerous fish traps and stakes in the vicinity.

The strong currents setting across the course make it difficult to keep clear of these obstructions; the lighted buoys in the approach are too far apart to give proper guidance.

From 3 days before to 3 days after full and change, the flood current is usually accompanied by a tidal bore about 1m in height. It travels at a great rate with a thundering noise and causes damage to local craft. It usually is felt up to about 31 miles upriver.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **5** — CHART INFORMATION

SECTOR 5

THE STRAIT OF MALACCA—TANJUNG SINABOI AND TANJUNG RU TO SINGAPORE STRAIT

Plan.—This sector describes the S and N coasts of the Strait of Malacca between Tanjung Sinaboi and Tanjung Ru to Singapore Strait. The descriptive sequence is SE.

General Remarks

5.1 The S coast of the Strait of Malacca between Tanjung Sinaboi and Tanjung Medang, the N point of Pulau Medang about 37 miles ESE, is fronted by numerous mudbanks, which are a continuation of South Sands. Some of these banks dry and are marked by occasional breakers.

Pulau Medang and Pulau Rupat are separated from the Sumatera coast to the W and S by Selat Rupat, a deep passage with the petroleum port of Dumai on its S side. Supertankers can be accommodated alongside the berths at this port.

Between Pulau Medang and Pulau Bengkalis, about 25 miles SE, the coast is bordered by mudbanks which extend up to 23 miles offshore.

Selat Bengkalis passes through these banks and forms the E entrance channel leading W to the oil port of Dumai.

The other branch of the channel extends SE and E for about 100 miles and then about 32 miles NE to join the E end of the Strait of Malacca.

Pulau Bengkalis, Padang, Merbau, Rangsang and Tebing Tinggi are separated from the coast of Sumatera by Selat Bengkalis, Selat Lalang and Selat Pandjang and from each other by narrow channels.

The E end of Pulau Bengkalis and the N coast of Pulau Rangsang are fronted by several long, narrow ridges of mud and sand, which lie up to 19 miles offshore, N of Pulau Rangsang.

The main fairway leading into and out of the Strait of Malacca lies between Long Bank and Fair Channel Bank about 7 miles to the N.

The high mountain ranges inland are sometimes visible early in the morning at certain times of the year. Some of the peaks of these ranges are useful marks to the navigator. The navigational aids along this stretch of coast are few and far between.

The N coast of the Strait of Malacca between Tanjung Ru and Tanjung Piai, about 166 miles SE, is only slightly indented. Most of the shoal areas which lie off this section of coast are contained within these bights N of a line drawn between the salient points.

Port Dickson and Melaka Road are the only two ports of any commercial importance to shipping.

Many of the salient points and off-lying dangers found along this section of coast are usually well marked by navigational aids. Some of these points have been reported to be radar conspicuous. When visible, the high peaks of the mountain ridges inland serve as good navigational aids for position fixing.

Winds—Weather.—See paragraph 4.1.

Tides—Currents.—See paragraph 4.1.

Caution.—It has been reported that certain vessels carrying hazardous cargo have been exhibiting an all round red light.

Additionally, vessels with low freeboard use security lights underway which mask running lights by their brilliance. The security lights are used due to the increased potential of pirate activity in the straits.

Although such lighting schemes are a violation of the regulations, vessels transiting the straits should be aware of the practice and take the necessary precautions and plan accordingly.

Off-lying Dangers

5.2 **South Sands** (2˚35'N., 101˚08'E.), similar to North Sands, previously described in paragraph 2.13, to the NNW, extends about 50 miles SE from a 7.4m patch about 8 miles SW of One Fathom Bank Light and terminate between Pyramid Shoal and the Sumatera coast to the S. These shoals extend over halfway across the strait from the Sumatera coast and are separated by fairly deep channels. None of these dangers are marked by navigational aids.

Pyramid Shoal (2˚27'N., 101˚30'E.), which lies on the N side of the SE end of South Sands, has a least depth of 3.4m, hard sand, and is the most dangerous shoal in the area because of its depth and protrusion into the fairway. Bambeck Shoal, the nearest shoal on the NE side lies on the NE side of the fairway.

A lighted buoy is moored about 7 miles SE of Pyramid Shoal. A depth of about 10m is charted between this buoy and the shoal. A depth of 13.6m was reported in position 2˚23'N, 101˚41'E.

Shoal patches of sandwave formation extend into the fairway NE of Pyramid Shoal, the most important being depths of 12.4 and 13.1m lying about 8 miles NW of Pyramid Shoal. These shoals reduce the width of the fairway at this point to about 7 miles and should be avoided by deep-draft vessels. A depth of 17.6m was reported in the fairway 9 miles NNW of Pyramid Shoal and there is a depth of 19.8m 5 miles NNE of the shoal.

A wreck with a depth of 10m, whose charted position is approximate, lies 6 miles SSE of **Tanjung Tuan** (2˚24'N., 101˚51'E.). An 8.5m patch lies about 8 miles SE of the same point.

5.3 **Raleigh Shoal** (2˚07'N., 101˚53'E.), about 4 miles long in a NW to SE direction with a least depth of 4.8m, lies centered about 15 miles E of **Tanjung Medang** (2˚08'N., 101˚39'E.).

A shoal, with a depth of 19.4m, was reported to lie 3.5 miles NNW of Raleigh Shoal. A lighted buoy is moored on the S side of the shoal.

Rob Roy Bank (1˚55'N., 102˚03'E.), a ridge about 15 miles long in a NW to SE direction with a least depth of 2.1m, lies about 27 miles SE of Tanjung Medang. A patch with a depth of

2.4m lies about 1.5 E of the 2.1m depth. The bank is steep-to on its NE and SW sides.

A lighted beacon, exhibiting a racon, stands in the middle of the bank.

A wreck, the exact depth which is unknown but which is considered to have a safe clearance of 15m and whose charted position is only approximate, lies about 11 miles E of Rob Roy Bank. Another wreck, with a depth of 17m, was reported to lie 1.5 miles farther SE. Another dangerous wreck lies in an approximate position about 10 miles NE of the bank.

Vowler Bank (1˚50'N., 102˚12'E.), with depths of less than 20m, lies with its NW end about 5 miles SE of the 2.4m depth on Rob Roy Bank. A 9.1m patch lies near the NW end of the bank and a similar depth lies s about 3 miles SE.

Clark Bank (1˚45'N., 102˚20'E.) consists of two narrow ridges, about 2 miles apart, extending in a NW to SE direction, which lies about 4 miles SE of Vowler Bank. Depths over these ridges range from 15.5 to 18.5m. Between these banks and the shoals extending from the coast of Sumatera there is a deep channel with a least width of 3 miles.

Fair Channel Bank (1˚33'N., 103˚03'E.) consists of two narrow ridges, with depths of less than 18.3m and about 3 miles apart, lying almost parallel with the coast. The bank extends about 22 miles NW from a position about 14 miles WNW of **Pulau Kukup** (1˚19'N., 103˚25'E.).

A wreck, with a swept depth of 25.5m, lies about 20 miles WNW of Pulau Kukup and a wreck, with a depth of 23m, lies about 10 miles WNW of the same islet.

A long narrow shoal, about 8 miles long in a NW-SE direction with a least depth of 9.1m, lies with its SE end about 12 miles W of Pulau Kukup. Southwest of Long Bank are numerous similar banks lying parallel with it, extending to within a short distance of the banks fringing the Sumatera side of the strait.

Tanjung Sinaboi to Little Karimun Island

5.4 **Tanjung Sinaboi** (2˚17'N., 101˚02'E.), low and thickly wooded, is the NE extremity of the peninsula separating the Sungai Rokan from Selat Rupat. Pulau Sinaboi, a small light-colored islet, lies close NW of Tanjung Sinaboi and shows up well against the darker growth of the mainland.

The coast between Tanjung Sinaboi and Tanjung Ketam, about 23 miles SE, is uniformly low and overgrown with mangroves. Good anchorage can be taken in the channel off this coast.

Between the inshore channel off the coast between Tanjung Sinaboi and Tanjung Ketam and the fairway of the Strait of Malacca, there are many mud banks which are a continuation SE of South Sands, as far as and S of Pyramid Shoal.

Bakal Iba Bank (2˚05'N., 101˚18'E.) lies parallel to and about 1 mile offshore close NW of Tanjung Ketam; it dries at its SE end, and has depths of 0.3 to 1.8m, hard sand, over the remainder. In the channel between the bank and the coast there is a least depth of 8.8m at its SE end.

Tides—Currents.—Along the edge of the coastal bank W of Pulau Sinaboi and in the channel between Tanjung Sinaboi and Tanjung Ketam, the currents set generally fair with the channel, setting SE at a maximum rate of 2 knots, and NW at 3 knots. The currents turn about 3 hours after HW and LW along the shore. About 7 to 9 miles NW of Pulau Rupat, the currents set from E to ENE and from W to NW at a rate of 2 knots.

The irregular outline of the shoals, however, causes deflections of the current, so that caution is very necessary. The current turns about 3 hours after HW and LW along the shore.Near the banks off the N entrance of Selat Rupat, the currents set diagonally across, from and to Bakal Tua Bank.

5.5 **Pulau Medang** (2˚05'N., 101˚40'E.) and Pulau Rupat are separated from each other by a narrow, winding strait of no importance to navigation. Both islands are heavily wooded.

Pulau Rupat is separated from the coast of Sumatera by Selat Rupat.

Foul ground, with numerous drying patches, extends about 7 miles offshore from the N side of Pulau Rupat and the NW side of Pulau Medang. A shoal with a depth of 14.7m lies 6.5 miles NNE of Tanjung Medang.

Between Tanjung Medang and Tanjung Mambul, the E entrance point of the N end of Selat Rupat, about 11 miles WSW, the tree-covered coast is bordered by a series of shoals which extend up to 5.2 miles offshore.

The NE side of Pulau Medang is tree covered and marked by some native villages. A conspicuous house with a red roof is situated about 4 miles SE of Tanjung Medang.

A detached bank, which dries on its outer side, lies about 2 miles offshore, about 6 miles SE of Tanjung Medang.

Selat Rupat (Selat Dumai) (2˚03'N., 101˚21'E.) separates Pulau Rupat from the mainland of Sumatera. Tanjung Ketam, the W entrance point of the N end of Selat Rupat, is low and sandy and is marked by some houses and coconut trees.

Pulau Ketam, a small islet, stands 7 miles SSE of Tanjung Ketam and Pulau Atung, Pulau Mampu, Pulau Payung, Pulau Rampang, and Pulau Mentelier stand up to 8.5 miles farther SSE. All of these islets are low but tree-covered. The entire S shore of the strait is densely wooded.

A prominent village stands on the N side of the strait about 4 miles E of Tanjung Kapal, the SW extremity of Pulau Rupat.

Dumai (1˚41'N., 101˚27'E.)

World Port Index No. 50785

5.6 The port of Dumai is situated on the S side of Selat Rupat on the mainland coast of Sumatera directly opposite Tanjung Kapal. Dumai is an important oil loading terminal, with facilities for loading general cargo.

Port of Dumai

http://www.dumaiport.co.id

Tides—Currents.—The average range of the spring tides is about 2.4m; the average range of the neap tides is 1.7m.

The current sets parallel to the faces of the wharves with the flood setting to the E at a rate of 3 knots and the ebb setting to the W at a maximum rate of 2 knots. There is no slack period at springs and neaps. Tidal signals are displayed from the oil wharf at the port of Dumai.

Two fixed red lights horizontally disposed indicate an E current; two fixed white lights, horizontally disposed, indicate a W

current. Red and white balls are used in lieu of the lights during the day time.

Depths—Limitations.—The Dumai port area can be reached by deep-draft vessels by proceeding from the Strait of Malacca into Selat Bengkalis and following a buoyed channel on a S course for about 22 miles to the junction of Selat Rupat.

Vessels must make a turn of about 180˚ to enter Selat Rupat and then follow a W course for a distance of 33 miles to Dumai. The Selat Bengkalis and the Selat Rupat fairways have been wire-dragged to a depth of 24m and 18.3m, respectively.

Incoming ships are assigned berths in accordance with time of arrival, product to be loaded, size of vessels, and loaded draft.

There are many wharves available at Dumai. One wharf is Pertamina-owned and consists of two berths. A new wharf is also Pertamina-owned and consists of four berths. The other four wharves are C.P.I.-owned and operated.

The table below lists the berthing facilities at the port.

Pilotage.—Pilotage for Rupat Strait and Bengkalis Strait is compulsory and is available 24 hours. The pilot boards in position 1˚54.5'N, 101˚51.3'E, near Fairway Lighted Buoy. Vessels should send ETA through Dumai (PKP) 96 hours and 24 hours in advance, notifying of any changes of over 3 hours immediately.

Vessels also need to state if proceeding through Singapore and send an amended ETA upon leaving there. Vessels should contact Morong Pilot Station on VHF channel 16 requesting a pilot at the fairway buoy.

Harbor pilotage is compulsory for all vessels entering the inner harbor at Dumai. The ETA must be sent 6 hours in advance. Harbor pilots are available 24 hours.

Pilots will board vessels at the cargo (berthing) anchorage in position 1˚42.5'N, 101˚26.0'E, or on arrival at Buoy 18 if a berth is available. Harbor pilotage is performed by government pilots.

All vessels proceeding to Dumai should hoist the International Code Flag “H” or “PT” when passing Buoy 17 and call C.P.I. on VHF channel 12. At this time the vessel will be notified if pilots are available; if not, then the vessel may proceed directly to Dumai Harbor Anchorage Area.

Regulations.—The Rupat Strait/Bengkalis Strait area has been designated as a restricted maritime zone by Indonesia. A partial exemption from the requirement to secure special Indonesian Consular clearance prior to entering this zone has been granted by the Indonesian navy to tankers bound for Dumai from any port in the world except Singapore.

Vessels require only normal clearance from their last port to obtain entry at Dumai. Vessels diverted at sea need only normal clearance from the last port and the diversion cable.

All vessels inbound to Dumai from abeam of Raleigh Bank Lighted Buoy until anchored off Dumai must display the International Code Flag hoist “CAL” flown from the signal yard, by day; and a red light, 1.8m above a white light, by night.

Anchorage.—The Dumai general anchorage is N and W of the oil wharves. The least depth in this area is 14.6m. Holding ground at these anchorages is good, with clay bottom.

It is reported that this area is sufficient enough for ease of maneuvering and will provide swinging room for several vessels of the size that are accommodated at the oil wharves.

Dumai—Port Facilities

Berth	Max. size	Length	Draft	Least depth at LWS
Pertamina Berth				
No. 1	100,000 dwt	275m	17.2m	18.0m
No. 2	10,500 dwt	135m	13.0m	15.0m
No. 3	35,000 dwt	200m	16.4m	16.0m
No. 4	25,000 dwt	154m	16.0m	15.0m
No. 5	35,000 dwt	200m	15.6m	16.0m
No. 6	3,000 dwt	90m	16.1m	15.0m
C.P.I. Oil Wharf				
No. 1	150,000 dwt	285m	17.7m	18.6m
No. 2	150,000 dwt	350m	17.7m	18.0m
No. 3	100,000 dwt	260m	17.7m	
No. 4	55,000 dwt	210m	15.3m	
Government Cargo Wharf				
No. 1	10,000 dwt	183m	10.4m	
No. 2	23,000 dwt	183m	10.4m	

5.7 **Selat Bengkalis** (1˚39'N., 101˚56'E.) lies between the SW side of Pulau Bengkalis and Sumatera and is entered W of Tanjung Jati, the W extremity of Pulau Bengkalis, which stands about 19 miles SE of Tanjung Masim. The N approach is deep and presents no difficulty if the buoyed channel is followed.

The W shore of the approach, from the NE extremity of Pulau Rupat to Tanjung Masim is covered with low trees and covered at HW. Tall trees stand inland.

Shoals, with depths from 3 to 11m, extend up to 20 miles N and NW from Tanjung Jati.

A shoal, with a depth of 7.2m, lies about 4 miles WNW of Tanjung Jati. A shoal, with a depth of 10.6m, lies on the SW side of the strait about 4.7 miles SW of the same point.

Southward of Tanjung Balai, about 17 miles SE of Tanjung Jati, Selat Bengkalis becomes Selat Lalang.

Selat Lalang leads into Selat Pandjang and this strait has considerable depths for about 60 miles but is then fouled by islets and shoals.

The **Sungai Siak** (1˚14'N., 102˚10'E.) branches off in a S direction at Tanjung Lajang 9 miles S of Tanjung Balaidalam.

5.8 **Pulau Bengkalis** (1˚29'N., 102˚16'E.) is uniformly covered with vegetation. Its N coast is fronted by shallow ridges running parallel to it and separated by deeper channels. The village of Bantantengah lies about midway between Tanjung Jati and Tanjung Parit, the NE end of the island. During May and November numerous fishing boats frequent the waters N of the island.

A shoal, with a depth of 3.9m, lies on a ridge about 7 miles N of Bantantengah.

The E coast of Pulau Bengkalis is fringed by a steep-to bank of mud and sand extending about 0.3 mile offshore. A river discharges into the strait about 2 miles S of Tanjung Senekip, which lies 3.75 miles SSE of Tanjung Parit.

A shoal, with a depth of 8.5m, lies 2.5 miles offshore 4.5 miles SE of Tanjung Senekip.

A shoal, with depths of less than 10m, lies centered 1.5 miles offshore between Tanjung Senekip and Tanjung Pulau Kandar.

5.9 **Tanjung Palau Kandar** (1˚15'N., 102˚30'E.), with the village of Sekadi on it, is the SE extremity of Pulau Bengkalis. A spit, with a depth of 0.5m, extends 0.5 mile S, and a 4.8m depth lies about 1 mile SW of the point.

Between the E coast of Pulau Bengkalis and Long Bank, about 29 miles to the E, there are several narrow sand ridges separated by channels with greater depths.

Tides—Currents.—The tidal currents set along the N side of Pulau Bengkalis and Pulau Rangsang, to the SE, in an E to ESE direction at a rate of 2 knots at springs, and from W to NW at a rate of 3 knots.

At neaps, both currents are weak off Pulau Bengkalis, but have a rate of from 1 to 1.5 knots off Pulau Rangsang.

In the bight between these two islands, the current sets in and out.

In Selat Bengkalis, the SE current begins about 2 hours after LW along the shore and may attain a rate of more than 2 knots. The NW current begins 2 hours after HW and at times attains a rate of 3 knots.

Bengkalis Settlement (1˚28'N., 102˚06'E.) (World Port Index No. 50790) stands on the NE side of Selat Bengkalis, about 11 miles SE of Tanjung Jati.

Pulabuhan Bengkalis is a small trading post with two small piers. The commercial pier, 30m long, has a usable length of 50m, with depths of 4m alongside. Vessels up to 500 grt are accepted.

Government Pier, lying approximately 0.6 mile SE, is 10m long. A dangerous wreck (PD) lies off the pier.

Anchorage can be made anywhere in the approach channel from NW or off the settlement, with good holding ground of mud, sand, and stiff clay.

5.10 **Sungaipakning** (1˚20'N., 102˚10'E.) (World Port Index No. 50805) stands about 2 miles S of Tanjung Balaidalam. A radio mast, painted red and white, stands in the town.

A shoal, with a least charted depth of 8m, extends about 3 miles SE from a point about 1 mile NE of the charted light in position 1˚20.7'N, 102˚09.5'E.

Depths—Limitations.—Wharf No. 1, reported capable of accommodating tankers up to 259m in length, with a depth of 14.5m alongside, extends from the shore at Sungaipakning. The T-head is 305m and is connected to the shore by a long causeway, 213m in length.

Wharf No. 2, which stands 0.5 mile S of Wharf No. 1, has a central platform 55m in length and 12m wide. The wharf is capable of handling two tankers simultaneously, but vessels up to 85,000 dwt have been successively loaded alongside.

The wharf is flanked by two large mooring dolphins; the outer dolphins are detached but the inner dolphins are connected to the loading platform by catwalks.

Pilotage.—The harbor pilot boards in the anchorage area.

Anchorage.—The recommended anchorage lies about 1 mile NNE of Wharf No. 1, in depths of 20 to 40m, clay, good holding ground, but mariners are cautioned that the tidal currents are strong.

5.11 **Lalang Marine Terminal** (1˚11'N., 102˚13'E.) consists of an SPM, to which is secured a 141,000 ton storage barge, in a depth of 22.7m. The berth is situated on the starboard side of the barge. The barge is 284m long and painted bright orange. There is a limiting depth of 17m in the approach. Vessels over 140,000 dwt and with a draft greater than 16.7m on departure will not be accepted without prior agreement with the terminal. Pilotage is compulsory; the pilot boards E of **Selat Morong** (1˚56'N., 101˚51'E.).

The Sungai Siak, which stands about 9 miles S of Tanjung Balai, is about 1 mile wide at its entrance and is navigable only by small craft with local knowledge. Above Siak, about 40 miles above the entrance, the navigation of the river is difficult for vessels exceeding 60m in length.

Islands and Channels

5.12 **Selat Padang** (1˚25'N., 102˚13'E.), the channel between Pulau Bengkalis and Pulau Padang to the S, is in frequent use by small craft trading between Singapore and Bengkalis. The channel is almost 1 mile wide with depths of 6 to 14m in the fairway. The channel is contracted to a width of 0.3 mile at its SE entrance by the extending shoal which has a least depth of 4.8m.

From **Tanjung Padang** (1˚25'N., 102˚12'E.), the S entrance point of the W end of the strait, a spit with a depth of 1.8m at its outer end, extends 2.5 miles W from the point. The spit dries up to 1 mile W of the point.

Dedap, a wooded islet, lies on a sandbank which extends about 0.2 mile offshore from the SW side of the strait about 11 miles SE of Tanjung Padang.

In Selat Padang the E current has a maximum rate of 2 knots and makes about 2 hours after LW. The W current has a maximum rate of about 3 knots and makes about 2 hours after HW. Toward neaps the currents are very weak but the W current predominates.

Selat Asam (1˚09'N., 102˚29'E.), which lies between Pulau Padang to the W and Pulau Merbau and Pulau Tebing Tinggi to the E, has a least width of about 1 mile and a least depth of about 12m in its N approach.

The shores are steep-to, except off the N entrance point at its S end where it joins Selat Lalang and Selat Pandjang. A spit, with a depth of 8m at its outer end, extends about 1 mile S from this point. A village stands on the SE extremity of Pulau Padang.

Selat Lalang is about 2.2 to 4 miles wide and has a least depth of 11m in the fairway but there is a ridge with a depth of 8m near the middle of the strait abreast Makapan Settlement which stands on the W bank about 15 miles S of Tanjung Lajang.

Selat Pandjang (0˚50'N., 102˚25'E.) has a width of 1.5 to 3.2 miles, except where it is fouled by shoals and islets.

The above passages are only used by local vessels and are of little commercial importance.

Tides—Currents.—In Selat Lalang and Selat Pandjang the currents turn from 2 to 2.5 hours after HW and LW along the shore.

The SE and E currents have a maximum rate of 3.5 knots, and set along the coast of Sumatera into Sungi Kampar, about 14 miles SE of the E entrance of Selat Pandjang.

The W and NW currents have a maximum rate of 4 knots, being stronger near the E end of Selat Pandjang.

5.13 Selat Ringgit (1˚00'N., 102˚36'E.), between the SE side of Pulau Merbau and the NW end of Pulau Tebing Tinggi, has a least width of about 46m, and depths are reported to be from about 5 to 12m. Vessels should favor the N side of the fairway at both ends of the strait.

Directions.—A vessel bound for Bengkalis Settlement from the Strait of Malacca may pass close along the E side of Pulau Bengkalis, round its SE end, taking care to avoid the spit which extends from it, and then proceed through Selat Padang.

Pulau Merbau (1˚03'N., 102˚32'E.), separated from the adjacent islands by Selat Asam and Selat Ringgit, is bordered by a shoal bank on its NE side which extends about 12 miles offshore. The inner part of this bank dries.

Between this bank and the bank which extends from the NW side of Pulau Rangsang is the W fairway leading into Selat Kungkung which in turn leads into Selat Ajer Hitam.

Several narrow banks lying in a N to S direction, with depths of 1.2 to 5.5m lie in the N part of this fairway.

The N and NE coasts of Pulau Rangsang are fringed by a mud bank which dries out up to 1 mile offshore. A village stands on the NE side of the island 8 miles SE of Tanjung Kedabu, the NE point.

Numerous fishing stakes may be encountered up to 5 miles offshore between Tanjung Kedabu and **Tanjung Medang Kaluwar** (0˚53'N., 103˚10'E.).

5.14 Selat Kungkung (1˚00'N., 102˚40'E.), entered between Pulau Merbau and the W end of Pulau Rangsang, should not be used by vessels without local knowledge, as the approaches for 20 miles to the N are fouled by long shoal ridges some of which have depths of less than 1.2m and they are not buoyed.

A drying bank extends up to 1 mile from the NW coast of Pulau Rangsang.

At **Tanjung Majan** (1˚01'N., 102˚44'E.), about 7 miles E of Tanjung Ajung, Selat Kungkung leads into Selat Ajer Hitam, which separates Pulau Rangsang from the N side of Pulau Tebing Tinggi.

Close to the SE end of Pulau Tebing Tinggi there is a narrow channel, with a least depth of 3.5m, leading into the E end of Selat Pandjang.

The **Sungai Sudur** (1˚02'N., 102˚47'E.) and the Sungai Suwir flow into the N and S sides, respectively, of the NW end of Selat Ajer Hitam.

Tides—Currents.—In Selat Kungkung and Selat Ajer Hitam, the SE current commences about 2 hours after LW, and the NW current about 2 hours after HW, at rates of 2.5 and 4 knots, respectively, at springs. Both currents are weak at neaps, the NW current being the stronger.

5.15 Selatpandjang Settlement (1˚01'N., 102˚42'E.) stands on the S shore about 5 miles E of the W entrance of Selat Kungkung. A T-head cargo pier, with a depth of about 7m alongside, extends from the shore abreast of the settlement. A light is shown on the pier. An oil jetty, 23m in length, with a depth of 6m, is also situated near the village. A ferry quay, 9m in length, with a depth of 5m, can also be found at the settlement.

Pulau Manggung (0˚49'N., 103˚05'E.), Pulau Topang, Pulau Lebu, Pulau Serapung, and Pulau Mendol, which stand off the entrances of both Selat Ajer Hitam and Selat Pandjang, are low, thickly wooded islands. A pier extends from the SW side of Pulau Mendol.

Serapung Village, on the E side of the island of the same name, may be easily identified by the red roof of the customs station. Local knowledge of the channels can be obtained here.

A shoal area with depths of less than 5.2m extends about 3 miles E from the NE extremity of Pulau Manggung and then curves S and SW to the S extremity of Pulau Topang. There is a least depth of 0.9m over this shoal.

A similar shoal area, with a depth of less than 0.6m extends from a position about 3 miles E of the SE extremity of Pulau Topang to Pulau Burung.

The least charted depth in the channel between the two shoal areas is about 5.3m.

5.16 Pulau Lalang (0˚50'N., 103˚17'E.), rocky, hilly, and overgrown with brush, stands 3.75 miles SE of Pulau Burung. It is a small reef-fringed islet surrounded by numerous rocks and shoals within 1 mile N, S, and W its sides. Detached reefs

lie about 1.2 miles E, 1 mile SSE, and 1.5 miles SSE, respectively of Pulau Lalang.

Pulau Rusah (0˚44'N., 103˚16'E.), a rock topped by tall trees, stands in the fairway of the channel leading W and S of Pulau Kundur into Selat Durian. Pulau Turus and Batu Lanjang, awash, lie 1 mile and 2.75 miles SSE, respectively, of Pulau Rusah.

Between Pulau Turus and Batu Lanjang to the W, and Pulau Kundur to the E, there is a drying shoal. It extends about 3 miles NW from a position about 2 miles E of Batu Lanjang.

Two drying rocks, and a scrub covered rocky islet, lie about l.5, 2, and 3 miles SE of Batu Lanjang.

A clear passage, with a least depth of 5.8m in mid-channel, lies between these dangers and the NE side of Pulau Mendol.

Tides—Currents.—In the strait between as well as outside these islands the flood sets to the SE, and the ebb to the NW; the ebb current being the stronger.

The current near the E coast of Pulau Bengkalis has a rate of almost 2 knots and increases to a rate of 3.5 knots near Pulau Belembang and Pulau Burung.

Selat Kampur (0˚28'N., 103˚08'E.), which rises in the mountain ranges in W Sumatera, discharges on both sides of Pulau Mendol but the main channel passes E of this island.

Small local vessels navigate this river up to 18 miles above the entrance but local knowledge is essential.

5.17 **Pulau Burung** (0˚51'N., 103˚14'E.), which stands about 5 miles SE of Tanjung Medang Kaluwar, the E extremity of Pulau Rangsang, is high, densely wooded, and fringed by above and below-water rocks.

Pulau Belembang (0˚53'N., 103˚14'E.) stands 1.5 miles N of Pulau Burung and is also surrounded by above and below-water rocks. The islet is low and covered with brush.

Drying rocks lie close NE and about 1 mile NE, respectively, of Pulau Belembang. A 4.4m patch lies about 2 miles NE of the islet.

Pulau Kempaan (Kenipaan) (0˚54'N., 103˚20'E.), about 2 miles in length, stands 6 miles ENE of Pulau Belembang and 2 miles W of the N extremity of Pulau Kundur. The bottom between this island and Pulau Kundur is foul. Above and below-water rocks lie in Selat Gelam between Pulau Kempaan and Pulau Babi. Pulau Nipah, close N of Pulau Kempaan, is the only uninhabited islet.

Pulau Babi (0˚57'N., 103˚22'E.), 2.5 miles NNE of Pulau Kempaan, rises to a height of 80m.

Pulau Tambelas (0˚59'N., 103˚13'E.), 80m high, stands about 4 miles NNW of Pulau Kempaan, in the fairway between Selat Gelam and the channels between the islands SW of it. The island has three peaks and from a distance appears as two islands.

The Karimum Islands

5.18 The Karimun Islands consist of Great Karimun (Pulau Karimunbesar), Little Karimun (Pulau Karimun Ketjil), and a number of off-lying islets. They differ in character from the low marshy islands of the E coast of Sumatera, being hilly with fertile soil, and are well-populated. They are surrounded by reefs and shoals, many of which are completely or partly dry.

The islands in the Karimun group N of Selat Gelam are described below. The islands in the Karimun group S of Selat Gelam are described in paragraph 8.76.

5.19 **Great Karimun** (1˚04'N., 103˚21'E.) is mountainous at its N end, the principal peaks being Betina, 416m high standing 1.75 miles SW of the N extremity, and Djantan, 453m high, about 1.25 miles S of Betina. The S end of the island, except near Tanjung Balai, consists of low, swampy ground. The surrounding islets are rocky and thickly overgrown.

On the E side of Great Karimun, a bay is formed between Tanjung Bula Kasap, the NE point of the island, and Tanjung Sebatak, about 5 miles SSE. This bay is fouled by a shallow mud bank which extends about 1 mile offshore, out to the line of its entrance points.

During the Southwest Monsoon good anchorage can be taken off the E side of Great Karimun, to the SE of Little Karimun, over a bottom of stiff gray mud with good holding ground. The depths over the bank fronting this anchorage range from 8.2 to 9.1m and have to be crossed to get to the anchorage area.

Selat Gelam (0˚58'N., 103˚26'E.), the passage between the S end of Great Karimun and the N end of Pulau Kondur, is used by local craft trading between Singapore and the islands to the SW. The passage at its E end is about 3 miles wide but about 6 miles to the W the channel is divided into two channels by Pulau Babi. The S channel has greater depths but it is fouled by more shoals. Neither channel is buoyed.

Assan and Mudu, rocky and thickly-overgrown islands, 83 and 65m high, respectively, lie about 1.2 miles off the NW side of Great Karimun. Sajuda, an above-water rock, lies 0.5 mile N of Assan and Seal Rock lies about 0.5 mile NE of Sajuda. Tokong Belanda, a low rock, lies about 1 mile WNW of the NW extremity of Assan.

Mudu (1˚06'N., 103˚17'E.) lies about 1 mile SSW of Assan. Reefs extend about 0.5 mile from its NW and W sides. A 5.7m patch lies about 1.2 miles W of the N extremity of Mudu. A drying reef extends about 0.7 mile SSW from the island.

5.20 **Little Karimun** (1˚09'N., 103˚24'E.), separated from the NE side of Great Karimun by a deep channel about 0.5 mile wide, is a bold island, 377m high.

In the NW approach to the channel between Great Karimun and Little Karimun are two islets, **Nangoi** (1˚10'N., 103˚22'E.), 39m high, about 1.2 miles W of the NW end of Little Karimun, and Tantun, a fairly steep-to islet, about 1 mile SW of Nangoi.

In the channel close to the SW side of Little Karimun is an above-water rock, which narrows the channel to about 0.3 mile. Petera, an islet about 9.1m high, stands in mid-channel at the S end of the channel.

A bank, with depths of 5.5m and a least depth of 1.5m, extends about 1.2 miles SSE from the S side of Little Karimun. This bank continues in the same direction, parallel with the coast of Great Karimun, for an additional 15 miles with depths of less than 10m. A 0.9m depth is near its middle.

In the passage between Great and Little Karimun, the tidal current attains a rate of 4 knots at springs.

Pulau Iyu Besar (1˚11'N., 103˚21'E.) and Pulau Iyu Kecil, each 45m high, lie about 3 miles N of Little Karimun. Pulau

Iyu Kecil lies 0.5 mile NE of Pulau Iyu Besar. The islets are known as The Brothers.

A rock, with a depth of 2m, lies 0.3 mile NE of Pulau Iyu Kecil, and a rock, with a depth of 2.5m, lies 0.2 mile N of the same islet. A rock, awash, lies 0.2 mile NW of Pulau Iyu Kecil, and a rock, with a depth of 6.1m, lies 0.5 mile S of the same islet. All of these rocks are steep-to.

Tanjong Ru to Tanjong Piai

5.21 **Taluong Ru** (2˚51'N., 101˚17'E.) stands on the E side of the approach to Selat Kelang. The coast between Tanjong Ru and Tanjong Gabang, about 15 miles SE, is indented about midway along its length by Kuala Langat. This shallow river is not frequented by any but small local craft.

The coastal bank, which extends about 2 miles from Kuala Langat, is steep-to and shoals rapidly from a depth of 27.4m to 0.3m, with numerous patches which dry, between the edge of the bank and the river entrance.

Bukit Jugra (2˚51'N., 101˚25'E.), a thickly-wooded conspicuous hill 240m high, stands about 3 miles NNE of the river entrance.

This hill is the only hill near the coast and is easily identified; when seen from the NW or W it appears as an oblong shape at both ends, but from the S it appears conical.

Kampong Morib (2˚45'N., 101˚27'E.), which is conspicuous, stands 3.75 miles SSE of the entrance of Kuala Langat. All of the buildings in the town are clearly visible from the offing. A drying sand bank extends up to 1.75 miles off Kampong Morib, the depths then increasing rapidly about 0.5 mile farther offshore. The edge of this bank is difficult to see and should be given a wide berth.

Taluong Gabang (2˚42'N., 101˚29'E.), about 4 miles SSE of Kampong Morib, is not easily identified. Kampong Batu Laut stands at the mouth of a small river about 2 miles SE of the point and is clearly visible from the offing. A steep-to mud bank extends 0.3 mile offshore at the village.

Between Tanjong Gabang and the entrance of the Sungai Sepang Besar, about 16 miles ESE, the thickly wooded coast is fringed by a sand and mudbank which extends up to 0.5 mile offshore. A conspicuous tree stands about 5 miles SE of Tanjong Gabang.

Tides—Currents.—Off the coastal bank SW of Kuala Langat the SE current begins from 4 hours 30 minutes to 4 hours before HW at the shore. At springs the rate is 1.75 knots and 0.5 knot at neaps. The NNW current begins from 1 hour 30 minutes to 2 hours after HW by the shore. At springs the rate is 2 knots and 1 knot at neaps.

5.22 The **Sungai Sepang Besar** (2˚36'N., 101˚43'E.) is navigable by small craft with a draft of about 1.8m at HW for a distance of about 4 miles. The Sungai Sepang Kechil discharges into the strait about 2 miles WNW of the Sungai Sepang Besar but is available only to small craft. A chimney, almost obscured by trees but noticeable at times by its smoke, stands 1.25 miles N of the entrance of the Sungai Sepang Kechil.

The **Sungai Lukut Besar** (2˚34'N., 101˚47'E.), which discharges about 5 miles E of the Sungai Sepang Besar, is shallow. A village stands on the bank at the river entrance. A 19m high hill stands close W of the entrance of the Sungai Lukut Besar. It makes a good landmark on an otherwise featureless stretch of coast.

Tanjong Kamuning (2˚31'N., 101˚48'E.) is steep-to with depths of 11m about 0.5 mile SW of it. Pulau Borong, a low densely-wooded rock-fringed islet surrounded by a shallow bank, stands 1.5 miles N of the point.

5.23 **Bambek Shoal** (2˚33'N., 101˚40'E.), about 4 miles offshore, lies SW of the mouth of the Sungai Sepang Besar. It has a depth of 0.3m near its center and is composed of hard sand. Its NW and SE sides are steep-to with depths increasing to over 15m. A bank with a least charted depth of 4.8m lies between Bambek Shoal and the coast. A deep channel lies between this bank and the coast.

Several detached banks, with depths of 11 to 18.3m, lie W and NW of Bambek Shoal. The W patch, with a depth of 18.7m, lies about 6 miles WNW of the shallowest part of Bambek Shoal.

The NW extremity of a sand ridge, which extends about 10 miles SE toward Tanjong Tuan, lies about 3 miles E of the shallowest part of Bambek Shoal.

Two patches, each with depths of 1.2m, stand on the ridge about 2 miles S and 3.5 miles SE respectively, of Tanjong Kamuning. Between the N part of this ridge and the coast there is a channel about 0.5 mile wide with depths of 20.1 to 36.6m, suitable for large vessels, leading NW to the anchorage off Port Dickson.

A narrow channel 0.3 mile wide with depths of 11 to 23.8m, lies between the S part of the ridge and the coast and leads N to this anchorage from Tanjong Tuan. This channel is suitable only for small craft with local knowledge.

On the NE side of this S approach to Port Dickson there are several shoals and rocks, the most remarkable being a rock which dries 0.9m, lying 1.75 miles SE of Pulau Arang Arang.

5.24 **Port Dickson** (2˚31'N., 101˚48'E.) (World Port Index No. 49960) is situated on the W coast of the Malaysian Peninsula facing the Strait of Malacca. The town stretches along the coast in the direction of Tanjung Tuan, located 8 miles SE.

Port Dickson is an important oil terminal operated by Shell and Esso, and is a minor port for general cargo.

Winds—Weather.—During the period from May through October, vessels may experience Sumatras, which usually blow from a SW to a NW direction. The average duration is between 1 hour and 4 hours, with wind velocities between 40 and 50 knots, followed shortly thereafter by heavy rain.

During the Southwest Monsoon, there is a continual swell and rough sea at the anchorage. At other times, an appreciable swell may also be experienced.

Tides—Currents.—Port Dickson tides are semi-diurnal. At the outer anchorage, the tidal current sets SE from 3 hours 30 minutes before until 2 hours 45 minutes after HW, and NW from 3 hours 25 minutes after until 4 hours 45 minutes before HW at Port Dickson.

In the inner anchorage, the tidal current sets SE from 3 hours 45 minutes before until 3 hours 45 minutes after HW, and NW during the remaining period.

The tidal current close inshore on the W side of Tanjong Kamuning at times sets in an opposite direction to that of the

outer anchorage, resulting in a confused tidal condition and eddies in the fairway S of Tanjong Kamuning.

Depths—Limitations.—There is a deep water approach channel from NW, marked by lighted buoys, which presents no difficulties and is clear of dangers.

Port installations comprise the following:

1. **Esso-Shell Single Buoy Mooring** (2˚31.3'N., 101˚47.0'E.), a yellow steel buoy, 10.7m in diameter, in a least depth of 27.4m, with a sand, mud, rock, and stone bottom. This facility will accommodate tankers up to 274m in length with a 14.3m draft or 90,000 dwt capacity.
2. The Railway Jetty, 182.9m long with a 46m face, is used by dry cargo vessels and LPG carriers drawing up to 7.9m. A small boat harbor that is contained in the curve of the stone approach to the Railway Jetty affords little shelter against S winds and dries out at LW.
3. Shell Jetty (2˚31.2'N., 101˚47.6'E.) is situated about 0.1 mile W of the Railway Jetty. It is a 213m long reinforced concrete jetty with a 51.8m long and 10.9m wide T-head and four dolphins. The maximum distance between the outer dolphins is 304.8m.

   Alongside depths of 7.9m allow vessels up to 18,000 dwt with a length of 152.4m and a draft of 6.4m to berth.

   Berthing maneuvers usually take place in daylight; vessels over 121.9m in length requiring to swing are taken in on the flood only.
4. New Shell Jetty (2˚32'N., 101˚47'E.) is a 430m long T-head jetty with three berths. Berth 1 and Berth 3, on its seaward face, can accommodate a vessel with a maximum draft of 10.5m. Berth 2, on the SE landward face, can accommodate a vessel with a maximum draft of 7.5m.
5. Esso Jetty is situated about 0.5 mile NW of Shell Jetty. It consists of a reinforced concrete island, 64m x 7.3m, with a distance between the outer buoys of 219.5m. The approach depth is 12.2m. There is an alongside depth of 10.3m, which allows vessels up to 19,500 dwt, with a maximum length of 170.7m, to berth day or night.

   Berthing is during daylight only but can be carried out on any state of tide for vessels up to 45,000 dwt. Vessels above this limit are berthed on the ebb only. A submarine oil pipeline is laid to the buoy from the shore, about 0.1 mile N of Tanjong Kamuning. Two floating hoses marked by lights may extend up to 230m from the mooring buoy.
6. The head of a T-headed jetty extending about 1 mile WSW from the shore is situated about 1 mile N of the Esso-Shell SBM; a submarine pipeline connects the SBM and the pier.

Aspect.—A large power station, with three conspicuous chimneys, one 118m high and the other two 94m high, stands on reclaimed land 0.7 mile N of Tanjong Kamuning. A conspicuous chimney, 94m high, with a flare, about 0.1 mile ENE and another flare 1 mile further E, stands 1.25 miles NE of Tanjong Kamuning.

Pilotage.—Compulsory for vessels berthing/unberthing at Railway Jetty and for berthing/unberthing at the SBM. Private services are operated by Shell and Esso for vessels making use of their respective facilities.

The mooring master boards 1 mile N of Fairway Lighted Buoy; vessels less than 30,000 dwt may be boarded at No. 1 Buoy.

The vesse'ls ETA should be sent, via Penang or Singapore Radio, 96 hours and 24 hours in advance. Vessels should keep a listening watch on Shell Port Dixon Radio on VHF channel 16 beginning 2 hours before arrival.

Anchorage.—Temporary anchorage for large vessels may be obtained 1 mile N of Fairway Lighted Buoy, in a depth of 24m, or 1.25 miles WNW of No. 1 Lighted Buoy.

Small vessels may anchor NE of Palau Arang, in depths of 7 to 9m, but holding ground is poor. A prohibited anchorage area is shown on the chart extending 1 mile W from Tanjung Kamuning and S around Palau Arang to the Railway Jetty.

5.25 Tanjong Tuan (Cape Rachado) (2˚25'N., 101˚51'E.), about 8 miles SSE of Port Dickson, is a steep bluffy headland covered with trees. It is easily distinguished because it is the highest hill in the vicinity.

From a distance the cape appears as an island. It has been reported that the cape is a good radar target at distances up to 27 miles. There are considerable depths about 1 mile off the cape.

Anchorage can be taken, in a depth of 20m, E of the light but care should be taken to avoid the charted 7.6m patch on Pedoman Shoal, 1.25 miles E of the light.

From Tanjong Tuan, the low wooded coast of Sumatera, about 20 miles distant, can be seen.

The Strait of Malacca is narrower here than at any other part NW of **Melaka** (2˚12'N., 102˚15'E.).

The bottom area between 1 and 12 miles SW of Tanjong Tuan and extending 10 miles in either direction along the axis of the fairway consists almost entirely of sand waves, some more than 9.1m from trough to crest, which gives rise to very irregular depths, many of which are a danger to vessels drawing more than 13.5m. The positions of these shoals can best be seen on the chart.

The main depths consist of a depth of 15.8m about 6 miles W of Tanjong Tuan; a line of shoals lying roughly along the axis of the fairway, with depths of between 14 and 18m from a position about 8 miles S of Tanjong Tuan; a 14m patch 10.5 miles SSW of Tanjong Tuan; and a ridge with depths of between 14.3 and 17.1m between 6 and 7.75 miles SSE of Tanjong Tuan. A rock, with a least depth of 8.5m, lies 7.5 miles SE of Tanjong Tuan.

Off Tanjong Tuan, the tidal currents set SE and NW at a rate of from 2 to 2.5 knots; the SE current begins from 3 to 4 hours after HW at Penang and runs for 6 hours.

The coast between Tanjong Tuan and the entrance of the Sungai Linggi, about 7 miles ESE, is indented by a shallow bay. The Sungai Linggi is navigable at HW by craft drawing 1.8m as far as **Pengkalan Kempas** (2˚26'N., 102˚01'E.).

A rock located between the entrance points of the river covers when there is a depth of 3m on the bar; this danger is marked by a beacon.

Batu Mandi, a rock, awash, marked by a beacon, lies about 2 miles SW of the S entrance point of the Sungai Linggi.

Good anchorage can be taken off the river entrance, in a depth of 16.5m, mud, with Tanjong Tuan Light bearing 292˚ and the beacon in the entrance of the river bearing 075˚.

Between the S entrance point of the Sungai Linggi and Tanjong Keling, about 15 miles SE, the coast consists of irregular rocky points interspersed with small sandy beaches.

Batu Tengah, marked by a light, consists of three rocks just above-water, lying about 2 miles SE of Batu Mandi and about 1 mile offshore. A shoal, with a depth of 14.3m lies about 6 miles SSW of Batu Mandi.

Pulau Batu Besar, 4.6m high, stands 1.25 miles offshore, 7 miles SE of Batu Tengah. A sandy ridge, with depths of 6.1 to 9.7m, lies from 0.5 to 2 miles NW of the rock.

A shoal with a depth of 16.3m, lies 3.5 miles WSW of Pulau Batu Besar.

Two white towers, each about 34m high, stand about 2 miles ENE of Pulau Batu Besar.

There is no safe passage for vessels without local knowledge between Pulau Batu Besar and the mainland as the area is fouled by rocks, some above-water.

The sea is discolored by rips, which do not necessarily coincide with the shoals.

A rocky shoal, with a depth of 3.4m, lies almost 1 mile E of Pulau Batu Besar.

5.26 Tanjong Panchor (2˚16'N., 102˚06'E.) stands on the coast about 2 miles E of Pulau Batu Besar. Foul ground extends in a general SW direction from Tanjong Panchor for a distance of about 2 miles. The outermost danger, which has a depth of 3.4m, lies 1.25 miles SW of the point. The passages between these dangers should only be attempted by small craft with local knowledge.

The coast between Tanjong Panchor and Tanjong Keling, about 5 miles SSE, is fringed by a bank of sand with depths of less than 5.5m which extends about 1 mile offshore. A rock which dries 0.9m lies near the outer edge of the bank almost 0.75 offshore and 1.5 miles SE of Tanjong Panchor.

Sungai Udang Port (2˚15'N., 102˚07'E.), a T-shaped jetty, is situated about 3 miles NW of Tanjung Keling. There are seven berths, with alongside depths of 7.2 to 20m, on the seaward side of the jetty; a buoyed channel, dredged to 20m, leads to the four center berths.

Vessels up to 120,000 dwt, with a maximum draft of 17.3m, can be accommodated at the two deep-water berths.

Pilotage is compulsory. Pilots board at Fairway Lighted Buoy or at the anchorage and should be requested, via the agent, 48 hours in advance. The vessel's ETA should be confirmed 72 hours, 48 hours, 24 hours, and 12 hours before arrival.

A General Purpose Anchorage has been established 5 miles NW of Tanjung Keling. The depth was reported (2001) to be 19.1m. Other designated anchorage areas include the Ocean Anchorage, Coastal Anchorage, and the eight LPG Anchorages.

5.27 Tanjung Keling (2˚13'N., 102˚09'E.), the NW limit of Melaka Road, is a low projecting point located near the site of the Melaka power station, a brick building flanked by palm trees which stands almost 1 mile NW of the point. Two tall black chimneys stand close NE of the power station. The chimneys can always be located by the smoke which constantly rises from them.

A detached rock, with a depth of 0.6m, lies 0.5 mile offshore almost 1 mile NW of the power station. A rocky 3.7m patch lies about 1 mile W of the station. A rock, which dries 0.9m, lies close S of the head of the boat landing pier.

Keling Shoals, several patches of sunken rocks with depths of 11m and considerably less over them, extend almost 1 mile S from Tanjong Keling. The shallowest rock has a depth of 1.2m and lies 0.3 mile SSW of the point.

The tanker berth consists of head and stern mooring buoys and can accommodate vessels of up to 10,000 dwt and 137m in length. Vessels approaching this berth should stem the tide, which may attain a rate of 4 knots at springs, and secure to the seaward mooring buoys ahead and astern, then maneuver into position using the remaining buoys; the flexible ends of the pipelines are marked by small buoys. A mooring boat is available to assist in berthing.

A depth of 13.1m exists in this berth but vessels are limited to a draft of 11m because of a detached 11.6m shoal patch.

Anchorage off Tanjong Keling, clear of Keling Shoals, is exposed but the holding ground of mud is good. The bottom is irregular and the water is discolored with numerous tide rips.

Melaka Road and Approaches

5.28 The town of Melaka stands on both banks of the Melaka River which discharges about 6 miles E of Tanjong Keling, the two parts being connected by several bridges. St. Paul's Hill, which is conspicuous, stands on the left bank of the river and is marked by the ruins of an ancient church and a disused lighthouse. A slender pointed roof stands near the coast about 0.5 mile NW of St. Paul's Hill disused lighthouse.

It is conspicuous from the offing being the only structure which rises above the buildings in the town. A white cylindrical minaret with a pointed dome stands in a gap between the trees on the coast about 1.2 miles NW of the lighthouse.

Aspect.—Two tall buildings about 34.7m high stand about 1 mile ESE of St. Paul's Hill.

A conspicuous radio mast stands about 137m NNE of St. Paul's Hill disused lighthouse. St. John's Hill, with the ruins of an old battery on it, stands 1 mile E of St. Paul's Hill.

Bukti China, an almost bare conspicuous hill, stands almost 0.75 mile NE of St. Paul's Hill. Bukti Bruang, an isolated hill 156m high, and Bukti Sebukor, about 64m high to the tops of the trees, stand about 3.7 and 2.5 miles, respectively, NNE of St. Paul's Hill. The country a few miles inland consists of undulating hills.

Gunong Ledang, which has a triple peak 1,275m high, stands about 24 miles NE of St. Paul's Hill. The coast near the town is low and wooded.

A stranded wreck is reported to lie about 0.1 mile off the breakwaters.

5.29 Pulau Upeh (2˚12'N., 102˚12'E.), a conspicuous, densely-wooded islet, about 34m high to the tops of the trees, stands offshore about 3 miles W of St. Paul's Hill.

A ridge, over which there are depths of less than 5.5m, extends about 1 mile from the E and W sides of the island parallel with the coast.

A shoal, with a depth of 6.4m, lies almost 0.5 mile SW of Pulau Upeh. Little Shoal, with a depth of 3.3m, lies about 0.5 mile SSE of Pulau Upeh; about 0.2 mile SSE is a 5.2m patch. An 8.2m patch is reported to lie about 2 miles SSE of the same islet.

Between Pulau Upeh and the mainland a bank runs parallel with the coast. Owens Rocks, which dry 1.5m, lie near it's NW end and about 0.3 mile N of Pulau Upeh.

Two patches which dry from about 0.3m to 0.6m lie near its SE end.

Pulau Panjang, a narrow, rocky flat almost covered at HW, lies 2 miles SSE of St. Paul's Hill, and is steep-to on its S side.

A stone beacon stands on its E end and a lighted beacon on its W end.

Foulerton Shoal, with a depth of 10.4m, lies about 0.7 mile SSE of the lighted beacon on Pulau Panjang. A small sandy shoal, with a depth of 4.6m, lies about 0.2 mile NNW of the beacon on the E end.

Pulau Jawa, consisting of two wooded islets nearly joined together, lies 0.75 mile S of St. Paul's Hill; the W islet is 18.3m high to the tops of the trees, and the E islet 6.1m high to the tops of the trees.

5.30 Batu Gelama (2˚10.4'N., 102˚14.9'E.), a rock which covers at HW, is marked by a lighted beacon.

A narrow ridge with depths of less than 5.5m extends about 1 mile WNW and 0.3 mile ESE of the beacon.

Two 4.9m patches lie between the NW end of this ridge and the ridge extending SE from Pulau Upeh.

Anchorage.—There is no designated area for vessels to anchor. Vessels should anchor as convenient from 1 to 2 miles offshore. A moderate sized vessel found the best berth about 2 miles offshore, in a depth of about 11m, with the disused light house on St. Paul's Hill bearing 038˚ and Pulau Panjang Lighted Beacon bearing 122˚, the holding ground is reported good. Small vessels usually anchor closer inshore.

Attention is drawn to a foul area 0.5 mile SW of the breakwater heads.

Anchorage is prohibited in the charted area extending nearly one mile SW of Tanjong Keling.

The charted quarantine anchorage is centered about one mile SE of Tanjong Keling.

The charted explosives anchorage lies SE of the quarantine anchorage, its NE corner being the S extremity of Pulau Upeh.

Reclamation within an area extending up to 0.5 mile from the shore and 1.75 miles WNW from the river mouth was reported in progress.

Directions.—A vessel approaching Melaka Road from the W should pass not less than 2 miles S of Tanjong Keling and 1 mile S of Pulau Upeh to clear the off-lying dangers, and course should not be altered until St. Paul's Hill bears less than 055˚.

Approaching from the E, after passing Pulau Undan and Pulau Hanyut, the course should be altered to clear Foulerton Shoal and then altered for the anchorage. Small vessels frequently pass N of Pulau Besar and Pulau Panjang, but this route should not be used without local knowledge.

A depth of 19m was reported about 0.5 mile SW of Pulau Undan. There are numerous fishing stakes off the coast.

A vessel approaching from the SE at night should make Pulau Undan Light and after passing SW of it, and of Pulau Hanyut, should steer with the light bearing 135˚ astern, until the light on St. Paul's Hill conspicuous radio mast bears 038˚, when it should be steered for on that bearing which will lead to the anchorage. Alternatively, the breakwater head lights may be used as leading lights.

Pulau Undan Light will also be sighted when approaching the road from the NW,and may be steered for from abreast Tanjong Keling.

Copyright Mark Moxon

Melaka—Lighter Quays

5.31 Melaka (2˚12'N., 102˚15'E.) (World Port Index No. 49970) is the seat of government of the State of Melaka. The principal buildings stand around the base of St. Paul's Hill.

Melaka is a lighterage port where there is activity employing a total of 44 wooden lighters for the loading and discharging of ocean-going vessels. The harbormaster offices are situated in a building along the quay.

Tides—Currents.—The spring range of the tide is 1.8m; the mean tidal range is 1.3m.

Depths—Limitations.—The Tanjung Bruas jetty will accommodate vessels of up to 125m in length on the seaward side and vessels of 65m in length on the inner side. The depth alongside is 9m at LW.

An oil mooring, consisting of two head and two stern buoys, provides discharge to a local power station via a submarine pipeline.

Quays that line both sides of the Melaka River just within the entrance are principally used by lighters loading or discharging cargo for vessels in Melaka Roads. The landing place is the Government Jetty, a concrete public quay, on the E side of the river. The channel leading into the port area between two breakwaters has a least depth of 0.6m. Small vessels drawing up to 1.5m can enter the river at MHWN.

An area bordering the shore NW of the NW breakwater is being reclaimed.

Pilotage.—Pilotage is compulsory for all vessels. At least 4 hours notice should be given to the Melaka Port Authority.

Vessels coming from W are boarded 2.75 miles WSW of Tanjong Keling. Those from E are boarded 5 miles SSE of the same point. A private pilot is used at the offshore oil mooring.

The tidal current sets SE at a rate of 2.5 knots from 3 hours before to 3 hours after HW at One Fathom Bank; for the remaining 12 hours it sets to the NW at a rate of about 1.7 knots.

Anchorage.—In this open roadstead there is good anchorage, in from 5.5 to 14.6m, about 1 to 2 miles offshore.

5.32 Between Melaka and Tanjong Seginting, about 46 miles SE, the low, thickly wooded coast is bordered by a mud bank which extends up to 2.5 miles offshore in places.

The **Water Islands** (2˚05'N., 102˚19'E.), centered about 8 miles SE of Melaka, consists of a group of six tree-covered islands of moderate height. Pulau Besar, the largest island, is 40m high and is separated from the coast to the N by a foul, rocky channel. The channel between Pulau Besar and Pulau Dodol, the next island to the S, is fouled by a rock with a depth of 0.9m, which lies 0.3 mile N of the latter island. The other channels between the islands are deep, but they should be avoided.

The **Sungai Muar** (2˚03'N., 102˚33'E.), a shallow river available only to small craft, discharges into the strait about 14 miles ESE of Pulau Besar. The river is tortuous but small craft with drafts of 1.8m can ascend to Kepong Hill about 60 miles above the entrance. A radio mast stands on the E bank of the river close within the entrance.

5.33 **Muar (**Bandar Maharani**)** (2˚03'N., 102˚34'E.) (World Port Index No. 49980), the headquarters of the state commissioner, is the second port in importance in Johore Province and has a considerable trade. Ocean-going vessels work cargo at the anchorage. Small vessels and barges can be accommodated at the river wharves abreast the town. Depths alongside these wharves are about 2m. The entrance bar has a least depth of 1.2m.

Anchorage can be taken by small vessels, in a depth of 4m, off the mouth of the Sungai Muar. Larger vessels can anchor about 4 miles WSW of the lighthouse at the entrance, in a depth of 7m, thick mud, good holding ground.

Bukit Mor (1˚59'N., 102˚41'E.), an isolated densely-wooded hill, 235m high, stands about 8 miles SE of the town of Muar.

Tanjong Tohor (1˚52'N., 102˚41'E.), a low point covered with jungle growth, is located about 13 miles SE of Muar.

A 17.5m shoal lies near the main fairway about 11 miles W of Tanjong Tohor.

5.34 **Formosa Bank** (1˚46'N., 102˚48'E.) and its NW extension fronts the coast from Tanjong Tohor to Tanjong Seginting; off the latter point it merges into the 11m bank fronting the coast. The bank has a least depth of 3.3m and is steep-to on its NW and SW sides.

Baker Patch, with a depth of 8.8m, lies on the NW extension of Formosa Bank. Between these banks and the coastal bank there is a deep clear channel.

The bank which lies between the SE end of Formosa Bank and the coastal bank is marked by numerous fishing stakes and vessels are advised to navigate in this vicinity during daylight only.

The **Sungai Batu Pahat** (1˚49'N., 102˚53'E.) is fronted by a shallow flat which, extends up to 3 miles offshore. A depth of 0.3m exists on this flat near the river entrance at LW. Within the entrance there are depths of 2.5 to 5m as far as the town of Batu Pahat (Bandar Penggaram), about 4 miles upstream.

The river is navigable by light-draft vessels for many miles but should only be entered by vessels that have local knowledge.

Pilotage is not compulsory. A local qualified pilot is not available, but an experienced guide can be obtained from the District Marine Office, Batu Pahat.

5.35 **Bukit Banang** (1˚49'N., 102˚57'E.), 470m high, is the summit of a range of rolling hills which terminates at Tanjong Seginting. Four radio masts stand on its summit. Several bright white lights, visible for a considerable distance, are sometimes shown near the radio masts.

A light is reported to be shown from Tanjung Seginting and Pulau Sialu.

Anchorage can be taken, in a depth of 7.3m, good holding ground, clear of the fishing stakes, about 2 miles SW of Pulau Sialu Light.

The coast between Tanjong Seginting and Tanjong Piai, about 50 miles SE, is low and thickly wooded; abreast Pulau Pisang the coast recedes about 5 miles. The coastal bank, as defined by the 10m curve, extends about 6 miles offshore in this bight and up to within 1 mile of Pulau Pisang.

Within a line joining Tanjong Seginting and Pulau Pisang the bottom is very uneven, being marked by isolated depths of 5.5 to 14.6m.

5.36 **Pulau Pisang** (1˚28'N., 103˚16'E.), tree covered and 134m high, stands about 19 miles NW of Tanjong Piai and can be seen for a considerable distance. The island has been reported to be a good radar target at distances up to 30 miles.

A bank, with depths of less than 10m, and a least depth of 4.8m about 4 miles within its outer end, extends about 7 miles NW from Pulau Pisang. A narrow steep-to spit, with a depth of 3m over its extremity, extends about 6 miles SE from Pulau Pisang. A channel about 0.7 mile wide with a least depth of 11m, lies between this spit and the coastal bank. This channel should not be used without local knowledge.

The Sungai Benut, entered about 8 miles N of Pulau Pisang, is the largest river along this part of the coast. Only small vessels with local knowledge can be accommodated.

The Sungai Pontian Besar and the Sungai Pointian Kechil are entered 8 miles and 9.75 miles SE, respectively, of the lighthouse at the entrance of the Sungai Benut. Both rivers are shallow and are available only to small craft.

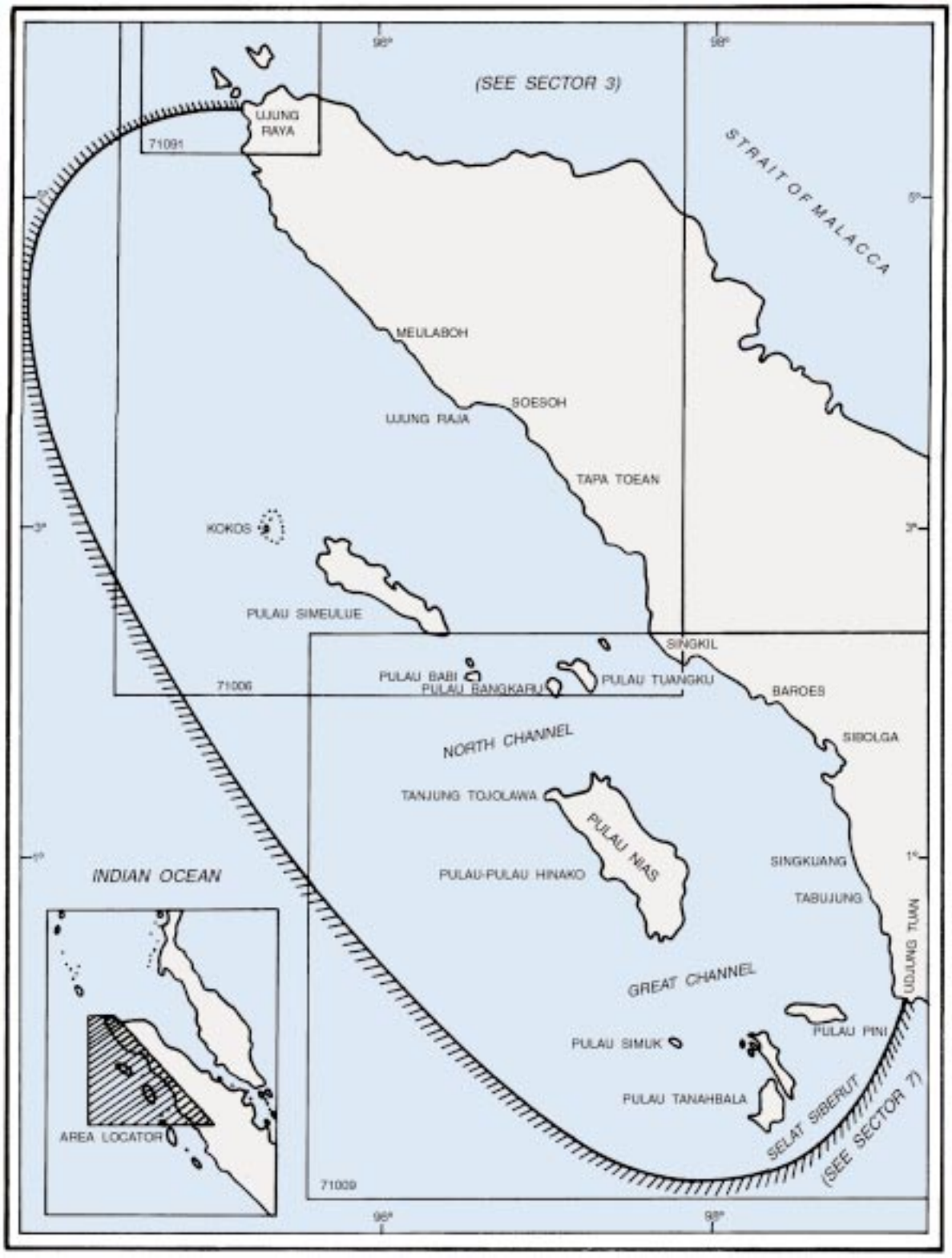
A radio mast stands at the entrance of the Sungai Pontian Kechil.

Fair Channel Bank and Long Bank, which lie in the strait adjacent to this section of coast, have been previously described in paragraph 5.4.

A traffic separation scheme is entered 5 miles SW of Pulau Pisang. This scheme continues SE into Singapore Strait; and then E through Singapore Strait where S of Johor, there is a precautionary area, before continuing NE into the South China Sea through the traffic separation scheme in the Horsburgh Light area.

5.37 **Pulau Kukup** (1˚19'N., 103˚25'E.), a low flat wooded island, lies within the coastal bank about 5.5 miles NW of Tanjong Piai. The trees on the NW side of the island are of a bright green color and those on the SE end are tall like those on the adjacent coast.

Caution.—In passing Pulau Kukup, caution must be exercised because the E current sets strongly toward the shore and the W current toward Long Bank on the opposite side of the fairway.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **6** — CHART INFORMATION

SECTOR 6

WEST COAST OF SUMATERA—UJUNG RAYA TO UDJUNG TUAN

Plan.—This sector describes the W coast of Sumatera from Ujung Raya to Udjung Tuan, including the off-lying islands. The arrangement is S from Ujung Raya and then W to E from the off-lying islands.

General Remarks

6.1 On the W coast of Sumatera there is a high, rocky coast, or if there is a strip of sand by the sea, the land rises rapidly behind it to the neighboring hills. Numerous small streams discharge their waters on the W coast, but most of them are barred and only navigable by small craft. Nearly the whole coast is inaccessible due to heavy surf.

The routes along the W coast of Sumatera may be considered as three in number, but the outer route may be said to be free from danger. The coast is reported to be only partially surveyed. Vessels should keep to the sea until abreast the desired port before hauling in.

The route to the W of all the islands, in the open sea, is the best of the three, especially for vessels not intending to touch at any of the W coast ports.

The middle route is the space between the chain of large islands in the offing and those small islands adjacent to and interspersed along the coast. It ranges from 10 to 30 miles distance from the coast of Sumatera.

The inner route is that close along the coast and between some of the islands and dangers off it. Like the middle route, it should seldom be chosen; but as there are in many places moderate depths for anchoring, it is preferable in that respect to the middle route.

Vessels visiting many of the ports are obliged to use it, but considerable risk is run when taking this route at night; those using it are generally obliged to anchor at sunset.

Winds—Weather.—The influence of the Southwest Monsoon and the Northeast Monsoon are felt on the W coast of Sumatera as far S as 2˚N, S of the Indian Ocean monsoons, but from **Ujung Raya** (5˚32'N., 95˚11'E.) to 4˚N the winds are quite different from those between 4˚N and 2˚N.

Between Ujung Raya and 4˚N, the Southwest Monsoon prevails from May to October, and the Northeast Monsoon, from December to March. During the height of the Southwest Monsoon, the sea breeze prevails at times during the night. Generally speaking the land winds are clearly perceptible by the deflection of the wind to SE or N during the night. Squalls are frequent during the monsoon, and there is often a considerable sea along this coast. It is somewhat hazy at times.

The Northeast Monsoon period is from December to March, and it is less strongly marked. When the monsoon has fairly set in, there is usually a gentle S breeze in the morning, followed by a calm, and in the afternoon a light breeze. After sunset comes, the land wind prevails all night. Between 4˚N and 2˚N is the region of calms and light variable winds.

The influence of the monsoons only appears in a W tendency of the day wind from March to November, and an E tendency from November to March; at night, except in January and February, there is always a N tendency in the wind.

In April, SW and NW winds are most prevalent, both night and day. From May the NW winds become more prominent.

During the following months they increase and reach their maximum in October; at times these winds cause a considerable sea. August is marked by a frequency of NE winds. At night, the winds from May to November are from NW to NE. From November to January, the wind is variable in the daytime; at night it is generally from NE to E.

Tides—Currents.—The tides on the W coast of Sumatera are chiefly semi-diurnal in character and of small range, rarely exceeding 1.2m.

The current off the W coast of Sumatera sets mainly NW at a maximum rate of 2 knots near the 200m curve. It seldom sets SE, but may sometimes set onshore. Beyond 8 miles from the coast, the surface current caused by the wind attains a maximum rate of 1.25 knot with NW winds and 1 knot with SE winds.

North of the Equator, the current outside the islands may sometimes be the reverse to that flowing between the islands and the coast.

Pilotage.—Pilotage is compulsory for all the ports of the Republic of Indonesia at which pilots are available.

Experience has shown that little confidence should be placed in the natives who offer themselves as pilots on the W coast of Sumatera for ports seldom visited. Signals for a pilot are in accordance with the International Code of Signals.

Regulations.—An extensive prohibited area, in which fishing and other activities not associated with the innocent passage of foreign vessels, has been established off the coastline of northwestern Sumatera to a line joining the following positions:

a. 5˚43.2'N, 94˚46.5'E.
b. 4˚48.0'N, 95˚10.0'E.
c. 2˚57.0'N, 95˚11.0'E.
d. 2˚51.0'N, 95˚13.9'E.
e. 1˚55.0'N, 96˚29.0'E.

This prohibited area does not apply to foreign vessels supporting offshore terminals. Mariners should consult with local authorities for further information.

Caution.—The coastline is deeply indented, forming numerous bays, none of which, however, N of **Sibolga** (1˚44'N., 98˚46'E.), afford complete shelter during the Southwest Monsoon. There are many visible and sunken dangers off the coast, but N of **Ujung Raja** (3˚44'N., 96˚31'E.), they do not extend to any great distance. South of that point they extend from 20 to 30 miles.

Many dangers no doubt exist that are not charted; caution is necessary at all times. Many of them are steep-to coral reefs, so that soundings will give no warning; a good lookout aloft should be kept during daylight, and vessels should proceed only at a moderate speed when navigating in the vicinity of dangers. Soundings, however, should not be neglected.

Ujung Raya to Teluk Rigaih

6.2 **Ujung Raya** (Ujung Raja) (5˚32'N., 95˚11'E.) is a lofty promontory rising precipitously from the sea and easily recognized from all directions; there are depths of 21.9m at a short distance from it.

A number of sunken dangers lie near the coast rendering it advisable to give it a berth of 5 or 6 miles, especially at night.

Most of the dangers are steep-to, as is the coast in most places, but they are generally seen by the surf breaking over them. There are numerous prominent headlands and mountains by means of which the position of a vessel is easily verified.

An indifferent bottom almost everywhere, and the heavy ocean swell and poor shelter from W winds, render most places on this portion of the W coast as undesirable anchorages.

The coast between Ujung Raya to Teluk Rigaih, about 57 miles SSE, is very irregular and has many prominent headlands, with bays between, none of which afford secure anchorage during the Southwest Monsoon.

Teluk Kruengraba (Kroeeng Raba Bay) (5˚28'N., 95˚04'E.), lying 2.5 miles S of Ujung Raya, is about 4 miles wide; the mountains on either side make it appear as a valley when being a considerable distance off, and it has been mistaken for **Aroih Cut** (Suratte Passage) (5˚32'N., 95˚09'E.).

There is a cement-handling pier in the bay. The pier is 125m long. with a depth of 10m alongside; vessels with a maximum length of 150m and a maximum draft of 9.1m can be accommodated. Pilotage is compulsory. The pilot boards 1.75 miles WNW of the breakwater light. Vessels can obtain anchorage, in 22m, about 2 miles NW of the light.

Ujung Ritieng (5˚26'N., 95˚14'E.) is the S entrance point of Teluk Kruengraba. The point is a precipitous headland with a rock above-water close off it and depths of 18.3m just beyond.

Aert van Nes (Karang Rada) (5˚27'N., 95˚09'E.), a coral patch with a least depth of 11.9m, lies about 5 miles WNW of Ujung Ritieng. Coehoorn Reef, 5.5 miles S of Aert van Nes, has a least depth of 11.9m.

Detached banks, with depths of from 12.8 to 16.5m, lie E and SE of Coehoorn Reef. Sindoro, a coral patch about 2 miles in length, N and S, with depths of 11.9 to 18.3m, is steep-to, with 54.9m close-to on its W side, and 20.1 to 27.4m on the N and E sides.

These reefs are not marked by discoloration but can be identified at times by a heavy swell over them.

6.3 **Pulau Rusa** (5˚17'N., 95˚12'E.), 95m high and marked by a light, is a densely wooded island with a rugged coastline. In heavy sea, the water for a considerable distance W of the island becomes a light green color and gives the impression of there being a reef in the vicinity.

Ujung Poedeng (Ujung Lambaroh) (5˚12'N., 95˚16'E.) lies about 6 miles SSE of Rusa, and is a low coastal point with a reef extending about 0.4 mile SE and 0.25 mile W. There is a shoal with depths of 3.2m located about 0.6 mile S of Poedeng. The sea usually breaks over this shoal.

Kluang Bay, entered between **Ujung Sidagung** (5˚08'N., 95˚18'E.), located 4 miles SSE of Ujung Lambaroh, and **Oedjoeng Tangkoera** (5˚07'N., 95˚17'E.), about 2 miles farther SW, is exposed to NW winds and does not afford a good anchorage. During the Southwest Monsoon, there is a confused sea in the bay.

Ujung Sidagung is a steep-to and rocky point close N of Ujung Seudheuen; the latter point is the termination of a high and very noticeable promontory, joined to the mainland by an isthmus covered with coconut palms.

From Ujung Seudheuen to Raja Bay, about 14 miles SSE, the coast is indented by several small bays available for small craft with local knowledge.

Raja Bay (Teluk Raya) (4˚54'N., 95˚22'E.), entered between Ujung No and the N side of Pulau Raja, about 3 miles S, is one of the best anchorages on this coast; although it is open to the W, it has good holding ground, with depths of about 14.6m. The head of the bay is fringed by a coral reef which extends a short distance, with above-water rocks on it in places.

6.4 **Lhokkruet** (Lho Kroeet) (4˚52'N., 95˚24'E.) (World Port Index No. 50590) is the southernmost of the two villages on the shore of the bay. It is one of the most important pepper ports of the W coast of Sumatera.

Pulau Raja (4˚52'N., 95˚22'E.) is densely wooded and about 53m high. A yellowish sandstone rock, about 0.9m high, lies on a reef which extends about 0.2 mile NW from the W extremity of the island.

Anchorage.—Anchorage may be obtained anywhere in Raja Bay. With NW winds the best anchorage is about 0.5 mile S of the NE part of Pulau Raja, in a depth of about 14.6m, under the lee of the island.

The coast extending SE of Raja Bay is skirted by reefs and above-water rocks within 1 mile of the coast, which are usually marked by swells.

Ujung Gla (4˚49'N., 95˚24'E.), about 4 miles S of Lho Kroeet, is a sparsely wooded rocky point with precipitous sides and an above-water rock close off its N side. The shore of the bay lying between Lho Kroeet and Ujung Gla consists of low, red-colored hills covered by coconut palms.

Pulau Keueh (4˚46'N., 95˚27'E.), an island 69m high, lies about 4 miles SE of Ujung Gla and 0.5 mile offshore. Its W side is steep-to, and may be approached closely, but the E and S sides have a coral reef 91m wide, with 11m close-to.

The **Pejaba Islands** (4˚43'N., 9˚28'E.), about 4 miles SSE of Pulau Keueh, consists of two wooded islands, with a low, rocky, barren islet, nearly always covered by surf, lying about 0.1 mile SW of the outer island. A rock, nearly awash, lies 0.3 mile S of the inner island.

6.5 **Ujung Gloempang** (4˚43'N., 95˚30'E.) is a precipitous tongue of land crowned by a green hill with a few scattered trees on it. A reef extends E from the point for about 0.1 mile and to a distance of 137m offshore. Foul ground extends about 0.3 mile S from Ujung Gloempang.

The **Tjikem Islands** (4˚41'N., 95˚31'E.), two in number, are located about 1.2 miles S of Ujung Gloempang. The W island is steep-to on its seaward side. Both islands are densely wooded and joined by a reef

Ujung Baro (4˚39'N., 95˚32'E.), the SW extremity of the peninsula within which is Teluk Rigaih, is a rocky headland rising steeply from the sea, covered with vegetation, and higher than the land within it. It is the N entrance point for Teluk Rigaih.

Gillis Reef, with a least depth of 3.4m, is about 46m in diameter and occasionally breaks; it lies 1.5 miles NW of Ujung Baro.

Pulau Rangas (4˚38'N., 95˚31'E.), lying about 2 miles SW of Ujung Baro, is a small rocky island 66m high, and covered with trees, which are visible for a considerable distance. Two rocks above-water lie off its SE side, and a sunken rock, which always breaks, lies 91m off its NW side, all of which are steep-to. A rock, 0.9m high, lies ESE, 0.4 mile from Pulau Rangas.

Anchorage.—There is fine weather anchorage all around the island, in a depth of about 21.9m; small vessels may find shelter during NW winds in the same depth, with the NE extremity of the island bearing 278˚, distant about 183m.

Teluk Rigaih to Meulaboh

6.6 **Teluk Rigaih** (4˚38'N., 95˚35'E.) (World Port Index No. 50580) is nearly 2 miles wide and about the same in length; the coast is for the most part composed of rocky cliffs, excepting the swampy portion on its NE side. The four islands which encumber it divide the bay into the N and S harbors.

There is always a heavy swell in Teluk Rigaih. South Harbor, the larger of the two, is used by all but small craft, being about 0.5 mile in extent, with depths of 9.1 to 11m, over sand and mud, and easy of access. It is open to the Southwest Monsoon, rendering it advisable to moor.

North Harbor has depths of 5.5 to 7.3m over a breadth of about 0.1 mile and is used by small trading craft; it affords fair shelter at all seasons and, being abreast the town, is much more convenient than the South Harbor.

Pulau Reusam (4˚39'N., 95˚33'E.), the largest and highest of the four islands in the bay, is surrounded by a reef. Two shoals, with depths of 3.7 to 5.5m, lie about 0.1 mile W of Pulau Reusam. A patch, with a depth of 5.9m, lies about 0.1 mile E of Pulau Reusam.

Anchorage.—Vessels making any stay at Teluk Rigaih are recommended to moor W or S of Pulau Reusam, where there are depths of about 15m, sand and mud.

There is an anchorage area for vessels in South Harbor, in a depth of about 9m.

6.7 **Sikawit** (5˚00'N., 95˚42'E.), a very noticeable twin peak summit 1,872 and 1,655m high, lies about 22 miles NNE of Teluk Rigaih.

Between Teluk Rigaih and Meulaboh, about 47 miles SE, the coast is low with flat land stretching a great distance inland. There are no off-lying dangers on this part of the coast.

The depths are regular, but it is recommended not to get inside the 20m curve at night, as within this depth soundings give little warning of being close inshore. This part of the coast is very uniform and without any remarkable features in the foreground.

The coast between **Ujung Toeba** (Ujung Tuba) (4˚12'N., 96˚01'E.), a low promontory, and **Ujung Kareueng** (4˚07'N., 96˚08'E.), about 8 miles SE, is swampy.

Ujung Kareueng, the W extremity of Meulaboh Bay, is a low point sparsely covered with coconut trees with buildings of a settlement on it; a light is shown from Ujung Kareueng. Ujung Geudong, fringed by a reef, is located about 1 mile NNE of Ujung Kareueng.

Meulaboh Bay affords less protection, there being no reefs seaward. The shore of the bay is fronted by a reef which extends 91m off **Kuala Tjangkul** (4˚08'N., 96˚08'E.).

6.8 **Meulaboh** (4˚08'N., 96˚08'E.) (World Port Index No. 50570), situated on the W side of the bay, is the shipping port for copra, pepper, and forest products.

Landing places for boats are available, but is often impossible because of heavy surf.

Tides—Currents.—The tides are inconsiderable, but occasionally rise as much as 0.3m.

Depths—Limitations.—A ferry berth, consisting of a T-shaped jetty, lies close S of the town. A quay, 52m in length, with a depth alongside of 1.5m, lies at the head of the bay.

Aspect.—About 2 miles N of Ujung Kareueng a white conical monument stands near the coast.

The mooring buoys of an oil depot lie about 1 mile ENE of Ujung Geudong. A submerged oil pipeline extends 0.5 mile NNW from the mooring buoys to the shore.

Anchorage.—Anchorage may be obtained, in a depth of about 7.9m, sand and mud, with the flagstaff close NW of Ujung Geudong bearing 268˚ and the light structure on Ujung Kareueng bearing 229˚. It is exposed to winds between SW and SE, and the holding ground is bad; vessels should be ready to leave at short notice.

Directions.—A vessel approaching from W can round the reefs off Ujung Kareueng by eye, as they are marked by breakers. When Ujung Geudong is open to Ujung Kareueng, a vessel may steer for the anchorage, rounding the latter point at a distance of about 1 mile. Approaching from S, the zinc roofs of Ujung Kareueng are visible from a considerable distance.

Caution.—Several dangers, marked by breakers, lie in the W approach to Meulaboh Bay. A reef, with a least depth of 4m, lies about 2 miles NW of Ujung Kareueng and 0.5 mile offshore. About 1 mile SSW of this reef is a 4.9m patch.

About 1 mile W of the same point is a 3.3m patch, with a similar patch close N of it. Between these patches and the W side of the peninsula lies a reef with a depth of 2.4m. Depths of about 3m less than charted were reported to exist in the bay E of a line joining Ujung Kareueng and Ujung Geudong.

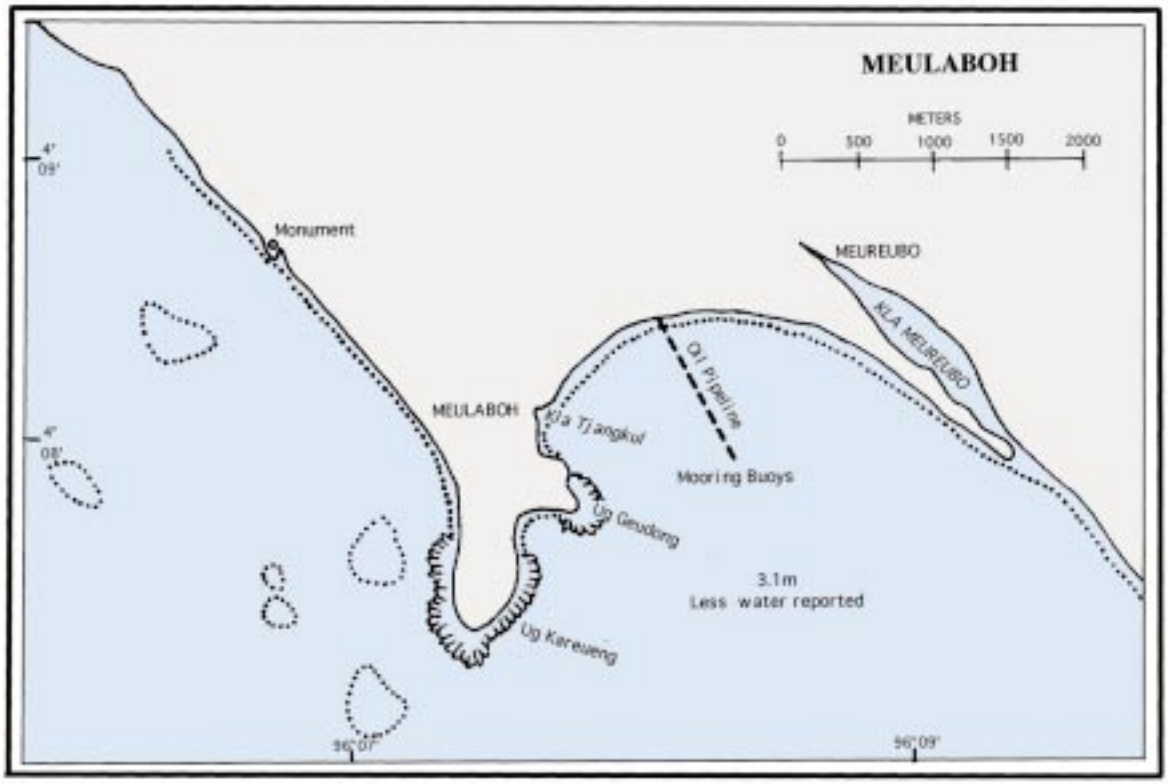
Meulaboh to the Sungai Singkil

6.9 Between Meulaboh and **Ujung Raja** (Oedjoeng Radja) (3˚44'N., 96˚31'E.) about 34 miles SE, the coast is low, with high trees behind. There are no off-lying dangers until about 12 miles SW of Ujung Raja and the soundings give good warning of approach to the coast. The mountains lie far inland and are only visible in the early morning.

Gunung Abong Abong (4˚15'N., 96˚48'E.), 2,985m high, lies about 35 miles NNE of Ujung Raja; it is a slightly curved dome-shaped summit, only distinguished from the other mountains in the vicinity by its great height.

Gunung Loser (3˚45'N., 97˚11'E.), lying about 40 miles E of Ujung Raja, has two sharp peaks, the NE of which is 3,381m high; from the SW it appears as a saddle.

The summits, which have flat tops, are 3,045 and 1,533m high and lie 4 miles SSE and 12.5 miles S, respectively, of Gunung Loser. Near the coast, there are many smaller mountain peaks further SE.



Meulaboh

From a position about 13 miles SW of Ujung Raja to a position about 4 miles W of **Tapa Toean** (3˚15'N., 97˚11'E.), a distance of about 50 miles SE there are many shoal patches with depths of from 7.6 to 12.8m close inside the 200m curve, and then to the coast there are numerous patches with even lesser depths reported.

Those reefs off the coast between Ujung Raja and **Ujung Brang Bang** (2˚16'N., 97˚46'E.) are seldom marked by breakers or discoloration.

Caution.—There are several islands off this coast; numerous isolated dangers, many out of sight of land, which make navigation hazardous.

6.10 The nature of the bottom changes completely S of **Ujung Raja** (3˚44'N., 96˚31'E.), whereas to the N, the depths decrease regularly. A vessel may come suddenly into considerable and irregular depths S, which will be close to dangerous shoals.

Soundings, however, should not be neglected, and a good lookout aloft should always be kept during the day. Night navigation is attended with considerable risk.

Teluk Susoh (Teluk Soesoh) (3˚43'N., 96˚48'E.), about 16 miles E of Ujung Raja, is entered between Ujung Pulo Kajee (UJung Pulaukayee) and Ujung Seurangga, about 1 mile SE; it affords some protection during the Southwest Monsoon, being sheltered from NW winds, which sometimes blow with considerable force, when a heavy swell sets into the anchorage. Both entrance points are fringed by a coral reef.

6.11 **Ujung Seurangga** (3˚43'N., 96˚48'E.) is a low barren sand spit, near the inner end of which is **Susoh** (Soesoh) (3˚43'N., 96˚48'E.) (World Port Index No. 50560). Near the E end of Susoh, with its zinc-roofed houses, is a noticeable tree which shows above the edge of the wood, and at the head of the bay there is a prominent tree, painted white.

A jetty with a length of 50m at its head, depth alongside 6m, extends from the shoreline. Barges use a wooded jetty by the palm oil tank farm.

Aspect.—Vessels approaching the roadstead can see some storehouses and a palm oil tank at the settlement for a distance of 9 miles.

The green hills near Teluk Susoh (Teluk Soesoh) are visible for a considerable distance.

Susoh Light (Soesoh Light) is situated at the SW extremity of Ujung Seurangga. Another light is situated 0.2 mile NNE of Susoh Light.

Anchorage.—Small vessels may obtain anchorage in Teluk Susoh W of Susoh village, in depths of from 12 to 14m, and, in a depth of 18m, mud, with the pier head bearing about 310˚.

Large vessels should anchor in the road, which, although sheltered to some extent by off-lying reefs, lies open to the W swell and to winds between W and S.

Directions.—Approach from the W on the parallel of 3˚40'N until Susoh Light bears 055˚ when it should be steered for on that bearing until a white beacon marking the 2.3m patch in the center of the bay, bears about 021˚. This course leads clear of all dangers at the greatest possible distance.

The coast between Teluk Susoh and Tapa Toean, about 36 miles SE, is low; the reefs lying in the vicinity of the 20m line are occasionally marked by swell, but never by discoloration. The chart should be referred to for the off-lying reefs between the coast and the 200m curve.

Caution.—There are two shoal patches of 2.3 and 8.7m, respectively, near the center of Teluk Susoh. The submerged dangers S and W of Susoh do not show by discoloration owing to the turbid water of the rivers. They are steep-to, but the sea does not break over them and they are very small, and there may be other dangers not yet discovered in the vicinity.

6.12 **Tapaktuan** (Tapa Toean) (3˚15'N., 97˚11'E.) (World Port Index No. 50550), entered between Ujung Kupiah and Ujung Batu Itam, about 2 miles E, is entirely open S. The shores of the roadstead are high and steep, and consist of wooded rocks and high hills.

It is reported to be fringed by a reef in most places, but abreast **Tapaktuan** (3˚15'N., 97˚11'E.), on the W side of the bay, there is a narrow channel through the reef, with a pier on its S side.

The NW portion of the bay is encumbered by Pakah Reef, which is marked by breakers and rollers.

Depths—Limitations.—The pier can accommodate vessels up to 5,000 dwt, with a maximum length of 60m and a maximum draft of about 5m, although ships remain in the roads to load and discharge. Cargo is conveyed to and from shore by private barges.

Aspect.—A very prominent house stands among those on the W shore of the bay.

Anchorage.—Good anchorage may be obtained, in a depth of 36m, mud, with the pier head bearing 324˚ and Ujung Kupiah bearing 270˚. The anchorage is uncomfortable with winds between W and S.

Caution.—Batu Tungkat, a rock which dries, lies about 1 mile W of Ujung Kupiah. Batavia Rock, with a depth of 11.9m, lies about 0.3 mile NW of Batu Tungkat. Batu Kupiah, which dries, lies about 0.1 mile SW of Ujung Kupiah, the W entrance point of the bay.

6.13 From a position about 8 miles W of Ujung Kupiah to a position offshore about 13 miles SW of **Ujung Pulo** (2˚54'N., 97˚31'E.), a distance of about 33 miles, proceed with caution as there are shoals with depths of from 5.5 to 11.9m, lying outside and just inside the 200m curve, and extending from 6.5 to 12 miles offshore. Between these shoals and the coast there are many other dangers with even less depths.

Prominent hills and mountains lie 6.5 miles N, 5.5 miles NNE, and 4 miles NE, respectively, of Ujung Pulo.

Between Ujung Pulo and the **Sungai Singkil** (2˚16'N., 97˚47'E.) is a wide alluvial plain thickly wooded in parts with casuarina trees. The coast is low with a sandy beach and rises inland. Many reefs and shoals, some of which are unmarked by surf, encumber the coast.

Off-lying Islands

6.14 **Pulau Simeulue** (2˚45'N., 96˚00'E.), the northernmost of the large islands off the W coast of Sumatera, lies about 65 miles from the coast. It is hilly with **Sibau** (2˚34'N., 96˚16'E.), the highest peak being 625m high. The coasts are mostly rocky, and there are many off-lying islands, islets, and reefs.

The reefs close to and between the several coral islets are steep-to and, except those near **Pulau Sioemat** (2˚39'N., 96˚23'E.), on the NE side of the island, show up distinctly.

The depths around the island vary greatly, so the soundings give little warning of the approach of land; a good lookout from aloft is advisable. Earthquakes and seismic sea waves occasionally occur, but minor shocks are frequent.

The **Kokos Islands** (2˚59'N., 95˚23'E.) are two low islands, lying about 24 miles W of the N extremity of Pulau Simeulue; they may be seen from a distance of about 13 miles. The southernmost island is marked by a light.

Depths of from 9 to 16.5m exist on the NW end of the bank extending 19 miles out from the W extremity of Pulau Simeulue. These patches are usually marked by heavy rollers.

6.15 The **Banjak Islands** (2˚10'N., 97˚17'E.), consisting of a group of islands more than 50 in number, extend from 13 miles NW to 38 miles W of Singkil. The three largest of the islands are Pulau Toeangkoe, Pulau Bangkaroe and Pulau Oedjoeng Batoe, besides which there are many islets with deep-water channels interspersed with rocks between them.

Pulau Bangkaroe (Pulau Bangkaru) (2˚05'N., 97˚07'E.), the southwesternmost of Banjak, is mountainous, attaining a height of 303m. Along the E coast, off the spurs of the mountain ridges, is a strip of low land which is overgrown with mangroves. The N, W, and S coasts are bold and the spurs of the mountains extend to the sea.

Between Pulau Bangkaroe and **Pulau Babi** (2˚06'N., 96˚39'E.), 23 miles to the W, the channel is deep and considered to be clear of dangers; it is recommended to keep to the Pulau Bangkaroe side. The channel between Pulau Bangkaroe and Pulau Toeangkoe is about 5 miles wide with deep water, and free from danger to within 0.5 mile of either side.

Pulau Toeangkoe (Pulau Tuangku) (2˚10'N., 97˚17'E.), the largest island of the group, is hilly and mountainous. The E side is low and overgrown with mangroves, with several bays in which there is sufficient depth of water; the channels leading to them between outlying reefs are mostly dangerous. Two conspicuous summits rise on the N coast and form good landmarks.

Pulau Palambak (Palambak Islands) lies off the E coast of Pulau Toeangkoe, with numerous reefs extending to the NW.

The N coast is fronted by numerous reefs and islands located up to 6 miles offshore.

6.16 **Pulau Oedjoeng Batoe** (Pulau Udjungbatu) (2˚20'N., 97˚24'E.), about 10 miles N of Pulau Palambak, is completely surrounded by an extensive reef, and the individual islands mutually connected by coast reefs, which are largely dry at LW. The passages between these islands are practicable for small craft only.

Between Pulau Oedjoeng Batoe and the islands and reefs extending N from Pulau Toeangkoe is a deep channel about 3 miles wide.

East of the reef and foul ground extending about 2 miles NE of Pulau Oedjoeng Batoe is a deep channel about 4 miles wide,

said to be one of the best passages between the Banjak Islands, but there are several shoal heads in the E part.

Djawi Djawi (Jawi-Jawi) (2˚23'N., 97˚33'E.), the NE of the Banjak Islands, lies about 9 miles E of Pulau Oedjoeng Batoe and about 6 miles W of the Sumatera coast. It is low and sandy, with a few shrubs, and may possibly be seen from a distance of 11 miles. It is surrounded by a large reef, of which the outer edge is always marked by discolored water and overfalls, a few rocks are also visible.

On the N side, between two sand flats which show above water, is a passage through which small craft may reach the shore.

Eastward and W of Djawi Djawi are numerous shoals, and to the W are a few sand flats.

Vessels proceeding N from or S to Singkil can use the channel between Djawi Djawi and the drying patch located about 2.2 miles E of the island. As the reef surrounding Djawi Djawi is always visible, vessels should favor the W side of the channel, taking care to avoid the 6.9m patch about 2 miles NNE of the island.

Ujung Singkil (2˚16'N., 97˚44'E.), 8.5 miles SSE of **Oedjoeng Pasir Gala** (Ujung Pasirgala) (2˚24'N., 97˚40'E.), may be identified by some dead trees standing in the sea close off it. From it a spit, with depths of from 1.8 to 5.5m, extends about 3 miles SW.

North Daphne Reef (Karang Rumambi) (2˚13'N., 97˚46'E.), with a depth of 1.5m, coral, and steep-to, lies about 4 miles SSE of Ujung Singkil.

Ujung Singkil to Baroes

6.17 The **Sungai Singkil** (Singkil River) (2˚16'N., 97˚47'E.) may be entered about 3 miles ESE of Ujung Singkil, between Ujung Brang Bang on the W side, and a drying bank on the E side which extends nearly 0.75 mile S from the coast.

Singkil Roadstead is located off the mouth of the Sungai Singkil and the town of **Singkil** (2˚16'N., 97˚48'E.) (World Port Index No. 50540).

Aspect.—A disused light structure is situated about 1.75 miles NE of Ujung Brang Bang.

Anchorage.—Anchorage may be obtained, in a depth of 7.9m, mud, with the disused light structure bearing 000˚.

It may be also obtained off the mouth of the river in a depth of about 14.6m, mud, with Ujung Brang Bang bearing 020˚, and **Ujung Ketapan** (2˚16'N., 97˚45'E.) located 1.25 miles W of Ujung Brang Bang, bearing 301˚.

This berth is very exposed during the Southwest Monsoon. A mooring buoy lies 0.8 mile S of the disused light structure.

Directions.—A vessel bound to Singkil from the N and having come through the channel E of Djawi Djawi, should keep that island bearing N of 327˚, astern, to avoid **Arum Pandjang** (2˚18'N., 97˚38'E.), which bearing also leads clear of the spit 3 miles SW of Ujung Singkil. Having passed the latter, steer for the anchorage N of North Daphne Reef.

6.18 The coastal plain between the Sungai Singkil and **Udjung Tuan** (0˚15'N., 99˚08'E.), about 156 miles SE, is generally narrow, being backed by mountains with numerous peaks.

Between the Sungai Singkil and Baroes (Barus), 40 miles SE, the coastal plain is fairly wide, but then to Udjung Tuan, about 116 miles farther SE, the mountains gradually approach the coast. The rivers are generally small and of little importance.

Off the whole of this coast there are numerous reefs and islands, some of which rise steeply from the 200m curve.

Teluk Telaga is located E of Singkil, with **Ujung Radja** (2˚14'N., 97˚52'E.) forming its W point. Teluk Telaga is open and landing is difficult as the sea is usually breaking on the whole of its N shore. Landing may sometimes be possible on the E side of Ujung Radja, where the shore is clear of dangers.

Between Ujung Radja and **Pulau Musala** (1˚38'N., 98˚32'E.), about 48 miles SE, there is a deep channel, with a least width of 6.5 miles.

The channel lies between a line of detached reefs, which extends about 8 miles offshore, and a group SW of them, radiating from **Pulau Lakota** (1˚51'N., 98˚01'E.) about 18 miles SW of Ujung Silabi.

6.19 **South Pylades Reef** (1˚41'N., 98˚01'E.) is marked by breakers.

From Teluk Telaga the coast takes a SE direction for a distance of 25 miles to **Ujung Silabi** (2˚02'N., 98˚16'E.), where it turns E, forming Tapues Road on the W end of the bight.

Tapues Roads (2˚00'N., 98˚17'E.) (World Port Index No. 50530) lies about 3 miles E of Ujung Silabi. Anchorage may be taken, in 7.3m, mud, close NE of Ujung Silabi.

Baroes Road is located about 2.2 miles ENE of **Tanjung Karang** (2˚00'N., 98˚21'E.), a peninsula forming the W side of the road, fringed by a drying reef extending about 0.2 mile offshore.

6.20 **Baroes** (2˚00'N., 98˚23'E.) (World Port Index No. 50520), on the E side of the entrance to the Sungai Pasar Terandam, has a landing place inside the mouth of the river. The roadstead is open and unsafe.

Anchorage.—Large vessels should anchor, in 16.5m, about 0.5 mile E of **Pulau Karang** (1˚58'N., 98˚21'E.), protected from W squalls.

Pulau Nias North Channel, separating the Banjak Islands from the N end of Pulau Nias, is a deep passage about 30 miles wide, and except for the reef extending SE from **Pulau Sarang Aloe** (1˚59'N., 97˚23'E.), is clear of dangers.

Pulau Nias

6.21 **Pulau Nias** (1˚32'N., 97˚20'E.), the largest of the islands off the W coast of Sumatera, is hilly and from E appears like a chain of mountains of varying height. It has hardly any conspicuous peaks, but Maziaja Mountain, 432m high in the N portion, is noticeable along with three somewhat lower peaks.

From the W, the hills along the coast are seen to better advantage and afford good landmarks in conjunction with the islands fronting the coast. From S, the headlands provide the best marks.

Pulau Sarangbaung (1˚42'N., 97˚27'E.) lies 10.5 miles NNE of the N extremity of Pulau Nias. There is a break in the reef on the SE side where boats can land at a village. The island is overgrown with coconuts and is visible for 12 miles.

The N coast of Pulau Nias, which forms the S side of Pulau Nias North Channel, is low, but there is a range of hills extending S from **Tanjung Siginingini** (1˚32'N., 97˚21'E.), the N extremity of the island, to Maziaja Mountain.

From Tanjung Siginingini to **Tanjung Tojolawa** (1˚25'N., 97˚03'E.), the NW extremity of Pulau Nias, the coast is in parts fringed by a reef, with several off-lying islands.

From **Pulau Senau** (1˚27'N., 97˚14'E.), lying about 11 miles ENE of Tanjung Tojolawa, the coast is completely exposed to N and NW squalls. They are prevalent here during the months of October, November, and the first part of December; they may be exceptionally heavy and cause a heavy swell and much sea.

Anchorage.—Good anchorage during the Northeast Monsoon can be taken off **Tanjung Helacha** (1˚28'N., 97˚19'E.), in 16.5m.

During the Southwest Monsoon, anchorages off this coast, as far W as Pulau Senau, are impracticable because of heavy seas.

When anchoring on the N coast of Pulau Nias, swarms of mosquitoes are blown on board at night with the land breeze, and in view of the prevailing malaria it is advisable to anchor as far as possible offshore.

6.22 The W coast of Pulau Nias is nearly inaccessible because of surf **Tanjung Sosilutte** (1˚23'N., 97˚04'E.), about 2 miles SE of Tanjung Tojolawa, is a low point with a remarkable tree, and it is the S extremity of the Tojolawa Peninsula, on the slopes of which are the buildings of a coconut plantation.

Labuan Atjeh, on the E side of the peninsula, affords sheltered anchorage during N winds, in depths of from 18.3 to 21.9m, sand. A 1.2m patch lies on the E side of the bay, about 0.3 mile offshore.

Pulau Mausi (1˚21'N., 97˚06'E.), low and barren, lies in the S approach to Labuan Atjeh, about 2.2 miles SE of Tanjung Sosilutte. It has a white sandy beach, and is fringed by a reef on which the sea always breaks, extending about 1 mile S; there is a depth of 7.7m at the outer end of the reef.

An extensive reef, with a depth of 8.2m, which is marked by discoloration, lies 3.5 miles S of Pulau Mausi.

Anchorage may be obtained, in a depth of about 35m, sand and mud, off the E side of Pulau Mausi, partially sheltered from the heavy swell.

Pulau Wunga (1˚13'N., 97˚05'E.), about 8 miles S of Pulau Mausi, is low and covered with coconut trees. A large conspicuous tree, visible for 16 miles, is located on a small elevation near the N end. The reef extending from the N side of the island is ordinarily marked by high rollers; on the S side is marked by rollers or breakers.

6.23 **Pulau Pulau Hinako** (0˚50'N., 97˚22'E.) forms a group of eight islands, of which **Pulau Hinako** (0˚52'N., 97˚20'E.) is the most populated. They are all of coral formation, covered with coconut trees, and flat, with the exception of Pulau Hinako, which has a small ridge on its NW side, on which is a mission church and school. A light is shown from Pulau Hinako.

Between and in the vicinity of the islands are numerous reefs, for which the chart should be consulted. The 20m curve must be considered the limit of safety at Pulau Hinako, as nearly everywhere within this curve are drying reefs or reefs with little depth.

The W side of the four outer islands, with exception of the coast reefs on which there are usually breakers, is clear. By passing the islands at a distance of 1 mile, one will always carry considerable depths.

Pulau Bawa (0˚50'N., 97˚20'E.) is atoll-shaped. The seaward side of all of the islands consists of a raw coral mass which is practically impassable except at Pulau Bawa, of which the W side has been washed smooth.

Caution.—Vessels approaching Pulau Pulau Hinako from the N must be careful to avoid the 5.9m patch about 4.7 miles NNE of the light structure of Pulau Hinako.

6.24 **Tanjung Sirombu** (0˚56'N., 97˚24'E.), lying about 34 miles SSE of Tanjung Sosilutte, is low and wooded and may be identified by several tall casuarina trees which stand above the other trees. The point is marked by a light. From a distance it resembles an island, but from closer in the low wooded sandy isthmus joining it to the land is visible.

From both N and S of the point, the broad flat-topped hill Sommumme, 587m high, about 12 miles NE, is visible.

The coast S of Tanjung Sirombu is high. The hilly land extends down the coast at nearly all points. In many places, especially off the projecting rugged headland, large black above-water rocks lie close inshore.

The coast is indented for about 33 miles SE from Tanjung Sirombu to **Tanjung Lauju** (0˚34'N., 97˚42'E.), the SW extremity of Pulau Nias. Tanjung Lauju is low, but rises gradually to 110m.

6.25 A narrow, low plain extends along the S coast of Pulau Nias, but it quickly turns over into rolling land on which various villages have been built. Lagudri provides anchorage between Tanjung Lauju, its W entrance point, and a point about 2 miles E. Its shores are covered with coconut palms, and there is a sandy beach at its head free from rocks, where landing may be effected. Elsewhere, the shores are fringed by a reef extending up to 137m offshore.

The best anchorage position is in 11 to 12.8m, mud and sand, with the entrance points bearing 170˚ and 218˚. It is quite open to S and SW winds and swell, which sometimes extend well up the bay.

A reef, which dries and is marked by breakers, lies about 0.5 mile WSW of Tanjung Lauju; a spit, with depths of less than 11m, extends about 0.6 mile SE from the same point.

Batu Mandi (0˚33'N., 97˚45'E.), a large black rock, lies about 0.3 mile S of the E entrance point and is a good mark.

Directions.—A vessel approaching from W should keep Batu Mandi bearing less than 090˚ until the village on the E side of the bay, about 1 miles NNE of the E entrance point, bears 043˚ and then steer for the village on that bearing.

When **Batu Ito** (0˚33'N., 97˚44'E.), lying on the coastal reef about 2 miles from the E entrance point, bears 164˚, alter course N for the anchorage.

Tanjung Hele (0˚33'N., 97˚49'E.), the S point of Telok Dalam, lies about 6 miles E of Teluk Lagudri. A reef marked by discolored water and very high surf, extends SE from Tanjung Hele, which should be rounded at a distance of at least 1 mile.

6.26 **Telok Dalam** (0˚33'N., 97˚49'E.) (World Port Index No. 50860) is about 1 mile in length. It affords good shelter from all but SE winds, which, however, do not cause much swell, and is free from dangers. It is easily recognized by Tanjung Batu, the N entrance point, which is dark, nearly perpendicular, and 96m high, and has but little reef fronting it. A pier at the head of the bay has a depth of 2m at its head.

Anchorage.—A good anchorage, in 18m, may be obtained with the pier head bearing 327˚ and Tanjung Batu bearing 096˚.

Directions.—Vessels should steer up the center of the bay on a 297˚ course, passing about 0.2 mile off Tanjung Batu, to the anchorage.

Leading beacons are situated at the head of the inlet; the front beacon is situated on the head of the pier while the rear beacon is situated at the head of the inlet, about 183m NW of the front beacon. The beacons, in line bearing 324˚, lead into the inlet.

6.27 The E coast of Pulau Nias has moderate depths with good anchorage and some streams; islets and reefs front the coast here, as on the W side, but the sea being smoother on the E coast renders it safer.

From Telok Dalam, the coast trends NE for about 6 miles to **Balo Todojghu** (Ujung Tedu Ichu) (0˚37'N., 97˚54'E.), a low point covered with coconut trees. A number of villages lie scattered along this stretch of coast. A narrow reef fronts the shore, preventing loading in most places.

With S winds, there is quiet anchorage with good holding ground, in from 21.9 to 23.8m, a little N of Balo Todojghu.

Between Balo Todojghu and **Ujung Sumabawa** (0˚48'N., 97˚54'E.), about 11 miles N, the coast is high, with mountain ranges approaching the coast. Ujung Sumabawa is marked by a light.

A low plain begins here and extends N, gradually getting wider; at **Tanjung Lambaru** (1˚09'N., 97˚48'E.) it has a width of 8 miles. The coast consists of a sandy beach, off which rocks are lying. The sea usually breaks, making landings very difficult. About 1 mile W of Ujung Sumabawa, landing may be effected with comparative ease.

Near Ujung Sumabawa, one's attention is attracted by a very conspicuous gap in the mountains, in the background of which the conical **Lologogo** (0˚55'N., 97˚49'E.), 498m high, together with the white patch 3 miles NE, are prominent features.

Tanjung Sjuani (Tanjung Syuani) (0˚57'N., 97˚56'E.), on which high casuarina trees grow close to the sea, appears as a dark steep point. Landing is very difficult.

6.28 **Sumabawa** (0˚54'N., 98˚01'E.), an island located about 5 miles SE of Tanjung Sjuani, is fringed by a narrow reef. A 6.4m patch lies about 2 miles NNW of Sumabawa.

Karang Makassar (Makassar Reefs) (0˚53'N., 98˚01'E.) are four isolated dangers, with depths of 3 to 8.2m, and deep channels between them. They lie from 1.75 to 7 miles S of Sumabawa, and from 6 to 7 miles offshore. They are marked by breakers or a heavy swell.

Ujung Onolimbu (1˚03'N., 97˚54'E.) lies about 6 miles NW of Tanjung Sjuani. Onolimbu Road has good anchorage, in depths of 21.9m to 25.6m, mud. It is close to shore, abreast a road leading to **Tagaule village** (1˚03'N., 97˚53'E.). There is another anchorage off Bodsyihona village (1˚05'N., 97˚49'E.) to the N, in a depth of 18.3m. Local knowledge is necessary.

Onolimbu consists of two islands located about 1 mile N and 2.5 miles NE, respectively, of Ujung Onolimbu.

There are several drying shoals about 3.5 miles NNW of Ujung Onolimbu.

Tanjung Lambaru (1˚09'N., 97˚48'E.), located about 8 miles NW of Ujung Onolimbu, is swampy and thickly overgrown; dead trees stand on it and in the water close off it.

6.29 **Gunungsitoli** (Gunung Sitoli) (1˚17'N., 97˚37'E.), about 14 miles NW of Tanjung Lambaru, forms a deep bight; at its head the hills approach the shore, leaving a strip of lowland between them.

The mouth of the river, leading to the port, will just admit small trading craft at HW; it is always marked by surf. The port jetty lies N of the town. An oil jetty lies 7 miles SE. Pilots are not available.

Gunungsitoli, the chief town of the island, is the seat of government. It lies mainly on the left bank of the river. The harbor is sheltered from W and SW winds, but to all winds from N and SE it is completely exposed so that considerable swells may result. It is advisable to anchor, in 40m, mud, about 0.2 mile offshore.

The main jetty, 60m in length, is T-shaped at the head and has a depth of 12m alongside. An L-shaped town pier has a length of 67m and a depth of only 2m alongside. Gunungsitoli Oil Jetty provides mooring to vessels up to 5,000 dwt with a maximum length of 90m. The berth lies at the head of a 170m long jetty with dolphins off each end. A depth of 9.5m is reported alongside.

North of Gunungsitoli, the coast is covered with coconut trees for about 6 miles. Close N of Gunungsitoli is **Tanjung Mbaa** (1˚18'N., 97˚36'E.), a rocky point from which a light is shown.

From Tanjung Mbaa, a narrow strip of coast land extends about 3 miles NW, then a fringing reef leads up to **Tanjung Laaja** (1˚28'N., 97˚29'E.). Tanjung Laaja is the N end of the slope of a hill backing the coast. It is covered with coconut trees, steep-to, and free from dangers but is difficult to identify.

Tanjung Dowi (1˚31'N., 97˚25'E.) is fronted by a reef which dries to a distance of about 0.1 mile, with depths of 5.5m at 0.4 mile from the point.

Teluk Siaba (1˚31'N., 97˚24'E.), the N anchorage of Pulau Nias, is entered W of Tanjung Dowi. There are two inlets on its W side. Anchorage may be obtained in Teluk Siaba, in depths of 29m to 40m, giving some shelter from N or W winds.

6.30 **Pulau Bintanah** (1˚29'N., 98˚10'E.), low and fringed by a reef, should be given a wide berth. From Pulau Bintanah, a chain of reefs and shoals, some of which dry, extends 32 miles to the S. The positions of these dangers may best be seen on the chart.

Makasser (1˚30'N., 98˚24'E.), a steep-to reef which dries, lies about 14 miles E of Pulau Bintanah.

Pandjang (1˚03'N., 98˚18'E.) is a small islet lying the S end of the chain of reefs. A partially-submerged wreck lies on the reef close S of the islet. Shoal water, with a least depth of 4m lies 3 miles N of Pandjang; a depth of 11m lies 5 miles S.

As other rocks may exist in the vicinity, vessels passing E of Pulau Bintanah should keep close over to Pulau Musala, which is steep-to, and to the mainland S.

If passing W of Pulau Bintanah, they should keep towards the coast of Pulau Nias to avoid the central reefs, which extend S to about 0˚47'N.

Pulau Musala (1˚38'N., 98˚32'E.) lies in the W approach to Teluk Tapanuli. At its NW end is a conical mountain, about 451m high, with a prominent tree on its summit.

There is a remarkable waterfall at the NW end of the island issuing from a hill with an elevation of 55m; it is a good mark when approaching from NW.

Teluk Labuanhunik (Teluk Tanah Ronto) (1˚40'N., 98˚31'E.), the largest indentation on the N side of Pulau Musala, has depths of 27.4m to 34.7m.

Pulo Pulotalam (Teluk Mansalar) (1˚37'N., 98˚35'E.), at the SE end of Pulau Musala, is sheltered W by an island, and affords safe anchorage, in depths of from 18.3 to 40.2m, soft mud.

From **Baroes Road** (2˚00'N., 98˚23'E.), the coast continues SE for about 27 miles, to the N entrance point of Teluk Tapanuli.

Teluk Tapanuli (1˚38'N., 98˚45'E.), entered between Ujung Karang and Ujung Batumamak (Batu Mamak), about 9 miles S, is the most sheltered and secure anchorage on this portion of the W coast of Sumatera. The bay is almost completely surrounded by high mountains.

6.31 **Sibolga** (Tapanuli) (1˚44'N., 98˚46'E.) (World Port Index No. 50510), an extensive inlet on the N side of Teluk Tapanuli, is subdivided into many coves by islands, where a large number of vessels may lie sheltered from all winds in 11 to 16.5m. The basin NW of the head of the harbor has depths of 3.7m and could contain a considerable number of small craft. Ocean-going vessels should remain in the roadstead anchorage.

The main berth at Sibolga is a T-shaped jetty SE of town. It has a length of 105m. A dolphin is situated off the NE end. A depth of 5 m is reported alongside the main berth.

Two smaller berths, the Wood Quay and the Iron Quay lie NW of the main jetty and have lengths of 75 and 35m respectively. Alongside depths are reported to be less than 2.5m for both.

Mooring buoys, situated in 9m of water just NW of Pulau Sarudut, indicate the Pertamina Oil Berths. A pier extends from the shoreline to the NE of the mooring buoys, with a tank farm situated at its root. Vessels up to 150m in length and up to 15,000 dwt can use the offshore berths.

A light is shown from Sibolga. Pilotage is not compulsory. Ferry boats depart Sibolga regularly for Nias.

Anchorage.—The usual anchorage is E of **Pulau Poncan-Kecil** (Ponchang Kechil) (1˚44'N., 98˚45'E.), in depths of 11 to 12.8m, mud.

Directions.—The N channel to Teluk Tapanuli, between Pulau Musala and the Sumatera coast, is 7 miles wide, with depths of 21.9 to 36.6m on either side of Banda Reef, lying nearly in mid-channel.

The S channel, between Pulau Musala group and **Pulau Tungkus Nasi** (1˚35'N., 98˚41'E.) is 5 miles in breadth and free from danger, with regular depths of about 43.8m.

Caution.—Submarine cables run from Tapanuli and a point 1.5 miles N. Vessels must not anchor within 50m of them.

An area, about 1 mile in diameter, where ammunition has been dumped, lies with its center about 2 miles SW of Ujung Karang.

6.32 The coast from **Ujung Batumamak** (Batu Mamak) (1˚34'N., 98˚42'E.), the SW extremity of Teluk Tapanuli, trends in a S direction for about 49 miles to Tanjung Tabujung (Tabuyung). There is a reef, with a depth of 3.7m, lying about 0.75 mile offshore, 13 miles S of Ujung Batumamak. An above-water rock lies about 1 mile offshore, 14 miles N of Tanjung Tabujung.

Tabujung Road, located N of Tanjung Tabujung, is partly sheltered by Pulau Tangah (Pulau Tonga) and **Pulau Si Dakah** (Pulau Labu) (0˚51'N., 98˚57'E.), about 4 and 1.5 miles, respectively, NW of Tanjung Tabujung. A light is shown from Pulau Si Dakah.

6.33 **Tabujung** (Tabuyung) (0˚51'N., 98˚58'E.) (World Port Index No. 50500) is situated less than 1 mile E of Tanjung Tabujung, close within a river entrance. The bar of the river has depths of from 5.5 to 7.3m.

Anchorage may be obtained either E of Pulau Tangah, in depths of 18 to 20m, or E or S of Pulau Si Dakah, in depths of 7.3 to 9m, mud. Both anchorages are fairly sheltered from NW winds, with good holding ground.

Caution.—A vessel passing W of Pulau Tangah should give it a berth of 3 miles.

6.34 The coast between Tanjung Tabujung and **Ujung Sikarakara** (0˚38'N., 99˚02'E.), about 14 miles S, is fronted by many dangers, some of which lie just within the 10m curve.

Sirene Reefs (0˚43'N., 98˚56'E.), one of the outermost dangers in this locality, consist of four heads, of which the westernmost and the southernmost, with 0.9m of water, sometimes break; there are depths of 1.4 and 6.9m on the other two patches.

Natal Road (0˚33'N., 99˚05'E.) lies off the coast between Ujung Sikarakara and Ujung Rakat, about 6 miles S; it is open W and is encumbered with many dangerous shoals, rendering it one of the worst anchorages on the coast. The shore is fringed by a bank, with depths of less than 5.5m, extending about 2 miles offshore.

Mandera, a hill 109m high, lies about 5.2 miles SE of Ujung Sikarakara, and about 1 mile NNE of **Natal** (0˚33'N., 99˚07'E.); it is wooded, appears wedge-shaped from NW, and, having low land on either side, is a good mark.

Anchorage may be obtained, in depths of about 7.3 to 11m, soft clay, about 3 miles offshore, with Mandera bearing 090˚. Small craft may anchor closer inshore, in a depth of 4.9m.

Teluk Batahan (0˚24'N., 99˚07'E.), about 8 miles wide, is an open bight and lies S of Natal Road between **Ujung Sumur** (0˚30'N., 99˚05'E.), about 2 miles S of Ujung Rakat and **Ujung Palimbungan** (0˚20'N., 99˚06'E.), about 10 miles S.

6.35 **Pulau Tamang** (Pulau Temang) (0˚22'N., 99˚05'E.) is an easily-identified hilly island is located at the SE extremity of Teluk Batahan, about 1 mile from the coast. It is fringed by a reef except at its W end, where there is a depth of 11m about

0.1 mile offshore. A light is shown on the W end of Pulau Tamang.

A shoal, with a depth of 11.9m, lies 0.75 mile W of the W extremity of Pulau Tamang.

Anchorage.—There is good anchorage, in depths of 16.5 to 18.3m, soft clay, between the island and the mainland, with the N point of the island bearing about 315˚ and Ujung Palimbungan bearing S.

From Pulau Tamang, the coast is indented by a bight and trends S for 6 miles to **Udjang Iban** (0˚15'N., 99˚08'E.), which is rocky.

6.36 Great Channel (0˚15'N., 98˚00'E.), between Pulau Nias and Pulau Pulau Batu, is about 37 miles across and safe with a good lookout, but caution is necessary when near any of the islands on either side during the night, as the dangers are not all known.

A bank, with depths of 23.8 to 36.6m, extends 23 miles S of Pulau Nias.

Pulau Pulau Batu (Kepulauan Batu) (0˚18'S., 98˚28'E.), forming the S side of Great Channel, consists of three large islands, Pulau Tanahmasa, Pulau Tanahbala and Pulau Pini, with numerous islands fringed by extensive coral reef.

Pulau Simuk (0˚05'S., 97˚52'E.), the westernmost island of the Pulau Pulau Batu group, and located about 25 miles W of the W extremity of Pulau Tanahmasa, is low, but covered with high trees.

Pulau Sigata, about 17 miles E of Pulau Simuk, is 117m high on its E side with a slight elevation reported on the W side. A light is shown on the E side of Pulau Sigata.

Pulau Tanahmasa (0˚12'S., 98˚27'E.), 10 miles E of Pulau Sigata, is the central and largest island of Pulau Pulau Batu.

The N coast of Pulau Tanahmasa is low and fringed by a reef, which extends about 0.3 mile W from **Tanjung Seropi** (0˚01'S., 98˚17'E.), the W extremity of the island. This island is moderately elevated and hilly, covered with trees, but its summits are not conspicuous, with the exception of one 270m high, which is visible from the SE and E for a considerable distance.

Many small islands line its coasts, both on the E and W sides, with moderate depths among them, forming safe bays or harbors.

6.37 Pulau Tanahbala (0˚25'S., 98˚25'E.) is the southernmost large island of the Pulau Pulau Batu group. On its N part is a hill, 270m high, which appears pyramidal in shape from the E and NW.

Tanjung Hatik (0˚30'S., 98˚17'E.), its W extremity, is visible from a considerable distance from the N, appearing as a separate island.

The E coast of Pulau Tanahbala trends N for a distance of 22 miles to its N extremity. The N part, for a distance of 10 miles, forms the W side of Selat Tanahbala, which lies between Pulau Tanahmasa and leads to **Telo Roadstead** (0˚03'S., 98˚17'E.) in smooth water. Local knowledge is necessary.

Pulau Pini (0˚08'N., 98˚40'E.), located between Pulau Tanahmasa and the coast of Sumatera, has no distinguishing features. It is densely overgrown, sparsely populated, and has no navigable streams.

The island is surrounded by a coral reef, excepting the SW extremity where it may be approached. Landing, however, is difficult because of the mangroves.

Laut (0˚17'N., 98˚42'E.), with a depth of 3.4m and difficult to distinguish, lies about 6 miles N of the N coast of Pulau Pini.

There are numerous detached shoals and patches lying up to 6 miles off the N, E, and SE coasts of Pulau Pini, for which the chart should be consulted. Several islets and a large number of reefs lie off the S side of Pulau Pini. Within the 20m curve, which is 2 miles off the W coast, the depths are very irregular and numerous patches from 4.6 to 9.1m surrounded by deeper water are found.

6.38 The S coast of Pulau Tanahbala forms the N shore of Selat Siberut, which lies between **Pulau Bodjo** (Pulau Bojo) (0˚38'S., 98˚31'E.) and Pulau Siberut, about 22 miles SE. Selat Siberut is the passage usually taken by vessels bound to **Teluk Bayur** (1˚00'S., 100˚22'E.) from N.

Low-powered vessels from the Indian Ocean bound to **Selat Sunda** (6˚00'S., 105˚45'E.) between May and September, and all vessels bound N from Selat Sunda between November and March, use this passage.

There is generally a long line of surf on the shores of the strait, particularly on its N and W portions. In the E portion, and under the Pulau Siberut shore, there is shelter from the sea which causes heavy surf on the N shore, where all the dangers lie within the 5.5m line.

Winds—Weather.—From November to May, when the Northeast Monsoon prevails S of the Equator, the weather is fine in Selat Siberut, with light S and SW winds. The wind is rarely stronger than force 2; in March and April strong W squalls lasting about 10 minutes may be experienced. In the other months of the monsoon rain, squalls with little wind may be expected.

If the wind shifts to S during the Southwest Monsoon period, which usually occurs between June and September, hard NW and W winds prevail in Selat Siberut, accompanied by heavy squalls.

Tides—Currents.—The tidal currents are reported to be irregular. Sometimes a W set is experienced for several successive days; at other times, an E set is experienced, with the latter being generally the weaker.

After a few days of light winds the currents turn at about HW and LW. The strongest currents are found close to the shores, where, N of **Tanjung Sigep** (0˚54'S., 98˚54'E.), the N extremity of Pulau Siberut, and between **Pulau Bodjo** (0˚38'S., 98˚31'E.) and Pulau Tanahbala, they sometimes attain a rate of from 2 to 3 knots. In the latter vicinity the flood sets ENE and the ebb WSW.

6.39 Pulau Bodjo (0˚38'S., 98˚31'E.), lying about 2 miles S of the SE extremity of Pulau Tanahbala, is densely wooded and about 150m high. It is fringed by a steep-to reef which nearly dries, extending about 0.3 mile offshore in places. A light is shown from the S side of the island.

Van Bylandt Reefs (Karang Posumah) (0˚37'S., 98˚40'E.) consists of two patches, located about 7 miles ENE and E,

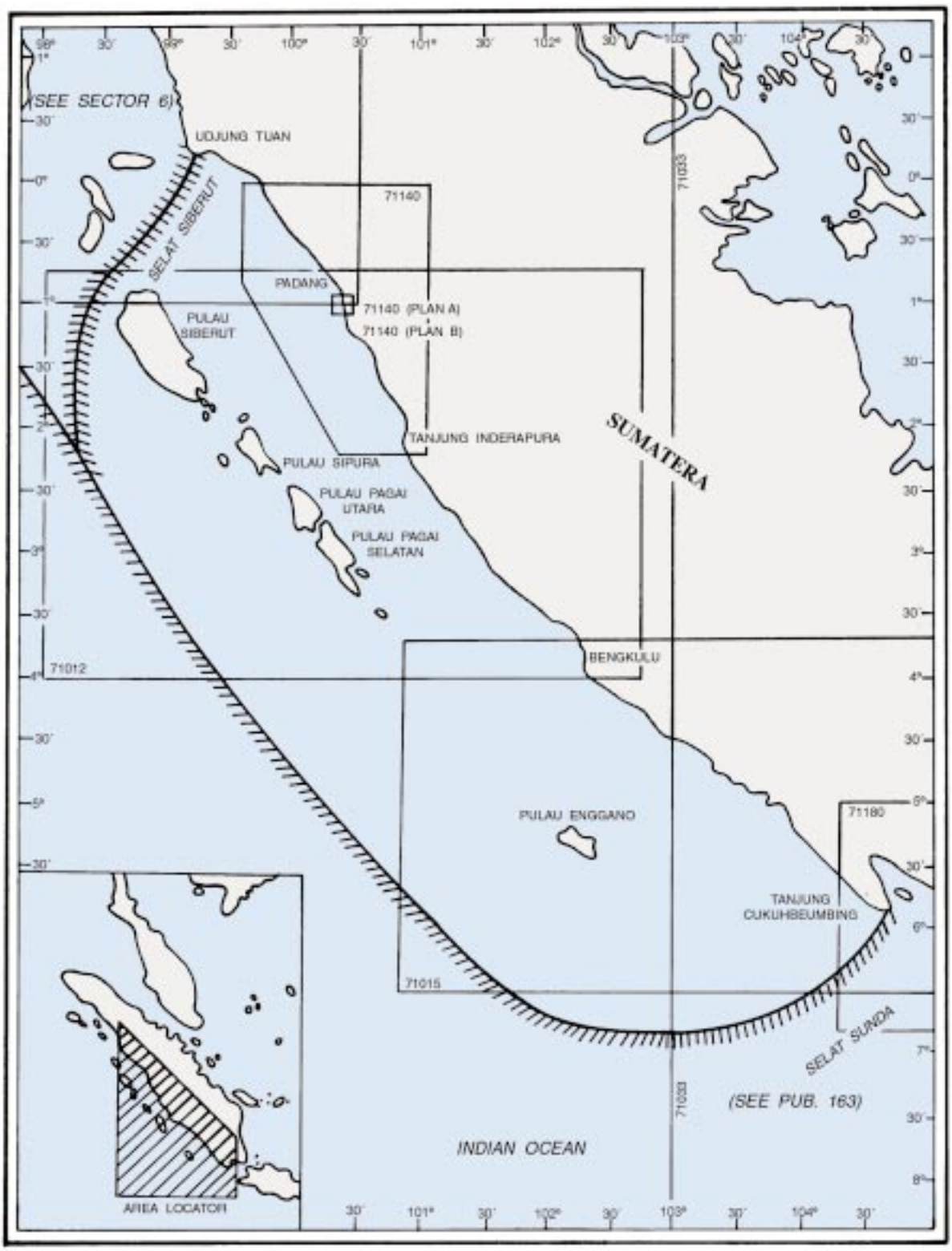
respectively, of Pulau Bodjo; they have depths of 4.9 to 5.5m. The SW side of the bank is very steep-to, but the NE side is more shelving. The shallowest parts may occasionally be distinguished by the swell, but seldom by breakers.

Makasser Reef (0˚48'S., 98˚37'E.), with a depth of 0.6m, lies about 12 miles SSE of the S extremity of Pulau Bodjo. It is easily recognized in the daytime by the high breakers on its shallow portion. The reef extends 1 mile beyond the breakers.

Directions.—Vessels approaching Selat Siberut from the W should steer to pass about 2 miles S of the W point of Pulau Tanahbala, and will sight Pulau Bodjo with its lighthouse.

The best course is to pass between Pulau Bodjo and Makasser Reef, which is clear of all danger; the reef is nearly always to be seen by the breakers.

The island should be passed at a distance of 2 miles, steering about 090˚, until Tanjung Sigep bears 155˚, when a course may be shaped for the desired port.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **7** — CHART INFORMATION

SECTOR 7

WEST COAST OF SUMATERA—UDJUNG TUAN TO TANJUNG BALIMBINGPAMANCASA

Plan.—This sector will be divided into two parts. The W coast of Sumatera from Udjung Tuan SE to Tanjung Balimbingpamancasa (Vlakke Hoek) will be described first. The offlying islands between the two above-mentioned points will then be described.

Udjung Tuan to Padang

7.1 **Udjung Tuan** (Ujung Tuan) (0˚15'N., 99˚08'E.) is a rocky point. A 175m hill, with a remarkable broad conical summit, lies close SE of the point.

Ujung Biang (0˚14'N., 99˚10'E.), another rocky point, lies about 3 miles SE of Udjung Tuan. Bukit Bargambar, 4 miles E of Ujung Biang, shows up well from the S; it appears as a blunted knoll rising from an extensive mountain ridge.

The coast from Udjung Tuan to Ujung Biang and then continuing E to Airbangis Road is mountainous.

Airbangis Road (0˚10'N., 99˚20'E.), about 9 miles across, is entered between Ujung Bukit and Ujung Sawang Puding; the road contains several isolated islands and shoals.

The village of Airbangis is situated on the E shore of the bay; the government representative here acts as the harbormaster.

Pulau Pangkal (0˚08'N., 99˚17'E.), the SW island off Airbangis, has a small, sharp pointed hill, 53m high, on its SW side. The island is marked by a light.

Pulau Talur (0˚07'N., 99˚21'E.), the SE island, is low and covered with coconut trees.

Pulau Pugago (0˚10'N., 99˚17'E.), about 2 miles NW of Pulau Pangkal, is oblong and covered with coconut trees.

Pulau Panjang (Pandjang) (0˚11'N., 99˚18'E.), 75m high, about 2 miles NE of Pulau Pugago, is a similar island but larger.

7.2 **Pulau Kasi** (0˚12'N., 99˚19'E.), which dries, lies about 1 mile NE of Pulau Panjang and is easily distinguished.

Sichangang (0˚10'N., 99˚24'E.), a flat-topped hill, rises about 3 miles S of Airbangis and forms the SE extremity of Airbangis Road; from it, the coast trends in a general SE direction for about 28 miles to **Ujung Katiagan** (0˚08'S., 99˚45'E.). A rocky hill rises immediately over Ujung Katiagan.

Ujung Masang (0˚18'S., 99˚48'E.), about 10 miles SSE of Ujung Katiagan, is low, with a reef stretching out about 0.5 mile and should not be approached in depths of less than 31m. The Sungai Masang enters the sea at the point.

Tiku Road (Tikoe Road) (0˚25'S., 99˚55'E.), about 9 miles SE of Ujung Masang, is in some measure protected by the low islands off it, which are overgrown with coconut trees, but nevertheless a heavy swell sets into the anchorage during NW and SW winds.

The **Tapi Peninsula** (0˚24'S., 99˚55'E.), formerly an island, is now joined to the mainland by a bare sand ridge, but has the appearance of an island when seen from a distance along the shore.

Tiku (Tikoe) (0˚24'S., 99˚55'E.) (World Port Index No. 50470) is situated within the Tapi Peninsula at the mouth of the river. This roadstead is partially protected by low offshore islands. NW or SW winds cause heavy seas to set into the roadstead.

Three islands extend in a SW direction from Tiku. From N, they are Karsik, Tangah, and Pulau Ujung; the latter islands lie about 2 miles SW of the Tapi Peninsula. Each of these islands is fringed by a reef. These islands should not be confused with the islands of the same name located in the vicinity of Pariaman Road.

7.3 **Pariaman Road** (Priaman Road) (0˚38'S., 100˚06'E.) is located about 18 miles SE of Tiku Road. The town of **Pariaman** (Priaman) (0˚38'S., 100˚07'E.) (World Port Index No. 50460) is situated on the S point of a small river and is the headquarters of an administrator.

The **Pariaman Islands** (0˚39'S., 100˚06'E.), three in number, are low and wooded; they lie in a NNW-SSE direction abreast the town.

Pulau Anso, the northernmost island, is surrounded by a reef Tangah, the middle islet, lies about 0.7 mile from Pulau Anso; a reef surrounds it mostly on its W side.

Oedjoeng. the S islet, lies about 1 mile from Tangah and is surrounded by a reef; Tangah and Oedjoeng should not be confused with the islands of the same name located near Tiku Road.

Pulau Karsik (0˚36'S., 100˚04'E.) lies about 3 miles NW of the town of Pariaman and about 2 miles offshore; it is small, covered with trees, and encircled by a reef. It should not be confused with the island of the same name located near Tiku Road.

The coast from Pariaman Road to Padang Road, a distance of about 24 miles, is said to be free of dangers near the shore.

Sao (0˚52'S., 100˚17'E.), about 8 miles N of Padang Road, is separated from the mainland by a clear channel about 1.3 miles wide. The island is overgrown with coconut trees and surrounded by a narrow reef.

7.4 **Padang Road** (0˚59'S., 100˚18'E.), the anchorage of Padang, is exposed and of little importance since construction of the breakwater at the head of Teluk Bayur (see paragraph 7.9). The road is dependent on weather conditions; the operation of discharging or loading cargo is very difficult for the native lighters when a strong W or NW wind gets up, as the entrance to the **Batang Arau** (0˚58'S., 100˚21'E.) becomes dangerous on account of the breakers; all communications with the shore at such times ceases, and it takes as much as 2 hours, rowing, to cover the 2 miles to the roadstead.

In the N approach to **Padang Road** (0˚59'S., 100˚18'E.), the Pading Islands, seven in number, interspersed with numerous reefs which can best be seen on the chart, lie from 6 to 13 miles off the town of Padang and the coast N; they are all covered with coconut trees.

Apenberg (0˚58'S., 100˚20'E.), the S point of entrance to the Batang Arau, is a bluff headland, 108m high, and thickly wooded. Whale Rock lies close W of the head. In approaching from the offing Apenberg will easily be known by its bluff aspect and the coast S of it being bold high land; the land near the sea to the N of the river is low, and all the coast is low then to Pariaman, but far back from the coast the land is generally high.

Pisang (1˚00'S., 100˚20'E.), an island lying about 2 miles S of Apenberg, is hilly, 0.4 mile in length in a N-S direction, and 0.3 mile in breadth, with two landing piers on its E side.

A coral reef encircles the island to the distance of 137m in places. Pisang Kechil lies between Pisang and the shore; it is connected with the shore by a sunken rocky ridge.

Padang to Teluk Bayur

7.5 **Padang** (0˚57'S., 100˚21'E.), the principal town and trading center of the W coast of Sumatera, is situated on a flat coastal strip on the N bank of Batang Arau. The town is also the semi-permanent seat of the Governor of Central Sumatera, as well as being a garrison town and railway headquarters.

Padang (0˚57'S., 100˚21'E.) is easily identified in clear weather, as it affords good landmarks to vessels approaching it.

The town, of rectangular layout, with a radical pattern to the S, covers an area of 2 square miles and is protected in the N and E by flood canals. Teluk Bayur is the port of Padang.

In Padang Road, the flood sets to the NW and ebb sets to the SE, at a rate of not more than 1 knot.

Ujung Biang Reef (0˚13'N., 99˚08'E.), with a depth of 2.7m, which sometimes breaks and is marked by discoloration, lies 2.5 miles S of Udjung Tuan.

Labuang Lulu Reef (0˚10'N., 99˚10'E.), lying about 3 miles S of Ujung Biang, has a depth of 6m; it is not marked by discoloration.

Makasser Reef (0˚07'N., 99˚13'E.), with a depth of 2.7m, lies about 4.3 miles WSW of Pulau Pangkal.

Van Speijk Reef (0˚01'S., 99˚20'E.), with a depth of 3.2m, lies 10 miles SSE of Pulau Pangkal; this reef sometimes breaks.

Moller Reef (0˚04'S., 99˚24'E.), marked by a light, lies 5 miles SE of Van Speijk Reef. The least depth is a rock with less than 1.8m of water; depths of less than 11m extend almost 0.5 mile N of the rock.

Gosong Satu (0˚01'N., 99˚27'E.), awash, lies about 7 miles NE of Moller Reef and 7 miles offshore.

Dua Reef (0˚04'N., 99˚26'E.) consists of two reefs about 0.2 mile apart, which are awash and always breaking; they lie about 3 miles NNW of Gosong Satu.

Sikarbau Reef (0˚06'N., 99˚23'E.), consisting of two reefs, the NE of which is awash and breaks, is located about 2.2 miles ESE of Pulau Talur. The SW reef has a depth of less than 1.8m, and is difficult to distinguish.

Sylph Reef (0˚06'N., 99˚25'E.), with a least depth of 0.9m, lies 2 miles E of Sikarbau Reef, and seldom breaks.

A reef with a depth of 0.9m and a 6.9m patch close SE of it, are located about 0.9 mile N of **Pulau Talur** (0˚07'N., 99˚21'E.).

A reef with a depth of 3.2m lies 0.3 mile E of the S point of Pulau Pangkal. A drying reef lies nearly 1 mile W of the N point of Pulau Pugago.

To the S of the shoals lying in the S approach to **Airbangis Road** (0˚10'N., 99˚20'E.), and W and S of **Ujung Masang** (0˚18'S., 99˚48'E.), are many outlying reefs for which the chart is the best reference; some of these reefs occasionally break. Others may exist, and a constant lookout from aloft should be kept when in this vicinity.

From **Fabhool Mobarak Reef** (Fatahool Marak) (0˚20'S., 99˚08'E.) and the 4.6m patch about 2 miles NW, these numerous reefs extend in an ESE direction.

A reef in Tiku Road, steep-to, lies in the fairway between **Pulau Ujung** (0˚25'S., 99˚53'E.) and Tangah; it dries in places and is marked by discoloration. A drying patch lies 0.2 mile N of Tangah. Between Pulau Ujung and Tangah there is a channel with depths of 14.6m on either side of the drying reef.

Doerian Reef (0˚37'S., 100˚01'E.) lies about 4 miles WSW of Pulau Karsik.

Kajoe Poetih (0˚38'S., 100˚02'E.), which often breaks, with a depth of 3.7m, lies about 2 miles ESE of Doerian Reef.

Three Reefs, with depths of 2.3 to 3.7m lie within 1 mile N to E of Kajoe Poetih.

Sepulu Reef (0˚38'S., 100˚05'E.), steep-to, with a depth of 7.8m, fronts the town of Priaman.

Sibarat Reef (0˚40'S., 100˚06'E.), which dries at LW, lies about 1 mile SW of Oedjoeng.

7.6 **Pulau Bando** (0˚46'S., 99˚59'E.), the northernmost islet, is small, encircled by a reef, and lies about 25 miles NW of the town of Padang. A conspicuous tree, visible for about 12 miles, stands on Pulau Bando.

Pulau Nyamuk (Njamoek) (1˚16'S., 100˚18'E.), about 20 miles SSW of the town of Padang, is the southernmost islet. It is low, sandy, covered with coconut palms, and has reefs extending a short distance from it. It is necessary to keep a careful lookout from aloft when navigating this area; the chart is the best guide.

A bank, with less than 5.5m of water, fronting the coast between Apenberg and **Ujung Jungut Batu Pati** (Oedjoeng Djoengoet Batoe Pati) (1˚00'S., 100˚22'E.), the W limit of Teluk Bayur, extends about 0.5 mile off these points, and to about 0.2 mile from Pisang.

7.7 **Gunung Talakmau** (0˚05'N., 99˚59'E.) rises to a height of 2,912m about 19 miles NE of Ujung Katiagan; it appears like a cone, separated from the chain of other mountains, and is visible 110 miles in clear weather. It is the highest mountain on Sumatera visible from the sea.

Gunung Pasaman (0˚03'N., 99˚57'E.) rises to a height of 2,190m about 3 miles SW of Gunung Talakmau.

Gunung Singgalang (0˚23'S., 100˚20'E.) rises to a height of 2,877m about 36 miles SE of Gunung Pasaman.

Marapi (0˚23'S., 100˚28'E.) rises to a height of 2,891m about 8 miles E of Gunung Singgalang.

Within **Ujung Masang** (0˚18'S., 99˚48'E.) there is marshy land, with several hills rising out of it, offering good landmarks for coasting vessels. They are **Masang** (0˚16'S., 99˚53'E.), 224m high, the easternmost and highest, with a flat summit; **Antokan** (0˚17'S., 99˚52'E.), 173m high, the southernmost;

Laboehan (0˚15'S., 99˚50'E.), 146m high, the westernmost; and **Pandji** (0˚15'S., 99˚51'E.), 103m high, the northernmost, which is crowned by high trees.

Gunung Tiga (0˚29'S., 100˚14'E.) rises to a height of 494m NE of the town of Pariaman, about 10 miles from the coast; when seen from the W it is somewhat conical in shape and has three tops, with the S being the lowest.

Dolok Sulasih (0˚35'S., 100˚14'E.), 198m high, rises about 5 miles S of Gunung Tiga, about 8 miles from the coast; it appears conical in shape when seen from the W.

Tjoebadak (Tjubadak) (0˚48'S., 100˚21'E.), 487m high, rises about 4 miles from the coast.

Talang (0˚58'S., 100˚40'E.), 2,597m high, is located in the W portion of the Padang Highlands, about 20 miles E of **Apenberg** (0˚58'S., 100˚20'E.). It has three craters; one is extinct, another emits thick sulphurous fumes, and the last is filled with a burnt-up lava lake.

7.8 **Gadoet** (0˚54'S., 100˚31'E.), 1,859m high; **Gantang** (1˚00'S., 100˚30'E.), 1,370m high, between Tadang and the coast; **Padang Berg** (0˚58'S., 100˚22'E.), 322m high on which there is a signal staff, near Apenberg; and **Mount Pangilun** (Pangeleon) (0˚55'S., 100˚22'E.), 92m high, N of it, are also conspicuous objects; the islets mentioned in the approaches should be all easily identified.

On a nearer approach the lighthouse and flagstaff of **Ujung Batumandi** (1˚03'S., 100˚22'E.) will be seen.

A light is shown from a skeleton iron tower, 31m high, on the E side of **Pulau Nyamuk** (1˚16'S., 100˚18'E.).

Directions.—Bargambar Mountain (0˚13'N., 99˚13'E.), open N or S of Ujung Biang, clears the **Pylades Reefs** (0˚21'N., 98˚51'E.).

If intending to take the inshore route from **Pulau Tamang** (0˚22'N., 99˚06'E.) anchorage S to Airbangis Road, pass between Pulau Tamang and the coast, keeping on the island side; then in mid-channel between the island and Ujung Palimbungan, and when the latter bears 079˚, steer toward Udjung Tuan to avoid the two reefs lying WNW of that point.

The 10m curve passes about 2 miles from Ujung Palimbungan and Udjung Tuan, but between these points, and sometimes outside, the depths are less, and the shore, which in this space contains some bays, is safe to approach to depths of 10.1 to 11m.

When Udjung Tuan bears about 090˚ steer to pass N of Ujung Biang Reef, marked by a beacon; when entering Airbangis Road N of Pulau Pugago and Pulau Pandjang pass between the latter island and Pulau Kasi to the anchorage.

This passage is undesirable for large vessels, but vessels of every description, by whatever channel they enter Airbangis Road, must keep a good lookout aloft for shoals.

Proceeding S from Airbangis Road, bearings of Pulau Talur and other objects will enable a vessel to pass between Moller Reef and Gosong Satu, then for Ujung Masang and **Tiku Road** (0˚25'S., 99˚55'E.). It may be approached from Tiku Road by reversing these directions.

The following clearing marks are useful for vessels using the inshore route:

1. The N point of Pulau Pandjang in range with Ujung Batu Barlayar, the point about 3 miles W, leads N of Ujung Biang Reef.
2. Sichangang, in range with the N point of Pulau Pugago, leads between Ujung Biang Reef and Labuang Lulu Reef, but right across the reef about 1 mile W of Pulau Pugago. This range leads from the anchorage in the bay to the offshore route.
3. The N point of Pulau Pandjang, in range with the N point of Pulau Pugago, leads S of Labuang Lulu Reef.
4. The light structure on Pulau Tamang bearing 350˚ leads W of Ujung Biang Reef.

The usual inshore route from Airbangis to Natal is to steer 296˚ with Pulau Pangkal bearing 116˚ astern. This course leads between Labuang Lulu Reef and the shore.

When the W point of Pulau Tamang bears 337˚ alter course to clear Ujung Biang Reef. When Ujung Biang Reef bears 270˚ steer a little outside of Pulau Tamang.

After passing Pulau Tamang, steer for a position 2 miles W of Kapal Reef, then steer for **Bukit Sikarakara** (0˚38'N., 99˚05'E.) bearing about 038˚, until **Bukit Mandera** (0˚34'N., 99˚07'E.) bears 090˚, then proceed for the anchorage.

If intending to use the outer routes within **Kepulauan Batu** (0˚10'S., 98˚30'E.), vessels from the N proceeding to Airbangis Road, outside the shoals, or to the S, should from abreast Pulau Tamang, distance 7 or 8 miles, steer about 175˚, passing about 2 miles W of **Bajang Reef** (0˚17'N., 99˚00'E.); when Ujung Biang bears 090˚, alter course to 130˚.

When Bukit Sikarakara is in range with the W point of Pulau Tamang bearing N, course may be altered more to the E, to pass N or S of Makasser reef, lying about 4.3 miles WSW of **Pulau Pangkal** (0˚08'N., 99˚17'E.), on a bearing of the light on that island.

The sea breaks on some of the shoals off Airbangis Road when there is much swell, and between most of them there are safe channels, but the shoals are not always discernible when the sea is smooth. Pulau Pangkal, bearing 090˚, leads N of Makasser Reef, and between it and **Labuan Lulu Reef** (0˚10'N., 99˚10'E.), lying 5 miles to the NW.

Then pass on either side of Pulau Pangkal to the anchorage, avoiding the shoals in the road. The best channel is N of Pulau Pangkal, where the depths are 18.3 to 20.1m over soft bottom.

Pulau Ujung Light (Oedjoeng) (0˚25'S., 99˚53'E.) should be approached bearing more than 090˚ to avoid the numerous shoals in the offing S and SW, over some of which the swell may be seen to roll if there is any sea. Pass S and E of it to the anchorage at Tiku Road.

Approaching Pariaman Road from the N along the shore, bring Pulau Ujung Light to bear 315˚; keeping it astern on that bearing will lead between **Gosong Reefs** (0˚28'S., 99˚58'E.) and **Soengai Bamban** (0˚32'S., 99˚59'E.) direct for Pulau Karsik off Pariaman.

Pass W of that islet; then steer 161˚ to pass W of **Sepula Reef** (0˚38'S., 100˚05'E.) and then between Pulau Anso and Pulau Tangah to the anchorage.

To pass outside the **Batik Reefs** (0˚32'S., 99˚56'E.) bring **Pulau Ujung** (0˚25'S., 99˚53'E.) bearing N, astern, and keep it so for 9 miles, leaving **Ingaris Reef** (0˚29'S., 99˚51'E.) about 2 miles to starboard, and Batik Kechil about the same distance to port; when Pulau Karsik bears 105˚ it may be steered for on that bearing.

Vessels bound for Padang to the SE and not entering Pariaman Road, about 4 miles SW of Pariaman, may steer to

pass about 1 mile E of **Pulau Air** (0˚53'S., 100˚12'E.) and the shoal SE. Pass 1 mile E of **Sipakal** (0˚56'S., 100˚15'E.), there being no known danger inshore of this except the reef lying more than 1 mile SW of **Pulau Sao** (0˚52'S., 100˚17'E.).

There is a channel on either side of Pulau Sao, but that to the W is the best and most direct; care must be taken to avoid the shoal already mentioned.

When S of that islet a direct course may be steered for **Apenberg** (0˚58'S., 100˚20'E.); should unfavorable weather be present, steer for the anchorage under **Pisang** (1˚00'S., 100˚20'E.), where vessels are sheltered from NW winds, or for Teluk Bayur within Pisang, where there is complete shelter.

Approaching Padang from the W and after passing well clear of **Stort Reef** (0˚55'S., 99˚59'E.), pass close S of **Pulau Pandan** (0˚57'S., 100˚08'E.) and then between **Siboentar** (0˚57'S., 100˚13'E.) and **Pulau Bindalang** (0˚59'S., 100˚12'E.). Steer for a position close S of **Pisang** (1˚00'S., 100˚20'E.) from where course may be shaped into the anchorage.

If bound for Teluk Bayur, follow the directions for Pisang anchorage above to a position 2 miles W of Pisang and from it steer to pass W of **Marlbro Light** (1˚02'S., 100˚21'E.) and then between it and **Ujung Batumandi** (1˚03'S., 100˚22'E.).

A vessel from Pariaman bound for Teluk Bayur may take the inshore route, pass W of Pisang, then as directed above.

Approaching Padang from the S, a vessel should make **Pulau Nyamuk Light** (1˚16'S., 100˚18'E.), a low islet 9.1 to 15.2m high. The island should not be brought to bear W of 343˚, nor approached within 1 mile, as reefs extend about 0.5 mile from it.

Having passed Pulau Nyamuk at about 1 mile distant, on either side, course should be shaped to pass the same distance W of **Bintanggor** (1˚09'S., 100˚19'E.) and **Sirandah** (1˚07'S., 100˚20'E.).

There is also a narrow and safe passage E of Bintanggor and Sirandah, with depths of 37 to 55m and which is generally considered the best.

Having passed Sirandah by either channel, it should then be brought to bear 180˚ astern, until Marlbro Light bears 090˚.

Then set course directly for the anchorage S of Pulau Pisang. This will lead between the two shoals NW of Sinjaroe.

If bound to Teluk Bayur a direct course for the outer end of the breakwater may be steered with the whole of Pulau Marak well open E of Sirandah astern, bearing 194˚ which leads between Marlbro Shoal and Ujung Batumandi, and W of the dangerous wreck lying S of the 7.3m patch on the E side of the fairway.

Anchorage.—The anchorage in **Airbangis Road** (0˚10'N., 99˚20'E.) is E of Pulau Panjang, as close to the fringing reef as convenient, in depths of 11 to 12.8m, soft mud, about 4 miles from the village of Airbangis.

The best anchorage in **Tiku Road** (0˚25'S., 99˚55'E.) is in depths of 12.8 to 14.6m E of Tangah, with the S point of the island bearing 278˚ and the W side of the **Tapi Peninsula** (0˚24'S., 99˚55'E.) bearing 020˚.

Small vessels may anchor, in 5.5m, sheltered from NW winds, E of the reef extending about 0.3 mile S of the Tapi Peninsula; the reef always breaks.

Vessels can anchor in **Pariaman Road** (0˚38'S., 100˚06'E.) to the E of Oedjoeng or Tangah, in 5.5 to 12.8m, mud bottom, sheltered from NW and W winds.

Anchorage in the S approach to Padang Road may be taken within the islets of Anggo, Pagang, Bintanggor, Sirondjong, Sikowai, and Sirandah which lie between 1.25 to 4 miles N of **Pulau Marak** (1˚12'S., 100˚18'E.), in depths of 18.3 to 37m, sheltered from NW and W winds.

Anchorage in **Padang Road** (0˚59'S., 100˚18'E.) to the E of Pisang, affords fair shelter, in 9.1 to 11m, soft blue mud, with the extremities of the island bearing about 236˚ and 240˚.

Caution.—An ammunition dumping ground is centered in a position about 6.7 miles SE of **Bando Islet** (0˚46'S., 99˚59'E.).

An area previously dangerous due to mines, but now considered safe for surface navigation, lies in the approaches to Teluk Bayur.

Should a vessel wish to avoid this area, she is advised to make for **Pulau Nyamuk** (1˚16'S., 100˚18'E.) then proceed N, passing W of Pulau Marak, then through the passage between **Bintanggor** (1˚09'S., 100˚19'E.) and Pagang, and Sirandah and **Sikowai** (1˚08'S., 100˚21'E.), then steer for **Marlbro Light** (1˚02'S., 100˚21'E.) and proceed as for Teluk Bayur.

Teluk Bayur (Telukbayur) (Emmahaven) (1˚00'S., 100˚22'E.)

World Port Index No. 50450

7.9 This bay is located about 3 miles S of Padang. At its head is the town of Teluk Bayur protected by a breakwater extending for a distance of 0.5 mile in a SE direction from the W shore, and enclosing an area of about 0.5 mile.

Port of Teluk Bayur

http://www.telukbayurport.com

Tides—Currents.—Tidal currents set NW and SE at a maximum rate of 1 knot. The tidal range at neaps is 0.3m while the range at springs is 0.9m.

During the Northwest Monsoon, there is often a considerable swell in the anchorage.

Depths—Limitations.—Vessels up to 22,000 dwt, with a maximum length of 180m, can be accommodated.

Wharf	Length	Depth
1st Wharf	108m	10.0m
2nd Wharf	108m	10.0m
3rd Wharf	96m	10.0m
No. 1 Quay	150m	10.0m
No. 2 Quay	150m	10.0m
Coal Terminal	225m	7.5m
Cement Terminal 1	150m	9.0m
Cement Terminal 2	150m	10.0m
Special Quay	98.5m	10.0m

The explosives pier is situated on the side of the breakwater and has a least depth of 6.3m alongside.

Teluk Bayur

The petroleum jetty, also situated on the NE side of the breakwater, is 183m NW of the explosives pier, and has a length of 9m, with an alongside depth of 5.8m.

On **Karsik Reef** (Karang Terlana) (1˚00'S., 100˚22'E.), which occupies the center of the harbor, a breakwater about 0.1 mile in length, built parallel to and about 0.2 mile from the main wharves, shelters the space within from all winds.

However, that portion of the bay E of the breakwater is open to S winds. Within this enclosed area, the depths are about 7.8 to 8.7m.

Marlbro (1˚02'S., 100˚21'E.), a submerged rock marked by a light and a racon, has a depth of 1.2m and lies about 2 miles W of Ujung Batumandi.

Pasir Gedang (1˚01'S., 100˚21'E.), marked by a beacon, lies about 1 mile NNE of Marlbro; on its E side is a sand cay on which coconut trees have been planted.

Aspect.—The limits for the roadstead for Teluk Bayur are a line joining the S part of the bay and **Pisang** (1˚00'S., 100˚20'E.), the meridian through the W point of Pisang, and a line 045˚ to 25˚ through **Whale Rock** (0˚58'S., 100˚20'E.).

To the N of **Ujung Batumandi** (Oedjoeng Sungei Bramei) (1˚03'S., 100˚22'E.), conspicuous by a lighthouse, the light-keeper's house, and a signal staff, a high ridge of hills forms the E shore of the bay, with Tampat, the village of Baramas, and Taloek Niboeng near the coast.

When the bay opens up, Teluk Bayur will appear on a background entirely closed by a high, overgrown ridge of hills.

Lights are shown from the head of the main breakwater and from each end of the breakwater on Karsik Reef.

There are several mooring buoys in the harbor and off the wharves to assist vessels in securing alongside and to keep vessels off the wharves when a swell is running in the harbor.

Pilotage.—Pilotage in Teluk Bayur is compulsory. Pilots board 0.5 mile S of the end of the main breakwater.

Vessels approaching the harbor can communicate by flag or morse code with the harbor office and should keep the pilot signal if necessary, the quarantine signal, displayed until answered by the harbor office.

Pilotage is available 24 hours and should be requested 6 hours in advance. The vessel's ETA should be sent 48 hours and 24 hours in advance. The harbormaster also is reported to perform the duties of harbor pilot.

By day, the pilot boat flies a blue flag with a white star; at night, the pilot boat carries a white light above a red light.

The signal for a pilot is in accordance with the International Code of Signals; such signal must be shown until the pilot is aboard or until an answering signal has been made.

A fine is assessed on vessels engaging a pilot and not taking him at the stated time.

Regulations.—The usual quarantine regulations for vessels from infectious ports, and for the control of the harbor, are in force in all harbors in the Republic of Indonesia.

Anchorage.—Anchorage can be taken inside Teluk Bayur roadstead limits as near the breakwater as safe navigation permits.

Anchoring is reported to be prohibited in the area best seen on the chart.

Teluk Bayur to Mokko Mokko

7.10 Teluk Bungus (Boengoes Baai) (Bungus Bay) (1˚03'S., 100˚23'E.), in which there are several villages, is separated from Teluk Bayur by Ujung Batumandi. A small pier and landing place lie about 0.2 mile E of the signal staff standing on the point. Karsik is a small islet lying near the middle of the N arm of the bay.

Sungi Pisang Bay (1˚07'S., 100˚22'E.), lying close S of Teluk Bungus, is about 1 mile across and open to W winds.

Two rocks lie in the entrance, with depths of 1.8 and 3.7m; abreast the rocks, close to the N shore, there is a narrow passage, with depths of 27 and 31m, decreasing to 12.8 and 16.5m. There is also a narrow passage between the S point of the bay and Sikowai Islet, lying off the bay's entrance.

Sungi Pinang Bay (1˚10'S., 100˚22'E.) lies S of Sungi Pisang Bay, and is free from off-lying dangers.

Taroesan Bay (Tarusan Bay) (1˚13'S., 100˚25'E.), fronted by the island of **Tjoebadak** (Chubadak) (1˚13'S., 100˚23'E.), is about 5 miles in extent and safe, with general depths of 12.8 to 29m, over soft blue clay.

There are two passages into the bay on either side of Tjoebadak, **South Ngalo Strait** (1˚11'S., 100˚23'E.) to the N and **Sirondjong Strait** (1˚14'S., 100˚24'E.) to the S.

Telok Dalam indents the N coast of Tjoebadak for a distance of about 0.7 mile and has general depths of 27m.

In the entrance is the islet of Tradjoe, W of which is the wider and deeper passage into the inlet.

Tanjung Taloek Lamboe (Tanjung Taluk Lambu) (Ujung Taluk Lambu) (1˚16'S., 100˚24'E.), the extremity of a prominent peninsula partly forming Taroesan Bay, lies about 3 miles S of the entrance to that bay.

Tjingkoek Bay (Chingkuk Bay) (1˚19'S., 100˚32'E.) lies about 11 miles SE of Tanjung Taloe Lamboe and is the northernmost of four bays indenting the coast within a distance of about 8 miles to the S of that bay.

7.11 Painan Bay (1˚22'S., 100˚34'E.), the next bay SSE, has fairway depths of 12.8 to 18.3m and depths of 7.3 to 12.8m in the bay.

Batoeng Bay (Teluk Batung) (1˚23'S., 100˚35'E.) is the next bay SSE.

Batoe Dandang (1˚22'S., 100˚33'E.), a reef with above-water rocks, extends off the N point of Batoeng Bay.

Soengeo Boeng in Bay (1˚26'S., 100˚34'E.), the southernmost of the four bays, is similar to Batoeng Bay.

Oedjoeng Taloek Kasai (Ujung Taluk Kasai) (1˚27'S., 100˚33'E.), 110m high, is a prominent point forming the SW end of the bay.

Batang Kapas Bay (1˚30'S., 100˚37'E.), which affords good anchorage, lies about 5 miles SE of Oedjoeng Taloek Kasai.

Oedjoeng Radja (Ujung Raja) (1˚36'S., 100˚38'E.) lies about 7 miles S of Batang Kapas Bay; it has a hill 124m high immediately over it with **Batu Mandamai** (1˚37'S., 100˚38'E.), 80m high, over the coast about 1 mile SSE.

The coast between Oedjoeng Radja and Tanjung Inderapura, about 35 miles SSE, forms a bight in which the Air Indrapoera and some minor streams discharge.

7.12 Air Indrapoera (2˚00'S., 100˚52'E.), the most important river S of Padang, is located about 10 miles N of the point of the same name. There is generally a heavy surf at the entrance, but small native craft can enter during the greater part of the year except at LW. It takes a very tortuous course to the town of **Inderapura** (Indrapoera) (2˚04'S., 100˚56'E.) and has its rise near **Rasa** (2˚00'S., 101˚00'E.), 270m high.

Tanjung Inderapura (Oedjoeng Tandjoeng) (Ujung Tanjung) (2˚09'S., 100˚49'E.) is low and its extremity covered with trees; it is steep-to.

Numerous islets and reefs, for which the chart is the best reference, lie off the coast between **Tanjung Taloek Lamboe** (1˚16'S., 100˚24'E.) and Mokko Mokko, about 90 miles SE.

Kurinchi Peak (Gunung Kerinci) (Indrapura Peak) (1˚41'S., 101˚15'E.), which rises to a height of 3,805m about 27 miles E of Oedjoeng Radja, is the highest in Sumatera.

Gunung Patah Sambilan (1˚41'S., 101˚08'E.) rises to a height of 2,591m about 8 miles W of Kurinchi Peak.

A light is shown from the middle of **Pulau Katangkatang** (Katang Katang) (1˚52'S., 100˚34'E.) which lies about 18 miles SSW of Oedjoeng Radja.

7.13 The entrance to Air Hadji, which is not easily made out, may be identified by **Lenggok** (1˚52'S., 100˚53'E.), a remarkable sugar-loaf hill covered with trees, which rises to a height of 329m about 5.2 miles NNE of the river entrance.

Batu Tiga (1˚36'S., 100˚40'E.), 261m high, and Sugirik, 271m high, rise about 2 miles within Oedjoeng Radja.

Djalamoe (Jalamu) (1˚43'S., 100˚46'E.), 105m high, rises about 8 miles to the SE.

Baringit (1˚43'S., 100˚56'E.), 1,387m high, rises about 11 miles E of Djalamoe.

Pandan Gadang (1˚54'S., 101˚08'E.), 1,847m high, rises about 12 miles SE of Baringit; these peaks, with others of less height back the coast some 17 miles inland and will be of much assistance in fixing the position of a vessel when navigating in this locality.

Anchorage.—There are no ports or anchorages that are safe during the Northwest Monsoon period between Tanjung Inderapura and **Vlakke Hoek** (5˚55'S., 104˚33'E.), at the entrance to Selat Sunda. Landing is always dangerous because of heavy surf.

There is safe anchorage in **Teluk Bungus** (1˚03'S., 100˚23'E.), with depths of 26 to 27m in the entrance and 11 to 18.3m farther in.

Anchorage can also be taken in the E side of the bay in the N bight in 16.5m, mud, and in the S bight, in 18.3 to 22m, open to W winds.

Anchorage in **Sungi Pinang Bay** (1˚10'S., 100˚22'E.) shelters vessels from almost every wind, and is only open to the SSW; anchorage may be found, in 46m, mud bottom, in the NW part of the bay, SW of the charted rocks.

Directions.—The directions for approaching Padang from the S apply here to **Teluk Bungus** (1˚03'S., 100˚23'E.). When in the entrance, bear toward the N side to avoid the shoals off Karsik, and anchor between it and the point, or nearer to the head, where there is good shelter. Shallow water extends off the point and island that form the NE side of this anchorage.

Approaching **Tjingkoek Bay** (1˚19'S., 100˚32'E.) from the N, vessels may pass on either side of **Pulau Nyamuk** (1˚16'S., 100˚18'E.), then steer for **Koembang** (Kumbang) (1˚19'S., 100˚26'E.) to avoid the shoals SE of Koembang.

Between Koembang and **Aoer Gedang** (Aur Gedang) (1˚23'S., 100˚29'E.), the depths are 29 to 46m; and from between these islands steer to pass S of the **Simangke Group** (1˚21'S., 100˚31'E.) and then into the bay.

The directions for approaching **Painan Bay** (1˚22'S., 100˚34'E.) are the same as those for Tjingkoek Bay given above.

7.14 **Tjingkoek Bay** (1˚19'S., 100˚32'E.) has regular depths and good anchorage near Salida village, in depths of 7.3 to 11m, at its NW part.

Anchorage may be obtained in **Painan Bay** (1˚22'S., 100˚34'E.) in a depth of 146m, good holding ground; small craft can go nearer to the NE corner of the bay in depths of 5.5 to 9.1m, off the village, where there is better shelter from NW winds.

Batoeng Bay (1˚23'S., 100˚35'E.) affords good anchorage in moderate depths, open to W winds.

Batang Kapas Bay (1˚30'S., 100˚37'E.) affords good anchorage, in depths of 12.8 to 18.3m, but is open to W winds.

Anchorage.—Small vessels can anchor, in 7.3m, W of the mouth of **Air Indrapoera** (2˚00'S., 100˚52'E.), with the peak of **Lenggok** (1˚52'S., 100˚53'E.) bearing 017˚.

Large vessels should not approach to within a depth of 14.6m or within 2 miles of the shore. Vessels should only anchor off this coast if necessary, as it is unsafe in W winds.

Anchorage may be obtained off Air Indrapoera, in a depth of 7.3m, with the S point of the river mouth bearing 097˚. A mooring buoy is situated in the roadstead of the river.

Caution.—The numerous off-lying islets, rocks, and reefs lying between **Tanjung Taloek Lamboe** (1˚16'S., 100˚24'E.) and Tanjung Inderapura, about 59 miles SSE, are steep-to and should be given a wide berth.

Vessels should pass well W of a line joining **Pulau Nyamuk** (1˚16'S., 100˚18'E.) and **Panjoe** (Panyu) (1˚30'S., 100˚26'E.), lying about 16 miles SE. Proceeding S from abreast **Oedjoeng Radja** (1˚36'S., 100˚38'E.) it will be prudent, if coasting, to keep 4 to 5 miles offshore, in order to avoid **Gosong Soemedang** (Sumedang) (1˚50'S., 100˚46'E.), an above-water rock.

In the daytime, with a good lookout aloft, most of the dangers will be visible; at night, a vessel should keep well outside all these islets.

Mokko Mokko to Bengkulu

7.15 **Mokko Mokko** (2˚34'S., 101˚07'E.), the only settlement not visible from seaward on this coast, is situated about 31 miles SE of Ujung Tanjung.

Pasar Bantal (2˚45'S., 101˚20'E.), about 17 miles SE of Mokko Mokko, may be identified by two white rocks a little N of it; the village stands on the S side of the entrance.

Pasar Ipuh (Pasar Ipu) (3˚01'S., 101˚29'E.), about 18 miles SSE of Pasar Bantal, may be identified by three red cliffs to the S and three green hills near the sea.

Ketahun (Ketaun) (3˚23'S., 101˚49'E.), the buildings of which have conspicuous roofs, is situated about 30 miles SE of Pasar Ipuh.

Sarang Alang (2˚33'S., 100˚59'E.), about 0.4 mile long and 183m wide, has a least depth of 5.5m and lies about 6 miles W of the mouth of the **Slagan River** (2˚33'S., 101˚05'E.). With a heavy sea, the sea breaks on it.

7.16 **Swallowfield Rock** (2˚59'S., 101˚27'E.), with a depth of 4.6m, lies about 2.7 miles NW of Air Ipuh. A 3.7m patch lies about 2 miles SW of Air Ipuh, and a rock, with a depth of 5.5m, lies about 0.7 mile S of the 3.7m patch.

Northwestward of Pasar Ipuh there are no reefs under the coast, but between Pasar Ipuh and **Bengkulu** (3˚47'S., 102˚15'E.) are numerous reefs and shoals, mostly off the rivers.

In a swell the 7.3m and 9.1m patches are marked by rollers, and shoals with 5.5 or less always break.

The coast S of Pasar Ipuh is fronted by a coral bank which stretches out 4 or 5 miles, with depths of 11 to 18.3m on its outer edge; it extends from Pasar Ipuh to Ketahun, a distance of about 30 miles, and should not be approached in depths of less than 18.3m as it is steep-to.

The coast between Ketahun and Bengkulu, a distance of about 36 miles, is safe to approach in depths of greater than 22m.

Coming from the N to Mokko Mokko, the high trees on the high S point of **Plokang Bay** (2˚33'S., 101˚05'E.) form the second easily distinguishable mark after Tanjung Inderapura, 32 miles to the N.

Talang (2˚06'S., 101˚15'E.) rises to 1,377m about 27 miles E of Tanjung Inderapura.

Raya (2˚13'S., 101˚26'E.), 2,550m high and conspicuous, rises SE of **Talang**.

Pandan (2˚44'S., 101˚51'E.), 2,168m high, and **Seblat** (2˚53'S., 102˚09'E.), 2,383m high, lie farther to the SE.

Kaba (3˚30'S., 102˚35'E.), 1,952m high, lies NE of Bengkulu.

Gedang Ulu Lais (3˚15'S., 102˚14'E.) and **Ulu Palik** (3˚24'S., 102˚20'E.), 2,130m and 2,500m high, respectively, rise to the N of Bengkulu.

Anchorage.—Anchorage may be obtained off Mokko Mokko, in 18.3m, soft ground, about 3 miles WSW of the **Slagan River** (2˚33'S., 101˚05'E.).

Small vessels may anchor nearer the shore, in a depth of about 9.1m. The native boats must be employed in landing on account of the surf. The coast in the neighborhood is a sandy beach onto which a heavy swell is generally setting, as is usually the case on this coast S of the Equator.

There is an anchorage off the mouth of **Kali Aer Dikit** (2˚41'S., 101˚14'E,.) in depths of 14.6 to 18.3m.

The best anchorage in the road off **Pasar Bantal** (2˚45'S., 101˚20'E.) is in depths of 14.6 to 16.5m, over ooze and sandy bottom, with the white rocks just N of Pasar Bantal bearing 024˚ and the river entrance 045˚.

Large vessels may anchor off **Pasar Ipuh** (3˚01'S., 101˚29'E.), in depths of 16.5 to 18.3m, with the central of three

red cliffs near the sea bearing 057˚; here the roadstead is tolerably clear, while farther in the bottom is foul.

Bengkulu (Benkulen) (3˚47'S., 102˚15'E.)

World Port Index No. 50440

7.17 Bengkulu is the capital of the Bengkulu district and the headquarters of an administrator. The Bengkulu River mouth (3˚46'S., 102˚16'E.) discharges into the bay about 2 miles NE of the town.

Bengkulu Road (3˚47'S., 102˚14'E.) may be considered as lying between **Ujung Coko** (Ujung Parit) (3˚43'S., 102˚14'E.), 4.5 miles N of Bengkulu and **Ujung Teluk Punggur** (3˚55'S., 102˚16'E.), about 8 miles S of Bengkulu, forming a large bay on either side of the town.

The inner road, with depths of 7.3 to 11m, lies NW of Bengkulu and within **Pata Sambilan Reef** (3˚47'S., 102˚14'E.).

The NW winds which prevail from October to April, when strong, cause a heavy swell and breakers in the roadstead; during the Southeast Monsoon the inner road is perfectly safe.

Pulo Tikus (3˚50'S., 102˚11'E.) lies about 5 miles SW of Bengkulu, and is surrounded by a coral reef about 2 miles in extent in a NW and SE direction. It is partly dry at LW and affords shelter from SW winds.

Pulo Tikus Basin, an excellent basin on the NE side of the reef, has depths of 11 to 14.6m, over soft mud, and 4.6 to 5.5m at its upper end. The passage is close to the edge of the reef on the W side; several detached patches lie off the E side, with 12.8 to 14.6m of water close-to.

Depths—Limitations.—The boat harbor is protected by two breakwaters; the W breakwater is 0.2 mile long while the E breakwater is only 183m long. The depth in the channel to the basin is 2m. Ocean-going vessels discharge cargo into lighters in the roads about 3 miles offshore.

A bank with a depth of 18.3m lies about 18 miles W of Ujung Coko.

Pata Sambilan (3˚47'S., 102˚14'E.), two reefs which dry in parts at LW, lie from 0.5 to l.5 miles off Bengkulu. They do not always break, but as they are liable to do so suddenly, boats should not attempt to cross them.

A 6.9m shoal lies about 0.5 mile NNE of the N edge of Pata Sambilan. A buoy is moored about 0.7 mile NW of the boat harbor and marks a 0.9m shoal.

Numerous other reefs and shoals, which can best be seen on the chart, lie in the approaches to Bengkulu. These reefs are avoided by keeping in depths above 20m.

A shoal, with a depth of 10.1m, lies about 2 miles NW of Ujung Teluk Punggur.

Aspect.—To the NE of Bengkulu, the land is high and rugged; one of the hills, **Bungkuk** (Suikerbrood) (3˚35'S., 102˚25'E.), 1,034m high, is a conspicuous mark in some directions from seaward and rises about 16 miles from Bengkulu. The roadstead will be easily made out by the clump of coconut trees on Pulo Tikus, which are visible from 12 to 15 miles. The mouth of the river is not easily recognized, with a fort and a few roofs of houses being the only objects visible from any distance seaward.

Anchorage.—The usual anchorage in the outer roadstead of Bengkulu is in 22 to 24m, about 2 miles NNE of Pulo Tikus.

The bottom is generally rocky and in some places reported to be foul. During S winds vessels may anchor, in 24m, under the shelter of Tikus Reef, mud bottom.

The best anchorage in the inner roadstead is just outside the 0.9m patch lying about 0.2 mile NW of the boat harbor, in a depth of 8.2m, mud and sand, good holding ground.

During N winds, vessels that do not go into Pulo Tikus Basin should anchor within 1 mile E of Pulo Tikus Light, in about 27m, where the sea will be partly broken by the reef.

Loading and discharging cargo may be done in favorable weather in this position .

Directions.—The approach to the harbor of Bengkulu from N is between the buoys already mentioned above; the S entrance, approach, pass W of the **Pata Sambilan** (3˚47'S., 102˚14'E.) and the reefs extending from the shore W of the town and then to the anchorage.

Approaching Bengkulu Road from the N, bring Pulo Tikus to bear S of 125˚ to avoid the reefs W of Tikus Reef. Bungkuk bearing 056˚, or E of that bearing, until Pulo Tikus Light bears 135˚, leads N of them, where course may be taken for the anchorage in the road or for Pulo Tikus Anchorage.

Coming from the W, the trees on Pulo Tikus will be seen before Bungkuk, which is much more conspicuous on a near approach.

Approaching the road from the S, Pulo Tikus should not be brought to bear to the W of 000˚ until within 3 miles of it, which will lead W of **Lebar Reef** (3˚56'S., 102˚12'E.), then steer 022˚ for the road.

From abreast Pulo Tikus, if bound for the inner road, haul to the N, passing W of the 6.9m shoal lying about 0.2 mile NNE of the N edge of the N of Pata Simbilan.

There is a channel 3 miles wide within Lebar Reef, with general depths of 27m. Vessels using this channel should keep within 2 miles of **Ujung Teluk Punggur** (3˚55'S., 102˚16'E.) until it bears 090˚, and may then steer for Pulo Tikus Anchorage, and then for the inner road; Lebar Reef may be seen by the overfalls on its edges.

Caution.—A dangerous wreck lies sunk in a position about 0.4 mile NNW of the head of the W mole at Bengkulu. A buoy is moored on the SW side of this wreck.

Bengkulu to Tanjung Balimbingpamancasa

7.18 **Pulau Bay** (Pulau Baai) (Teluk Ujung Pulau) (3˚55'S., 102˚17'E.) is located 8 miles SE of Bengkula. The bay is completely separated from the sea by a tongue of land, making it an excellent anchorage for shipping.

Depths—Limitations.—The middle of the harbor has a dredged depth of 10m. The dredged channel opening out to the sea has a depth of 10m, with its entrance protected by two breakwaters. Lights are shown from the end of each breakwater. The port can accommodate vessels up to 15,000 dwt, with a maximum length of 150m and a maximum draft of 9m. There are three separate berthing areas in the basin.

Situated E of the entrance channel and range lights are the Pertamina Oil Company and the Liquid Bulk Terminal areas. The oil jetty has a depth of 8.8m at its head. Dolphins extend on each side. Situated adjacent to the Liquid Bulk Terminal is the domestic berth. This berth is sometimes refered to as the

local wharf. This berth is 124m long and has 4m of water alongside.

Situated W of the entrance and range line is the Coal Open Storage area. Here the international berth extends 165m in length, with 10m alongside, and can accommodate a maximum draft of 9m.

7.19 Ujung Genting (Tanjong Genting) (3˚58'S., 102˚17'E.), a round bluff headland covered with high trees, is discernible in Bengkulu Road and lies about 3 miles SSE of Ujung Teluk Punggur.

From Ujung Genting, the coast of Sumatera extends in a SE direction for a distance of 183 miles to **Vlakke Hoek** (5˚55'S., 104˚33'E.), at the N side of the entrance to Selat Sunda.

Throughout its extent it is almost entirely without shelter, and being beaten by heavy surf, the few frequented places are dangerous for landing. It is in most places bold and safe to approach; the land is mountainous a short distance inland.

Pasaralas (Pasar Alas) (Alas) (4˚19'S., 102˚45'E.) (World Port Index No. 50430), lying about 35 miles SE of Ujung Genting, is a small pepper port.

Mana (Tanjung Manna) (4˚29'S., 102˚54'E.), lying about 14 miles SE of Pasaralas and marked by a light, projects considerably and may be identified by a hill covered with coconut palms. The coastal reef extends about 1 mile S of the point. A stranded wreck (PA) is charted close S of the point.

The town of Mana (Manna) lies in the bight to the NE of the point. The dwellings are conspicuous. A cascade falls perpendicularly from steep cliffs which line the shore near Mana, but landing should not be attempted.

7.20 Pasarpinoh (Pasar Pinoh) (4˚24'S., 102˚50'E.) (World Port Index No. 50420), another pepper port, lies about 6 miles NW of Tanjung Mana and **Padang Guchi** (4˚35'S., 103˚08'E.) (World Port Index No. 50410) lies about 15 miles SE.

Teluk Sambat (4˚50'S., 103˚22'E.), entered between Tanjung Bandar and Tanjung Linau, is about 5 miles wide. On its SE side is Linau village, situated on the N side of a bight 0.5 mile wide, where small craft find shelter from S winds.

The coast for about 30 miles SE of Tanjung Linau is steep-to; reefs lie off the coast in places on this stretch.

Teluk Pugung (5˚00'S., 103˚42'E.), 18 miles SE of Tanjung Linau, is deep; the 200m curve penetrates deeply into the bay.

Pulau Pisang (5˚07'S., 103˚51'E.), quartz rock, 41m high and densely overgrown with coconut palms, is almost 1 mile in extent and lies about 11 miles SE of Teluk Pugung and I mile offshore; the intermediate coast is steep-to. It is surrounded by a narrow coastal reef with deep water about 0.2 mile off, with the exception of the NE side, where it is connected to the mainland by a ledge with a greatest depth of 73m.

On this ledge and to the N of the island, are patches with depths from 1.8 to 5.5m.

7.21 Teluk Kroe (Krui) (5˚09'S., 103˚54'E.) (World Port Index No. 50400) lies about 3 miles SE of Pulau Pisang; at the head of the bay there is about 55m less than 0.5 mile offshore in places. The town of Kroe is situated on the bank of a small river which is entered close E of **Tanjung Salobu** (5˚11'S., 103˚56'E.), the S point of the road, which is visible for some distance from the offing.

Karang Jati, with a least depth of 2.7m, lies 0.8 mile NNW of Tanjung Salobu and about 0.4 mile offshore.

Foul ground extends from Tanjung Salobu for a distance of 0.2 mile, with deep water close-to. A buoy is charted on the W edge of Karang Jati. There is a boat basin protected by two moles at Kroe.

Labuan Tapokan (5˚16'S., 103˚58'E.) indents the coast about 9 miles SE of Teluk Kroe. A reef with a least depth of 4.1m, coral and sand, lies in the middle of the bay; the reef always breaks.

Labuan Jambu (5˚20'S., 104˚01'E.) lies immediately SSE of Labuan Tapokan and is completely clear of dangers.

Labuan Siging (5˚31'S., 104˚12'E.) affords good shelter against SE and S swell and landing can almost always be effected immediately N of **Ujung Siging** (5˚32'S., 104˚13'E.), the S point of the bay.

Off the bay are patches of 8.2m and 18.3m, with a sand bottom. A distinct rocky shoal of 5.4m extends S from Ujung Siging. A reef extends about 0.3 mile offshore from Ujung Siging. There is always a heavy swell at this shoal.

There are also occasionally heavy swells on the shoal patches W of the bay.

Teluk Bengkunat (5˚37'S., 104˚18'E.) lies about 7 miles SE of Ujung Siging.

7.22 Ujung Cukubatuberagam (5˚37'S., 104˚18'E.), the S extremity of the bay, is fringed by a coral reef; a 3.6m patch lies 0.5 mile N of the point and a shoal, upon which there is a rock with a depth of 0.6m, lies 1.5 miles NNW of the point.

The coast from Ujung Cukubatuberagam trends about 23 miles SE to **Tanjung Balimbingpamancasa** (Vlakke Hoek) (5˚55'S., 104˚33'E.), the S point of Teluk Balimbing and the NW entrance point of Selat Sunda; the coast is generally low and densely overgrown, but inland the country is mountainous.

Teluk Balimbing (5˚54'S., 104˚34'E.) indents the coast just N of Tanjung Balimbingpamancasa. The village of Balimbing is situated close E of the SW entrance point of Teluk Balimbing. To the N of this same point the 10m curve is about 0.5 mile offshore and the depths shoal quickly to 5.4m. The depths in the bay shoal gradually.

Pulau Batu Kecil (5˚54'S., 104˚27'E.) lies about 7 miles WNW of Tanjung Balimbingpamancasa; it is low, wooded, about 0.7 mile in extent, and surrounded by a reef. A shoal bank extends NW and SE of the island.

7.23 Regular depths over a sandy bottom are found between **Bengkulu** (3˚47'S., 102˚15'E.) and Mana, about 57 miles SE. Farther to the S the coast becomes more steep, moderate depths extending out only a short distance, until Pulau Batu Kecil is approached where they extend 8 miles from the coast of Sumatera.

A few shoals, which can best be seen on the chart, lie off the coast between **Pasaralas** (4˚19'S., 102˚45'E.) and Mana, about 14 miles SE.

A shoal, about 2 miles in extent and with a least depth of 5.9, lies 1.5 miles SW of **Ujung Cukubatuberagam** (5˚37'S., 104˚18'E.), with a 10.1m patch about 1.7 miles S of the shoal.

Two patches, with depths of 4.1 and 5.4m, lie 3 and 1.75 miles NNW, respectively, of **Tanjung Balimbingpamancasa**

(5˚55'S., 104˚33'E.); other shoal patches may exist in the vicinity.

Off the coast W of **Langgar Peak** (5˚49'S., 104˚33'E.) are several patches with depths of 5.9 to 8.7m; the outer patch, with a least depth of 7.3m, lies about 2 miles offshore and 5 miles W of the peak.

Gunung Dempo (4˚01'S., 103˚07'E.) rises to a height of 3,159m about 31 miles NNE of Tanjung Mana. **Dingin** (3˚59'S., 102˚56'E.) rises to 2,020m about 11 miles WNW of Gunung Dempo. These two peaks are apparently useful marks for identifying the locality.

Pandan (4˚34'S., 103˚31'E.), 1,811m high, rises about 16 miles NNE of Teluk Sambat.

Pugung (4˚59'S., 103˚51'E.) rises to a height of 1,964m, about 8 miles E of Teluk Pugung, there are many other high peaks in the vicinity.

Tanggamus (Keizerspiek) (5˚26'S., 104˚40'E.), 2,102m high, rises about 24 miles ENE of Teluk Bengkunat.

A light is shown on **Tanjung Bandar** (4˚49'S., 103˚20'E.).

A light is normally shown from the highest point on the SE side of **Pulau Pisang** (5˚07'S., 103˚51'E.).

A light is normally shown on **Tanjung Salobu** (5˚11'S., 103˚56'E.).

7.24 **Langgar** (5˚49'S., 104˚33'E.), a conspicuous peak, rises to a height of 158m about 29 miles NNE of Teluk Balimbing.

A light, from which a racon transmits, is shown from a white dwelling on Tanjung Balimbingpamancasa.

A light is shown from a structure on the NW part of Ujung Walor.

Directions.—In approaching Teluk Kroe, the high and conspicuous mountain, Pugung, which rises about 9 miles N of **Pulau Pisang** (5˚07'S., 103˚51'E.), may be discerned a considerable distance from the offing.

Vessels should approach the anchorage under Pulau Pisang from the S; there appear to be no dangers to avoid excepting the reef extending a short distance from the island.

Small craft may enter by the N channel by keeping at about 0.2 mile distant from the island shore.

In approaching the town of Kroe from the S, the houses should be kept open of Tanjung Salobu to avoid the reef off **Ujung Walor** (5˚14'S., 103˚54'E.).

Anchorage.—The best anchorage off **Pasaralas** (4˚19'S., 102˚45'E.), a small pepper port, is in 22m, mud. In lesser depths, the ground is foul and rocky.

Anchorage may be taken in the N part of Teluk Sambat, W of **Aer Sambat** (4˚48'S., 103˚23'E.) off the village of Bintuhan (Bandar), where there is good shelter from NW and W winds, in 14.6 to 18.3m, sand and mud bottom.

Anchorage can also be taken off **Tanjung Linau** (4˚52'S., 103˚24'E.).

Anchorage may be taken in **Teluk Pugung** (5˚00'S., 103˚42'E.), in 18.3m, off the village of Penengahan, sheltered from the swell; however, landing is only practicable during good weather.

Anchorage may be taken in Teluk Kroe, between **Pulau Pisang** (5˚07'S., 103˚51'E.) and the coast of Sumatera, sheltered from NW and W winds, in about 14.6 to 31m, sand, E of the island.

Large vessels may anchor about 0.2 mile N of the lighthouse on **Tanjung Salobu** (5˚11'S., 103˚56'E.), in about 11.9m, hard sand bottom. It is safe in the Southeast Monsoon, being well sheltered from these winds by the reef off the S of the bay; but during the Northwest Monsoon there is but little shelter in any of these bays, and craft must be prepared to leave at any time.

Anchorage may be obtained in **Labuan Topokan** (5˚16'S., 103˚58'E.), off the village of Pager Dalem, where landing can always be effected except in strong NW winds.

The anchorage in **Labuan Jambu** (5˚20'S., 104˚01'E.) is immediately off the small river of Jambu, but no shelter is afforded against SE swell.

Labuan Siging (5˚31'S., 104˚12'E.) affords anchorage, in 9.1 to 11m, over sand, with Ujung Siging bearing about 170˚.

Anchorage may be obtained in **Teluk Bengkunat** (5˚37'S., 104˚18'E.) and is really the only good anchorage between **Ujung Walor** (5˚14'S., 103˚54'E.) and Tanjung Balimbingpamancasa, about 57 miles SE.

Anchorage, though completely exposed to NW winds, may be taken in Teluk Balimbing, in 7.2m, sand, with Tanjung Balimbingpamancasa Light bearing 192˚ and the entrance of a river lying about 2 miles NE of the light, bearing 084˚.

Anchorage is available off a village on the NE side of Pulau Beta Kecil, in depths of 14.6 to 22m.

Caution.—Off **Tanjung Mana** (4˚29'S., 102˚54'E.) during the East Monsoon period, heavy rollers get up in 7.3m, and a break may occur in depths of 5.5m after the sea breeze sets in, thus preventing any communication with the shore. It is therefore not a desirable anchorage.

Off-lying Islands—Selat Siberut to Selat Sunda

7.25 The chain of islands that are parallel to the W coast of Sumatera between Selat Siberut and Selat Sunda, lie off the coast at a distance of about 60 miles; they are for the most part unsurveyed.

Selat Siberut (0˚50'S., 98˚45'E.), between Pulau Bojo and Pulau Siberut, is about 21 miles wide. This strait, together with its dangers therein, is described in paragraph 6.38.

Kepulaun Mentawai (Mentawei Islands) (2˚00'S., 99˚30'E.) consists of four large inhabited islands, namely Siberut, Sipura, Pagai Utara, and Pagai Selatan, and of several smaller islands, which are not inhabited. They are of volcanic formation and earthquakes occur from time to time. They are hilly.

The temperature and climatic phenomena vary considerably on the E and W coasts. When the wind is blowing hard from the W or NW on the W coasts there are sometimes fresh E winds on the E coasts. There are no definite wet or dry seasons. The W and NW winds usually bring rain, but the rainfall is also heavy in the Southeast Monsoon period. At these times the weather is very variable, and days of rain are succeeded by bright and clear weather.

The E coasts are particularly unhealthful. Discolored water is often met with off the E coasts of Kepulaun Mentawai, although during surveys of this area no bottom was found with 183m of wire out.

The villages of Kepulaun Mentawai are small and rarely exceed 100 inhabitants. Siberut, situated on Pulau Siberut, at its SE end, is the only village of any importance. A Government official resides here. The inhabitants of the islands live

mostly in the interior as the coastal areas are generally swampy. In language, customs and appearance, the people are unlike those of Sumatera and their origin is uncertain. They are very primitive and wear little clothing. Both sexes are generously tatooed. The people are peaceful and honest, but very shy.

Pulau Siberut

7.26 Pulau Siberut (1˚20'S., 99˚50'E.) is about 60 miles in length and from 15 to 24 miles in breadth. It is the northernmost large island of Kepulaun Mentawai.

It is a fairly high island, wooded, without any conspicuous points, and with low stretches of foreshore which the constant accumulation of stone deposits have formed. These flat stretches along the coast are covered by the rising tide and farther inland become extended marshes which dry sufficiently to be walked over after persistent droughts, but which are submerged in the rainy season.

The E coast is almost entirely overgrown with mangroves and has a few sandy beaches. The W and S coasts are nearly all sandy beaches, on which there is a constantly breaking surf, making landing difficult.

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

Several small islands lie close to the coast on the E side; others interspersed with shoals lie off the SW and S sides.

The N coast of Pulau Siberut forms the S side of Selat Siberut. It is low but covered with tall trees.

Tanjung Siopa (0˚59'S., 98˚40'E.), the NW extremity, is a rocky point, from which a sandy beach, fronted by a reef to a distance of 0.3 mile, trends NE to the double point **Tanjung Amongorun** (Boompjeshoek) (0˚57'S., 98˚43'E.), a distance of 3 miles. A conspicuous white rock, located on the W head of Tanjung Amongorun, is visible from some distance N. With the exception of Tanjung Amongorun, the whole shore is sandy.

Tanjung Sigep (0˚54'S., 98˚54'E.), the E extremity, is low and thickly wooded.

Anchorage may be taken anywhere in Selat Siberut, in moderate depths, sand, from 1 to 2 miles off the N coast of Pulau Siberut.

Directions.—A course may be steered by day along the N coast of Pulau Siberut by passing 2 miles N of Tanjung Amongorun and 1 mile N of Tanjung Sigep.

By night, vessels approaching from the W should steer for the light of **Pulau Bodjo** (0˚38'S., 98˚31'E.) and then pass S of it at a distance of 2 miles. Then bring the light to bear 276˚ and, while steering 096˚, use it as a stern mark. From the E, steer for the light bearing 276˚.

Caution.—A bank, with general depths of under 37m, extends for a distance of 14 miles from the N end of Pulau Siberut halfway across the strait and has a breadth of 12 miles.

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

There are a number of islets and reefs lying 1 to 1.5 miles offshore between Tanjung Sigep and Tabekat Bay.

7.27 Labuan Badjau (0˚56'S., 98˚55'E.), close S of Tanjung Sigep, is deep but the entrance to the inner part is very difficult due to reefs, difficult to distinguish, and nearly drying at LW.

Anchorage, sheltered from W winds, for vessels with local knowledge, is available, in a depth of about 46m, with Pulau Masien, a low and wooded islet lying 4 miles SE of Tanjung Sigep, bearing about 128˚.

Anchorage is also possible, with local knowledge, about 0.7 mile S of Pulau Masien, in a depth of 11m, with the S entrance point of Labuan Badjau and Tanjung Sigep in line bearing 321˚.

Tabekat Bay (1˚03'S., 98˚57'E.) lies about 6 miles SE of Labuan Badjau. Tabekat, 285m high, is the highest hill on the NE part of the island and lies close W of the bay.

Anchorage may be obtained, in 14.6 to 18.3m, in the S basin of the bay.

Approaching the N entrance of the bay, steer for Tabekat in range with the S extremity of **Pulau Umana** (1˚03'S., 98˚57'E.) bearing 283˚ until **Pulau Karang** (1˚01'S., 98˚57'E.) comes into range with the sand cay about 1 mile S of it, bearing 339˚.

A course of 260˚ should then be steered between the drying reef S of Pulau Umana and the drying spot on the N end of **Pulau Langeirak** (1˚04'S., 98˚57'E.). This passage is about 0.3 mile wide and the reefs on either side are steep-to.

When the whole of **Pulau Limo** (1˚05'S., 98˚57'E.) is open W of Pulau Langeirak, a vessel may anchor or proceed into Tabekat Bay, keeping along the coast of Pulau Langeirak to avoid the spit off the mouth of the river and anchor as desirable. Approaching the S entrance of the bay is not recommended.

Ujung Sikabalun (1˚07'S., 99˚00'E.), about 4.5 miles SE of Tabekat Bay, is very conspicuous from the N as well as from the S. The long row of high casuarina trees suddenly ends N of it and the mangroves that border S. A large house, which is very conspicuous, stands among several smaller houses in the vicinity of the point.

Anchorage may be obtained under the shore of the point, in a depth of about 27m.

7.28 Telok Silogui (1˚14'S., 99˚02'E.) lies about 7 miles SSE of Ujung Sikabalun. It is about 1 mile long, E and W, and the entrance about 0.8 mile wide; it has general depths of 33 to 51m. A reef, with a depth of 2.3m, steep-to, lies in the entrance about 0.5 mile S of the N entrance point. The Silogui River discharges into this bay. Anchorage may be obtained off the mouth of the river, in 36.5m.

Telok Sipompong (1˚17'S., 99˚04'E.), about 5 miles SSE of Telok Silogui is about 1 mile long.

Off the entrance is the low, overgrown island, **Tabanan** (1˚17'S., 99˚05'E.), which, if entering the bay, is best left to the N. A conspicuous hill, rising to a height of 260m, lies about 4 miles W of Teluk Sipompong; the S summit of the hill is a sharp cone.

Saibi Road (1˚20'S., 99˚07'E.) lies about 4 miles SSE of Telok Sipompong.

To the W of **Pulau Panjang Saibi** (1˚22'S., 99˚07'E.), which has a peculiarly-shaped shallow cove with a narrow entrance, is a well-sheltered anchorage. The island may be passed on either side.

Off the village of **Maara Saibi** (Muarasaibi) (1˚20'S., 99˚05'E.), where there is a settlement of traders, is a wide, steep-to bank of mud and sand.

Small vessels may obtain anchorage on the E point of the bank, in a depth of 9.1m.

Gosong Saibi di Tangah (1˚19'S., 99˚06'E.), located in Saibi Road, is reported visible.

7.29 **Kasih Gosong Saibi** (1˚20'S., 99˚07'E.), also located in the roads, is a drying reef with a sand patch; it was formerly an overgrown island.

Telok Saribua (Teluk Sarabua) (1˚29'S., 99˚09'E.) indents the coast about 6 miles in a NW direction, with the depths and width decreasing regularly.

The bay affords sheltered anchorage for vessels with local knowledge.

Laki Laki (Gunung Lagilagi) (1˚26'S., 99˚09'E.) rises near the coast to a height of 198m, it is conspicuous from both N and S.

Teluk Simalepet (1˚34'S., 99˚12'E.) affords a sheltered anchorage behind Pulau Simalepet in very bad weather. The N entrance is clear and safe. The S entrance is narrow. On the S side of the bay are two small mangrove islands, each surrounded by a reef.

Siberut Bay (Teluk Siberut) (1˚36'S., 99˚14'E.) may be recognized from a considerable distance by a gap between two ridges of hills located behind the bay.

The town of Muarasiberut (Siberut) is the headquarters of the Government Official of Kepulauan Mentawai subdivision.

Anchorage, sheltered from all winds except those between N through E, is available behind Ujung Sikabai, the S entrance point of the bay.

A vessel approaching anchorage in Teluk Siberut should steer for the N side of the gap in the hills behind the town, bearing about 211˚; when abeam of Kasih di Tengah, keep the pier head in line with the light green tree on the same bearing, which will lead into the anchorage.

7.30 From **Ujung Sikabai** (1˚36'S., 99˚15'E.), the coast trends SE for about 3 miles to **Ujung Pinang Pinang** (Ujung Rugurugut) (1˚38'S., 99˚17'E.), about 1 mile S of which is the entrance to Teluk Pinang Pinang. The latter is clear, affords sheltered anchorage to vessels with local knowledge, and can be entered without difficulty.

Between Ujung Sikabai and **Ujung Sibajau** (Tanjung Sibajau) (1˚45'S., 99˚17'E.), about 10 miles SSE, are several bays which can best be seen on the chart. Ujung Sibajau, the N entrance point of Telok Katurei, has some high trees.

Gosong Sibabui, a sunken coral reef marked by discoloration, lies from about 0.4 to 0.7 mile SE of **Pulau Sibabui** (1˚44'S., 99˚18'E.).

Telok Katurei (Teluk Katorai) (1˚45'S., 99˚15'E.) is limited to the S by two islands. Off the entrance are a few reefs which make entry more difficult, but they are, however, usually marked by rollers or breakers. The bay penetrates deeply into the land in a N direction; about 5 miles within the entrance the bay is divided into two arms.

To enter Telok Katurei, it is easiest and safest to enter by steering 270˚ for Ujung Sibajau and then shaping a course to pass just S of the reef extending about 0.7 mile WSW from this point. This reef may always be distinguished and nearly dries. When farther inside, keep along the E side of the channel; that is, close along the islands. Vessels of light draft may go into the inner reach of the bay.

To the W and just N of **Masehee Island** (1˚43'S., 99˚15'E.), the channel is difficult on account of the shoal depth and the drying reef S of **Ujung Masipehe** (1˚41'S., 99˚14'E.). There is always a little current setting out from the bay.

Coming from the S, the channel W of **Siloina** (1˚47'S., 99˚17'E.) is not advisable on account of the reef located SSE from it, which can be distinguished only on very rare occasions. The 3.2m reef S of the above is never seen.

7.31 The S and W coasts of Pulau Siberut are densely overgrown. In the morning, a thick mist hangs over the shore.

Near the SE end of Pulau Siberut are four large islands, as well as several smaller islands; all are uninhabited.

Pulau Karangmajat (Pulau Karamajet) (1˚55'S., 99˚18'E.), the S island, has a hill 41m high in the center with dark high trees, and is one of the few landmarks visible from **Selat Bungalaut** (1˚55'S., 99˚25'E.); on the SE point of the island are some dead trees. There are always heavy breakers on the S and W coasts.

Pulau Botiek (1˚53'S., 99˚16'E.), 1 mile NW of Pulau Karangmajat, is low and overgrown; on the shallowest patches of the reef on the W side of the island, there are usually rollers or breakers.

Pulau Mainu (Simaimu) (1˚51'S., 99˚18'E.), about 2 miles NE of Pulau Botiek, is low with high trees; there are dead trees on the E end, at which the sea always breaks.

Pulau Masokut (Nyang Nyang) (1˚51'S., 99˚14'E.), the largest of the four large islands and of which **Ujung Pulanggajet** (1˚51'S., 99˚14'E.) is the SW end, lies 1.25 miles NW of Pulau Mainu; the SW end of the island is overgrown with dark, high trees and the sea always breaks on this point.

There is somewhat sheltered anchorage in a bay that indents the S coast of Pulau Masokut; anchorage may be taken, in 18.3m, SE of Muara Masausuh, a river that empties into the bay.

Telok Taileleo (Teluk Taileleu) (1˚48'S., 99˚11'E.), on the S coast, is clear and shoals regularly, but one is not sheltered against the swell which trends around.

Pulau Koraniki (Pulau Dodiki) (1˚50'S., 99˚08'E.) lies 2 miles S in the bay. There is a small settlement at the W end of the bay; the village of **Taileleo** (1˚45'S., 99˚08'E.) is situated about 2 miles N of it.

7.32 **Tobow** (1˚47'S., 99˚07'E.), a hill, rises to the W of Teluk Taileleo and is conspicuous from Selat Bungkalaut.

Pulau Koraniki, **Pulau Ngiau** (Si Nyau Nyau) (1˚52'S., 99˚05'E.), and **Pulau Jujuat** (1˚48'S., 99˚02'E.) are low, densely overgrown, and uninhabited islands.

Selat Bungalaut (Seaflower Channel) (1˚55'S., 99˚25'E.) is formed between the islands off the S side of Pulau Siberut and Pulau Sipura. The channel is deep and about 15 miles wide. It is clear of dangers except for a 11m patch, which is not marked by discoloration, and located about 2 miles NW of **Pulau Pototogat** (2˚01'S., 99˚33'E.). There is no suitable anchorage in the channel.

A current setting to the E at the rate of 2 knots has been reported in Selat Bungalaut at 1 hour 30 minutes after HWS tides.

Due to the mud carried into the sea by the rivers, the sea along the W and S coasts of Pulau Siberut is not clear and the reefs are not marked by discolored water, although they are marked by rollers or breakers, this being dependent upon the direction and height of the swell.

The rock 1 mile S of **Pulau Koraniki** (1˚50'S., 99˚08'E.) is always marked by heavy breakers.

At the larger rivers, and also at **Simalubek** (1˚37'S., 98˚50'E.) and **Kali Simatalu** (1˚27'S., 98˚45'E.), but especially from **Kali Simaleki** (1˚09'S., 98˚38'E.) to near the N coast of Pulau Siberut, there are frequently strong discolorations caused by the river water.

7.33 Tanjung Simansih (1˚41'S., 98˚52'E.) lies 18 miles WNW of the W entrance point of Telok Taileleo.

Both points are low and projecting, are overgrown with casuarina trees, and always stand out from a distance.

On the steep coast N of Tanjung Simansih are a few white and yellow spots, a result of slides of rocks and trees which have carried with them the vegetation, either completely or in parts. New patches appear from time to time and old spots become less prominent.

At **Kali Simatalu** (1˚27'S., 98˚45'E.), about 11 miles NW of Tanjung Simasuket, is a gap plainly visible when abeam.

Tetekuku (1˚33'S., 98˚50'E.), a fairly conspicuous hill rising to a height of 375m, stands about 7 miles SE of Kali Simatalu.

Tanjung Sakaladat (1˚12'S., 98˚35'E.) is the W extremity of Pulau Siberut. A cone-shaped hill rises to a height of 406m about 10 miles ENE of the point. A 246m hill and a 298m hill lie 6 and 17 miles, respectively, SE of Tanjung Sakaladat.

At **Kali Simaleki** (1˚09'S., 98˚38'E.) is a rocky headland; the sea breaks heavily on a rock off this headland.

Chinambeleo (1˚07'S., 98˚39'E.) is a conspicuous 145m high hill rising about 6 miles NE of Tanjung Sakaladat. About 2.2 miles N of Chinambeleo is a 186m high hill that is also conspicuous, especially when viewed from the N.

A depth of 24m lies about 7 miles WNW Tanjung Sakaladat.

7.34 Pulau Sipura (Pulau Sipora) (2˚10'S., 99˚38'E.) is a densely overgrown island; the W coast is low, with numerous bays. The ridges of hills are not high and present no conspicuous landmarks; the S point of the island is low.

Siburu Bay (Teluk Siburu) (2˚01'S., 99˚35'E.) is formed by the N coast of Pulau Sipura and Pulau Siburu, Simakakak, and Pototogat. There are a few low hills on the islands. The depths in the bay range from 37 to 73m over a sandy bottom. The bay affords good anchorage, sheltered from swell and all winds, for vessels with local knowledge.

In navigating the E entrance of the bay S of Pulau Siburu, care must be taken to avoid the reefs extending S of the island. Reefs are also located NW of a line joining the SE points of Pototogat and Pulau Siburu.

To the SE of Siburu Bay, for a distance of about 7 miles, the coast forms deep, narrow inlets, which are not inhabited.

Siuban Bay (Teluk Siuban) (2˚11'S., 99˚43'E.) is the only bay of importance on the E coast. A detachment of armed police is encamped here and this bay is the greatest shipping point for coconuts. The bay is clear and is easily navigated without aids. The S side may be recognized from a considerable distance on account of the cleared tongue of land on which the police camp buildings are situated. In the inner part of the bay is a landing pier for small vessels.

Telok Semebai (Teluk Simabai) (2˚17'S., 99˚47'E.), about 7 miles SE of Siuban Bay, is easily navigated. Near the middle of the bay is a small drying sandbank which may be passed on either side. To the S of this bank, the bottom is mud and the depths from 18.3 to 37m.

Tanjung Kinapet (Tanjung Batu Kinapat) (2˚24'S., 99˚51'E.) is the S point of Pulau Sipura and is fringed by a narrow reef.

7.35 Teluk Siberimanua (2˚08'S., 99˚33'E.) indents the W coast of Pulau Sipura in a SE direction; it has a good anchorage ground.

The bay is sheltered by **Pulau Pitoyat** (2˚08'S., 99˚31'E.), which is low and thickly wooded, and another island on the same reef lying to the NW.

Pulau Noko Pulau (Muko) (2˚13'S., 99˚32'E.), a low and densely overgrown island, lies about 5 miles S of Pulau Pitoyat; it is separated from the shore by a clear passage with a least depth of 12.8m in the middle.

Simailipit (2˚14'S., 99˚35'E.) and Trait are two deep bays SE of Pulau Noko. The depths decrease regularly and the coastal reef in each bay always breaks, so that they may be entered without difficulty. The vessel, however, is apt to roll considerably, as there is no shelter against the prevailing SW swell.

Pulau Siduamata (2˚22'S., 99˚43'E.), about 7 miles W of Tanjung Kinapet, is low and densely overgrown. Off the SW and SE sides is a fairly broad fringing reef. There is a small bay on the N coast where the Malay traders load produce.

There is a depth of 12.8m through the channel between Pulau Siduamata and Pulau Sipura.

Under the shore of Sipura, NW of Pulau Siduamata, is **Tobo** (2˚20'S., 99˚43'E.).

7.36 Selat Sipura (Sipora Strait) (2˚30'S., 99˚50'E.) is about 10 miles wide between the S extremity of Pulau Sipura and the N extremity of Pulau Pagai Utara. The ridge on which Kepulaun Mentawai lies is about 8 miles wide between the 200m curves and is steeper on the NE side than on the SW. Generally speaking, the highest part of the ridge has depths of from 37 to 55m.

On the E side of Pulau Sipura the current was reported setting to the SSE between the N end of the island and Selat Sipura from 1 hour before LW to 3 hours before HW; the current was setting W between the S extremity of **Pulau Sipura** and the N extremity (2˚30'S., 100˚00'E.) of Pulau Pagai Utara from 3 hours to 1 hour before HW.

7.37 Pulau Setan (1˚58'S., 99˚34'E.) consists of several small, steep rocks. About 1 mile NW of Pototogat is a coral shoal with a least depth of 11m; this shoal is not marked by discoloration.

A reef, with a depth of 4.6m, lies about 3 miles ESE of the SE end of **Pulau Siburu** (1˚59'S., 99˚35'E.).

Three drying patches, the middle of which is a sand cay and visible at HW, lie about 3 miles SE of the S entrance point of **Telok Semebai** (2˚17'S., 99˚47'E.).

About 2 miles N of **Pitoyat** (2˚08'S., 99˚31'E.) and about 1 mile offshore is a shoal with a least depth of 6.4m; there is a clear channel into Teluk Siberimanua on either side of Pitoyat.

A ridge with depths under 18.3m extends to the NW from **Pulau Noko** (2˚13'S., 99˚32'E.) up to a distance of 1.5 miles.

A detached patch with a depth of 16.5m is located about 2 miles SW of the island.

In Selat Sipura, a shoal, with a least depth of 11m and about 1 mile in extent, lies about 4 miles W of the N end of Pulau Pagai Utara; otherwise the strait is clear of any known dangers.

Simangkocho (Gunung Simakoyo) (2˚19'S., 99˚47'E.), a plain, solitary cone, rises to a height of 234m about 6 miles NNW of the SE end of Pulau Sipura.

When viewed from the NW and SE this hill appears as a sharp cone; from the NE and SW it is not so sharp, but well-defined on account of the surrounding low land. It is also visible from the W coast.

A 313m high hill stands on the NE coast of Pulau Sipura, about 7 miles SE of Pulau Siburu; when seen from the N or SE, it appears as a level ridge extending in an E and W direction. Along the E coast, close behind the beach, are many small hills.

Kepulauan Pagai

7.38 These two islands, Pulau Pagai Utara and Pulau Pagai Selatan, are separated by the deep and narrow Sikakap Strait.

When passing down the E coasts of Pulau Pagai Utara and Pulau Pagai Selatan at an average distance of 3 miles from the shore, no current was found on ebb tide. After LW at Selat Sipura, a N current was experienced for 4 hours, running at a rate of 3.5 knots.

Pulau Pagai Utara (North Pagi) (2˚40'S., 100˚05'E.) is hilly, but the peaks are difficult to distinguish. The hilly land lies in the middle of the island and extends in a NW and SE direction. The coast is flat practically throughout. Only the N part of the W coast is hilly and rocky in places; the SW, S, and E coasts are low and marshy. The island is fringed by a very narrow coast reef and the 20m curve runs close along the shore.

Taluung Simapinang (Pinang Pinang) (2˚30'S., 100˚00'E.), the NE point of the island, is overgrown with casuarina trees and stands out sharply. The entire E coast is low and marshy with few coves and heights.

Saumanganyo Road (2˚36'S., 100˚07'E.) is located about 10 miles SE of Tanjung Simapinang.

Tanjung Simatobe (2˚39'S., 100˚10'E.) lies about 4 miles SE of Saumanganyo Road; the entrance to Selat Sikakap lies about 8 miles further SE.

Tanjung Takarimau (2˚34'S., 99˚58'E.), on the W coast of the island, is a rocky point.

7.39 Tanjung Sigogoa (2˚37'S., 99˚58'E.) stands out sharply as a steep, solitary rock which is connected to the shore by a narrow tongue of land. Batu Malai indents the coast between the two points.

Si Labulabu Bay (2˚45'S., 99˚59'E.) indents the coast about 8 miles S of Tanjung Tumale; it is most easily entered by passing N of Si Labulabu Gedang and then continuing to the anchorage NE or E of Silabulabu Kechil, the narrow channel between the two islands, which has depths of 10.5 to 17.8m.

Betumonga Bay (Teluk Betumongo) (2˚49'S., 100˚00'E.) to the S of Si Labulabu Bay, and **Sabeo Guguk** (2˚50'S., 100˚03'E.), on the S coast of the island, are both clear but open to SW swell.

Sikakap Strait (Selat Sikakap) (2˚48'S., 100˚10'E.) separates Pulau Pagai Utara and Pulau Pagai Selatan. In the middle of the E entrance is the island of **Tonggo** (2˚47'S., 100˚14'E.), which, although hilly, with a conspicuous tree in the middle, is difficult to distinguish from the offing against the shore behind it. The passage S of this island reportedly could not be used.

The E part of the strait, about 0.2 mile wide, is deep and clear, with hilly and densely-overgrown shores.

In the W entrance of the strait are the islands of **Nusa** (Siruso) (2˚51'S., 100˚08'E.), Siopa Besar, and Siopa Kechil; Nusa is marked by a light.

Tides—Currents.—Along the N coast of Pulau Pagai Utara, in the vicinity of position 2˚30'S, 99˚54'E, a current with a velocity of 1.5 knots is occasionally encountered, probably caused by irregular depths.

In Selat Sipura, there is seldom more than a 2 knot current, even at springs; the current changes at the times of HW and LW.

7.40 Si Jau Jau (2˚31'S., 100˚03'E.) and **Kiki** (2˚33'S., 100˚04'E.) are the largest of some low sand banks lying about 1 mile offshore and 3 to 5 miles SE of Tanjung Simapinang. Vessels should keep outside of them as there are several shoals between them and the shore.

A 5.5m patch lies in Saumanganyo Road, about 0.5 mile N from the N end of **Saumanganyo Islet** (2˚36'S., 100˚07'E.); a reef with a depth of 1.4m lies about 0.2 mile SSW from the same point. A group of shoals lies about 2 miles N of Tonggo.

Togut (2˚46'S., 100˚12'E.) rises to a height of 243m, close to the N shore of the E entrance to Selat Sikakap; it is an excellent landmark from any place on the E coast.

A small hill with a conspicuous tree on **Siopa Besar** (2˚53'S., 100˚10'E.), and the 315m hill, also with a conspicuous tree, on Pulau Pagai Selatan are good landmarks when approaching Selat Sikakap from the W.

Anchorage.—Good anchorage can be obtained between Si Jau Jau and Kiki, lying about 1.2 miles SE. Vessels should keep outside of them as there are several shoals between them and the shore.

Si Labulabu Bay (2˚45'S., 99˚59'E.) affords a calm anchorage.

7.41 Pulau Pagai Selatan (South Pagi) (3˚00'S., 100˚20'E.) is also hilly, especially in the N part, and presents the appearance of a high dune landscape.

The ridge, about 368m high, which practically extends across the island and slopes toward the sea E of Bitojat Besar, is conspicuous from the NW as well as from the SE. The ridge is nearly as flat as a table.

The hill, 315m high, with a conspicuous tree, is conspicuous from the W, N, and E.

The hills located on the S promontory are detached and visible from the W coast as well as from the E coast.

The islands near the W coast are all low, densely overgrown, and uninhabited. The two N islands, **Bitojat Besar** (Pulau Pitojetsabeu) (3˚01'S., 100˚09'E.) and Bitojat Kechil, close E, are separated by a narrow channel with a depth of 9.1m in mid-channel.

Pulau Sibigau (3˚04'S., 100˚11'E.), about 2 miles SE of Bitojat Besar, and on which there is a conspicuous tree, is connected to Pulau Pagi Selatan by a ridge with less than 18.3m of water.

On this ridge is the island of **Ragi** (3˚03'S., 100˚13'E.), which is fringed by a wide coastal reef. Elsewhere the depths are not less than 11m.

7.42 Tanjung Beritarikap (Bio) (3˚21'S., 100˚27'E.), the S end of Pulau Pagai Selatan, is a tongue of land about 2 miles wide on which there is nearly always heavy breakers. On the E side of this land, close under the shore, are several islands which, from seaward, are difficult to distinguish from the coast.

Veeckens Bay (Teluk Veeckens) (3˚10'S., 100˚27'E.) is spacious and formed between the coast of Pulau Pagi Selatan and a group of low islands, all of which are densely overgrown and uninhabited. The depths in the bay range from 26 to 55m, sand and mud, but one may pass deep into the NW part of the bay, between the islands, in depths not less than 14.6m. Shoals and rocks are easily distinguished so that navigation presents no difficulty.

Pulau Taitaitanopo (Tinopo) (3˚10'S., 100˚30'E.) lies on the E side of Teluk Taitaitanopo, and **Pulau Siumang** (Saumang) (3˚14'S., 100˚31'E.) lies about 2 miles to the S.

Pulau Simonga (Simungguk) (3˚16'S., 100˚34'E.) lies about 2.7 miles SE of Pulau Siumang.

Tanjung Laggaisao (Sibelua) (3˚01'S., 100˚28'E.) about 8 miles N of Veeckens Bay, stands out sharply, and from the S and N is made conspicuous by an obliquely overhanging tree.

About 1 mile S of this point is a cove about 1 mile in length, which is foul with rocks and islets.

7.43 Labajau (3˚05'S., 100˚28'E.) lies close to the coast about 4 miles S of Tanjung Laggaisao; it is fringed by a reef on its E side.

The coast N of Tanjung Laggaisao is low with a few small hills in the interior. Farther N the coast is hilly and in some places rocky, with plantations here and there on the slopes and some villages by the rivulets. About 4 miles SE of the entrance to Selat Sikakap the coast line becomes irregular, and there are many small islets, of which the outer and larger are known as **Si Jau Jau** (2˚46'S., 100˚17'E.). The passage between these islands and the coast is not navigable.

7.44 Selat Sanding (Sanding Strait) (3˚25'S., 100˚35'E.), between the S end of Pulau Pagai Selatan and Pulau Sanding, is clear, 12 miles wide, with depths of 37 to 82m. The only obstructions are Europa Reef and some rocks extending from the N side of Pulau Sanding.

Pulau Sanding (3˚28'S., 100˚39'E.), the southwesternmost of Kepulaun Mentawai and lying about 13 miles SE of Pulau Pagai Selatan, is low and densely overgrown. It is inhabited by a few Malays who gather coconuts. The coastal reef is very narrow along the S and W coasts; it is about 3 miles wide on the N side of the island. The entire edge of the coastal reef, except on the SW side, is lined with small, overgrown islets.

A wreck, best seen on the chart, lies 6 miles NE of Pulau Sanding on the 50 fauthom line.

Stupai Islet (3˚27'S., 100˚41'E.), NE of Pulau Sanding, is the largest. A channel in the coastal reef, W of this island, forms a good but narrow road for small vessels. The island on the NW point of the coastal reef is difficult to distinguish from the shore.

Between **Libuat Island** (3˚07'S., 100˚14'E.) and Silau Island, about 6 miles SE, is a reef on which the sea always breaks; it lies about 2 miles SE of Libuat Island.

The reef between Silau Island and **Pulau Sibarubaru** (Si Baru Baru) (3˚17'S., 100˚20'E.) is also nearly always marked by breakers.

7.45 Si Jau Jau (3˚09'S., 100˚31'E.), lying E of the N end of Pulau Taitaitanopo (Tinopo), has reefs extending about 0.3 mile N and about 0.375 mile S from it. A 5.5m patch lies about 1 mile SSE of the S extremity of the island, with a 9.1m patch between.

There are also two patches with depths of 3.7 and 5.5m N of Si Jau Jau.

Pulau Simonga (Simungguk), S of Pulau Taitaitanopo, should not be approached closer than 2 miles on the SW side as there are frequently rollers which would indicate that the depth is less than 5.5m.

The reefs NW and SE of Pulau Simonga have depths less than about 3.7m and are frequently marked by rollers or breakers.

A rock, which dries, lies about 0.45 mile E of Labajau; another rock, with a depth of less than 1.8m, lies about 0.2 mile S of Labajau. Another rock, which dries, lies about 2 miles E of the S extremity of Labajau.

Europa Reef (3˚31'S., 100˚33'E.), which breaks, lies about 4.2 miles WSW of Pulau Sanding and consists of two detached patches separated by deep water.

From the highest point of Sanding, the two patches bear 255˚ and 245˚, respectively, from the summit on the S end of Pulau Pagai Selatan, they bear 147˚. These patches are frequently marked by rollers or breakers, and the least depth is probably not more than 7.3m.

Directions.—Veeckens Bay is most easily and safely entered from the S. The channel depth ranges from about 18.3 to 37m.

The bay is also easily reached from **Tinopo Strait** (3˚08'S., 100˚29'E.), but the E side of this strait should be avoided. By steering 216˚ through the middle of the strait, one passes between the drying reef E of Labajau and the 5.5m shoal N of Si Jau Jau.

One may also make Tanjung Laggaisao (Sibelua) and then steer close under the shore through the strait, avoiding a drying rock E of Labajau. The reefs in this vicinity are not very well marked by discolored water.

Tio Bay (Teluk Tiop) (3˚13'S., 100˚21'E.), E of Silau Island, affords good anchorage, sheltered against ocean swell, for vessels with local knowledge.

Veeckens Bay offers a safe anchorage, but as all islands are infested with mosquitoes, it is not advisable to anchor close under the shore.

Pulau Mega (4˚00'S., 101˚02'E.), lying about 38 miles SE of Pulau Sanding, is 2 miles in length and surrounded by a reef

It is low and densely overgrown, and should be visible for a distance of about 15 miles in clear weather.

Anchorage may be taken, in 22m, sand and coral, about 0.5 mile off the E coast of the island, with the extremities of the island bearing 225˚ and 315˚.

7.46 Pulau Enggano (Engano) (Telanjang) (5˚23'S., 102˚15'E.), the southernmost of the large islands fronting the W coast of Sumatera, lies about 60 miles W of Sumatera. Pulau Enggano is about 20 miles long and about 10 miles wide.

A range of hills runs through the island from NW to SE. The hills extend down to the sea along the SW and S but the island is lower and more level toward the NW and NE sides. It is densely wooded, unbroken by a field of grass or a trace of cultivation; it can not be said to have a beach, as the trees reach to and overhang it. A quantity of coconut trees are seen along the coasts; the sea breaks furiously on the drying coral reefs which fringe the island.

There are heavy breakers on the reefs even in the calmest weather. The island forms part of Benkulen Province.

Teluk Enggano (Engano Bay) (5˚28'S., 102˚24'E.), the principal anchorage, is on the E side of the island, and has in its entrance three small islands surrounded by reefs, which always break heavily.

Pulau Dua (5˚27'S., 102˚24'E.) is inhabited and covered with trees; except for a small opening on the W side, it is surrounded by a coral reef of considerable extent, partly dry at LW, but having depths of 7.3 to 18.3m close-to.

Marbau, an island about 2 miles S of Pulau Dua is also covered with trees and surrounded by a reef, which on the W side extends but a short distance.

There is a deep, narrow passage apparently between the reef off the S side of Marbau and the reef which extends SE of **Tanjung Kahoabi** (5˚29'S., 102˚23'E.).

Bangkei, the middle island of the three and the smallest, is conspicuous from the sea, having a high sandy beach, with a tuft of trees near the center. It is located on the outer detached reef which lies off **Eumo Point** (5˚27'S., 102˚23'E.), the NE point of Telok Kiowa, a deep cove in the S part of Teluk Enggano.

A 3.2m patch lies about 0.5 mile NE of Bangkei and a 3.7m patch lies about 0.2 mile N of Bangkei.

The coastal reef on the NW side of Pulau Dua is extending to the NW. Telok Labuho, uninhabited, lies within **Tanjung Labuho** (5˚31'S., 102˚17'E.).

On the SW side of Pulau Enggano, there is a small bay between **Pulau Satu** (5˚28'S., 102˚14'E.) and the shore.

At **Tanjung Kioyo** (5˚25'S., 102˚12'E.), about 4 miles NNW of Pulau Satu, the coastal reef extends in a rocky spit and forms a deep cove.

Tanjung Kooma (5˚21'S., 102˚06'E.), the W extremity of Pulau Enggano, lies about 8 miles NW of Tanjung Kioyo.

7.47 Tanjung Lakoaha (5˚17'S., 102˚10'E.), the N extremity of the island, lies about 6 miles NE of Tanjung Kooma.

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

Malakoni (5˚21'S., 102˚17'E.) is the principal settlement of Pulau Enggano. It is situated about 9 miles ESE of Tanjung Lakoaha. It is a port of call for local steamers and a Native Administrator resides here; a light is shown from Malakoni.

Two detached reefs, with depths of 4.1 and 4.6m, lie about 0.5 mile SW of Pulau Dua. In the channel N and W of Pulau Dua other shoal patches exist. A depth of 11m was reported to lie about 0.6 mile N of the W end of Pulo Pulau.

A 16m patch lies about 4 miles S of **Tanjung Kahoabi** (5˚29'S., 102˚23'E.).

Black Rock (5˚31'S., 102˚16'E.), 2.4m high, lies about 0.5 mile off Tanjung Labuho, the S point of Pulau Enggano. About 2 miles SE of the same point are some shoal patches with a least depth of 3.5m.

For navigation around Pulau Enggano at greater distances, the hilltops of the main chains are sufficiently good objects for bearings.

Buabua (5˚25'S., 102˚17'E.), 281m high, is the highest and most conspicuous.

7.48 Nanuua (5˚27'S., 102˚20'E.), 195m high, on account of its saddle shape, is also fairly conspicuous from the NE, W, and SW. The 107m hill on the SE point stands out sharply above the low, sloping promontory.

Anchorage.—In Teluk Enggano, the best anchorage is 327˚, distant about 0.3 mile, from the W point of Pulau Dua, in 26m, sand. There is also anchorage between Marbau and Bangkei, in 16.5 to 33m, sand, NW of Marbau; both these are fairly-sheltered anchorages.

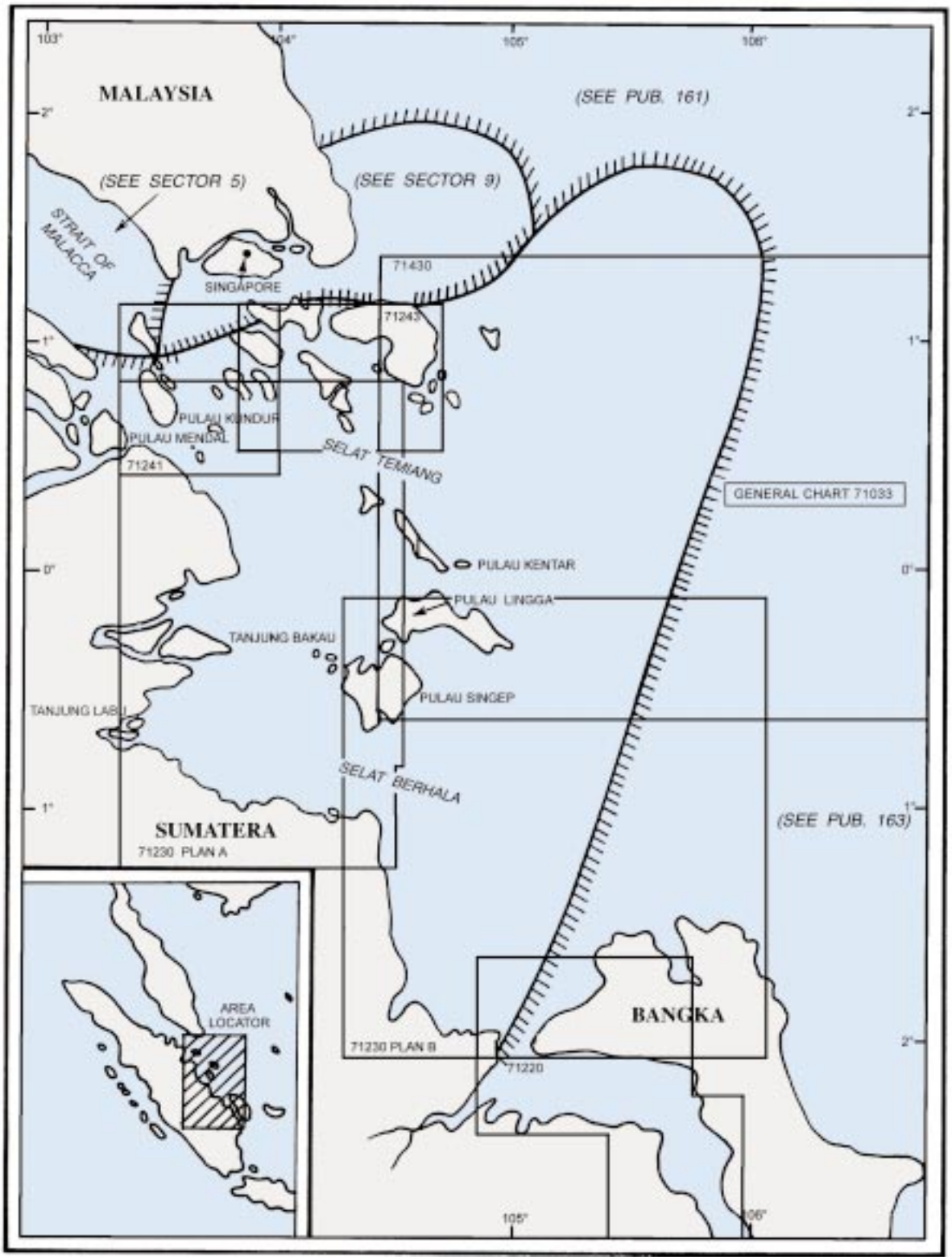
Anchorage can also be obtained,in about 20m, NW of Pulau Dua, with the conspicuous 107m high hill, located about 2 miles W of Tanjung Kahoabi, bearing 219˚ and the N tip of Pulau Dua bearing 105˚.

There is anchorage in a small bay between Pulau Satu and the shore for small craft, in about 14.6m, sand, with the S end of the island bearing 281˚, distant 0.3 mile.

Directions.—To approach Teluk Enggano, steer 248˚ N of Pulau Dua and anchor as directed above.

7.49 Barohia Anchorage (5˚18'S., 102˚08'E.), a little W of the N point of Pulau Enggano, is a narrow inlet in the fringing reef, extending E and W nearly 0.8 mile and having in mid-channel a depth of 11 to 14.6m, except near the head, where there are shallow patches near the landing place. This anchorage is not safe in the West Monsoon period.

Excellent anchorage is obtained off the settlement of **Malakoni** (5˚21'S., 102˚17'E.). Vessels are advised to veer about 24m of cable and to steer 235˚ towards the mouth of the river, continuing on that course until the anchor holds. The mouth of the river is easily distinguished.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **8** — CHART INFORMATION

SECTOR 8

EAST COAST OF SUMATERA—SELAT BANGKA TO SINGAPORE STRAIT VIA OUTER AND INNER ROUTES

Plan.—Selat Bangka (Banka Strait) to Singapore Strait is described, first via the Outer Route and then via Selat Riau (Riouw Strait), the Inner Route. Selat Bangka to Singapore Strait by Selat Berhala (Berhala Strait) is then described, followed by describing Selat Durian (Doerian Strait), the Alternate Inner Route.

General Remarks

8.1 Vessels bound from Selat Bangka to Singapore now seldom use the outer route to the E of Kepulauan Lingga (Lingga Archipelago) and Kepulauan Riau (Riouw Archipelago). Most vessels prefer to proceed by Selat Riau or Selat Berhala.

Selat Berhala and Selat Durian, its continuation N, form the inner and alternative route to Selat Riau when bound to Singapore from S. Its fairway is deep throughout, the least water, of 10.1 to 11.9m, lying SW of **Pulau Mutyi** (Moetji) (0˚30'S., 104˚00'E.), about 30 miles NW of Pulau Berhala. Since it has been marked with lights and buoys, this channel is equally available for all classes of vessels.

Selat Berhala forms the S part of this route and Selat Durian the N part. The intermediate portion has not received a specific denomination.

The entire route is about 120 miles long from **Pulau Berhala** (0˚52'S., 104˚24'E.) to the **Karimun** (Karimon) **Islands** (1˚05'N., 103˚30'E.) in Singapore Strait. It is bound on the W side by the coast of Sumatera (Sumatra), **Pulau Sanglang Besar** (Sanglang-besar) (False Doerian) (0˚37'N., 103˚41'E.), and the contiguous islands, and on the E side by Pulau Singkep (0˚30'S., 104˚30'E.) and other islands of the S and W coast of **Pulau Lingga** (0˚10'S., 104˚35'E.), and by **Pulau Durian-kecil** (Little Durian) (Little Doerian) (0˚44'N., 103˚40'E.) and **Pulau Durian** (Doerian) (Great Durian) (0˚44'N., 103˚43'E.) and the adjacent islands.

Tides—Currents.—Between the N end of Selat Bangka, Kepulauan Riau, Kepulauan Lingga, and Singapore, the average rate of the tidal currents in the Southwest Monsoon is greater than in the Northeast Monsoon on account of the prevalent winds from that direction; nevertheless, in the later monsoon greater rates have been observed than in the former.

The greatest rates observed were 2 knots in the Northeast Monsoon and 1.25 knots in the Southwest Monsoon, whereas the average rates, on the contrary, were only 0.5 and 0.75 knot, respectively.

North to Singapore Strait from Selat Bangka—Outer Route

8.2 The coast of Sumatera (Sumatra) from **Batakarang Point** (2˚00'S., 104˚45'E.) trends NNW for about 65 miles to **Tanjung Jabung** (Djaboong) (1˚00'S., 104˚22'E.). The entire coast is very low, covered with wood, and fronted by a mud bank that, within a depth of 9.1m, in places, extends about 13 miles offshore. It may be approached to a depth of 9.1m, except off Tanjung Jabung, where the 10m curve is barely 1 mile offshore, with less than 3.7m close to its edge.

Vessels bound for Selat Berhala, when approaching Tanjung Jabung should keep about 8 miles offshore until it bears 270˚.

Tanjung Batakarang was reported to have extended nearly 1 mile E of its charted position.

Pulau-pulau Tuju (Tudju Eilanden) (1˚10'S., 105˚18'E.) lie in the NE approach to Selat Bangka, in a position about 20 miles from the N coast of Bangka. These islands are generally visible at a distance of about 25 miles and are surrounded by reefs. Many shoals in the area are not marked by discoloration.

Pulau Saya (0˚47'S., 104˚56'E.), located about 30 miles NW of Pulau-pulau Tuju, is steep-to, of granite formation, covered with wood, and has a double-peaked 210m high summit; the N peak is about 18.3m less in elevation than the S one, and both peaks are in range on a 180˚ and opposite bearing. A small village is situated on the NW side of the island.

Nyamuk (0˚48'S., 104˚56'E.) is the N of two steep granite rocks lying 0.75 mile N of Pulau Saya. A rock, awash at LW, lies between the islets.

Caution.—Less water than charted has been reported (1995) about 7 miles SSW of Pulau Saya.

8.3 **Pulau Singkep** (0˚30'S., 104˚30'E.) is located about 20 miles N of Tanjung Jabung on the Sumatera coast. The island, about 20 miles in length and the same in breadth, is much indented on its N and S sides.

North of Pulau Singkep is Pulau Lingga, with **Pulau Selayar** (0˚18'S., 104˚26'E.) in the channel between. Off the W end of Pulau Singkep is a group of islands separated from Pulau Singkep by **Selat Sebayur** (0˚25'S., 104˚15'E.).

From **Tanjung Malang** (Perpat) (0˚39'S., 104˚30'E.), the SE point of Pulau Singkep, the coast has a NE direction for 10 miles to **Tanjung Tengku** (0˚30'S., 104˚35'E.), with Tanjung Tija (Tidja) (0˚28'S., 104˚36'E.) about 2 miles farther N.

The coast between these two points is fairly thickly populated; the most important village is **Dabo** (Kotadabok) (0˚30'S., 104˚34'E.).

Pulau Lingga (0˚10'S., 104˚35'E.), lying about 4 miles N of Pulau Singkep, is about 35 miles long, in a NW and SE direction; it largely consists of alluvial flats.

8.4 **Kotadaik** (0˚14'S., 104˚38'E.), the principal village, is situated on the W side of a shallow bay on the S coast of the island.

Tanjung Goroh (0˚20'S., 104˚55'E.), the SE point of Pulau Lingga, may be known by a saddle hill. Between Tanjung Goroh and **Tanjung Jang** (Djang) (0˚18'S., 105˚00'E.) is a shallow bight named **Tolo Bay** (0˚18'S., 104˚57'E.).

On the W side of the entrance is **Pulau Kokau** (0˚20'S., 104˚56'E.), a small hilly islet; 0.3 mile to the S of the islet is **Batu Maresoh** (0˚19'S., 104˚56'E.), a rock just above HW.

Pulau Sunsa (0˚19'S., 105˚00'E.), about 0.5 mile S of Tanjung Jang, has a hill 99m high; a small wooded rock lies close W, and 0.7 mile WSW of the islet there is a rock awash at LW. A rock, with a depth of 2m, lies about 0.5 mile SE of Pulau Sunsa. The outer end of the coastal reef on the W side of Pulau Sunsa is located 1.4 miles from Tanjung Jang Light.

Pulau Merati (0˚18'S., 105˚01'E.), lying 1.5 miles E of Tanjung Jang Light, is surrounded by a reef; nearly midway between it and Tanjung Jang is a rock above-water.

The NE coast of Pulau Lingga is formed of numerous hillocks, from 61 to 91m high, which gives it a uniform appearance, but neither it nor the adjacent islets are safe to approach at night. The hills near the N end of the island are 202m and 226m high.

8.5 Pulau Selentang (0˚07'S., 105˚00'E.), called "Pulo Semat" by the natives, is a sandy islet 24m high and covered with high trees. Pulau Selentang lies about 11 miles N of Tanjung Jang.

It is surrounded by a reef which extends as much as 0.75 mile from its N side. Two rocks, with depths of 1.2 and 2.7m, lie, respectively, about 0.3 mile and 183m S of the islet.

Pulau Bujang (0˚08'S., 104˚55'E.), about 5 miles W of Pulau Selentang, is hilly and wooded, with a peaked hill 111m high near its center; it is steep-to on the NE side but elsewhere is surrounded by a reef which dries. On the SE side, are two wooded rocks.

Bulu (0˚08'S., 104˚55'E.) is a small village situated on a bight on the SE side. Between the island and the coast the depths are from 10.1 to 12.8m.

Tjawan Reef (0˚07'S., 104˚53'E.), which dries, lies about 0.5 mile NW of Pulau Bujang.

Pulau Gojong (0˚11'S., 104˚54'E.), lying between Pulau Bujang and **Tanjung Liang** (0˚12'S., 104˚53'E.), is low and wooded, it is surrounded except on its SW side, by a reef that dries and extends for a distance of 0.4 mile.

Pulau Malangbilang (Malang Bilang) (0˚11'S., 104˚55'E.), a rock 4.3m high, and **Pasir Pandjang** (0˚10'S., 104˚55'E.), a sandbank which dries, lie about 1 mile SE and NE, respectively, of Pulau Gojong.

Pulau Kongka-besar (Kongka Besar) (0˚03'S., 104˚51'E.) lies about 4 miles NW of Pulau Bujang and is hilly throughout its length, with some remarkable peaks; the E coast is rocky and steep-to. A drying rock lies about 2 miles W of the NW point of the island.

Maras Rocks (0˚05'S., 104˚53'E.), two wooded rocks, lie about 1 mile SE of Pulau Kongka-besar, with a narrow channel between and a depth of 11m. Midway between Maras Rocks and Tjawan Reef, to the SE, there is a reef with rocks above HW.

8.6 Kongka Kecil (Ketjil) (0˚04'S., 104˚50'E.), 116m high, close W of Pulau Kongka-besar, is separated from it by a narrow channel, with depths of 4.6m and used by small vessels; a village is situated on its E side.

Two detached reefs lie SE of Kongka Kecil; on the N one is **Penoh Island** (0˚05'S., 104˚51'E.), and on the S there are rocks above-water which lie within the 10m curve around the larger islands. About 1 mile SSW from Kongka Kecil is **Penoh Laoet** (0˚05'S., 104˚50'E.), on the S end of a reef.

For other islets, depths, and dangers between Kongka Kecil and the NE coast of Pulau Lingga, the appropriate chart is the best guide.

Blading (0˚01'S., 104˚50'E.) is the largest of a group of islets and rocks of which are lying about 2 miles N of Pulau Kongka-besar. Reefs with rocks above-water extend about 1 mile NW.

Krokodil (0˚00'N., 104˚53'E.), about 4.6m high lies 3.5 miles Blading Island, with a reef 0.3 mile W. Depths of 5.9 to 8.7m lie between it and Pulau Kentar to the WNW.

Pulau Kentar (0˚02'N., 104˚46'E.), located 1.5 miles E of Tanjung Gantong, the SE point of Pulau Sebangka, is hilly, the highest point near its SE point being 120m high.

When coming from the N and before the adjacent islands to the S are visible, this high point resembles the hill on the SE end of Pulau Lingga. From the S side of the island, a bank, with less than 5.5m of water, extends about 1 mile.

Nearly 1 mile beyond, a narrow reef stretches 2.5 miles in an E and W direction, with a least depth of 3m, and W of this there is a sand bank nearly always dry.

Between the E end of the narrow bank and the bank extending from Pulau Kentar there is a small reef with a rock above-water named **Anak Langoe** (0˚01'N., 104˚47'E.).

8.7 Bakau (0˚05'N., 104˚45'E.), lying about 1 mile N of Pulau Kentar, is surrounded by a reef; Tjandur and **Beringin** (0˚06'N., 104˚44'E.), two small islets, are located on the reef about 1 mile N of Bakau.

Kapas (0˚08'N., 104˚42'E.), a rock 0.6m high on the N end of the reef, lies nearly 3.5 miles NW of Bakau.

Pulau Sebangka (0˚08'N., 104˚35'E.) lies between Pulau Lingga and Pulau Temiang to the NW. It is 19 miles long between **Tanjung Gantong** (0˚01'N., 104˚42'E.), its SE end, and **Oetan Besar** (0˚15'N., 104˚29'E.), its NW end, with a maximum breadth of about 3 miles.

Reefs, dry at LW, front the N side of Tanjung Gantong; they are visible from the discoloration of the water.

Alut (0˚04'S., 104˚42'E.), 156m high, lies about 4 miles S of Sebangka.

Teluk Limbung (Limboeng Bay) (0˚10'S., 104˚47'E.), a shallow bay, indents the E coast of Pulau Lingga W of **Tanjung Takih** (0˚08'S., 104˚50'E.); it is only available for small craft.

Numerous islands and shoals, best be seen on the chart, lie between the NE coasts of Pulau Lingga and the Bakung Islands (Bakong Islands) and Pulau Sebangka to the NE.

8.8 Pulau Mesanak (0˚25'N., 104˚31'E.), located 7 miles N of the N end of Pulau Sebangka, has the form of an elbow, of which the long arm extends 4.5 miles in a N and S direction, and the short arm 3 miles E and W. Ridges of hills extend the whole length of both arms, the highest point, 107m high, being where the arms meet.

On the E side of Pulau Mesanak, the coastal reef extends for a distance of 0.7 mile; close to the rocky E point, and connected to it, is **Koejoe Island** (0˚24'N., 104˚34'E.), small but moderately high.

Two rocks which cover at HW lie nearly 0.5 mile off the N side of the island and about 1 mile E of **Observation Point** (0˚26'N., 104˚31'E.), the NW extremity of the island.

Patches of 6.9m lies about 0.1 mile NW of the above-mentioned rocks and about 0.2 mile N of Observation Point.

West of the island, foul ground extends W of Merodong Island and other islands.

Pulau Nyamok (Njamok) (0˚20'N., 104˚33'E.), 56m high, and lying about 2 miles SE of the S end of Pulau Mesanak, is surrounded by a reef which extends about 1 mile NE, with drying rocks, and is generally breaking.

In the channel between Pulau Nyamok and Pulau Mesanak, there is a sandy islet with some trees; the channel is apparently choked with rocks.

The Merodong group of islands lie to the W of Pulau Mesanak, between it and the Temiang group. The former group comprises six islands, separated by channels unsuitable for navigation and there is no reason in venturing among them or between them and Pulau Mesanak.

Merodong (0˚24'N., 104˚27'E.), the N island, is 186m high and its conical peak is one of the principal landmarks for making Selat Riau (Riouw Strait). Rocks, dry at LW, extend 0.8 mile NNE from the NW end of Merodong, on the S side of Selat Merodong (Selat Merodong).

Numerous islands and dangers extend for a distance of 20 miles off the E coast of **Pulau Bintan** (1˚00'N., 104˚34'E.).

Vessels making the passage between Selat Bangka and Singapore Strait should generally pass outside, or to the E, of the whole of these islands and dangers. The whole coast and the islands off it are, as a rule, fringed by coral.

8.9 Selat Kijang (Kidjang Strait) (0˚50'N., 104˚37'E.) is a narrow passage between the SE coast of Pulau Bintan and several small islands immediately off that coast.

Tanjung Tili (0˚49'N., 104˚36'E.), the S extremity of Pulau Bintan, marks the W side of the S entrance of Kijang Strait.

The distance from Tanjung Tili to the N entrance of Selat Kijang is about 8 miles. The N part of the strait is unmarked and used only by small vessels with local knowledge.

The S part is suitable for use by vessels inbound for Sungei Kolar, a port situated on the W side of the strait about 3 miles NNE of Tanjung Tili.

A bar, with depths of 5.6m extends across the S entrance to Selat Kijang from Tanjung Tili to the SW extremity of Pulau Koyang. A lighted buoy is moored 0.6 mile ENE of Tanjung Tili.

Range lights are shown l.25 miles SSW of Tanjung Tili. The front light stands close off Tanjung Maga, the NW extremity of Pulau Siulung; the rear light stands on the N coast of Pulau Mantang, 700m from the front. The entrance channel is marked by buoys.

An overhead cable, with a clearance of 45m, crosses the channel about 0.2 mile S of the berth at Sungei Kolar.

Vessels leaving Sungai Kolar pass N of Pulau Mana, a small island in the middle of Selat Kijang about 0.5 mile NNE of Sungei Kolar, then E and S through **Selat Dendang** (0˚51'36"N., 104˚37'18"E.) and S and SW through **Selat Kelong** (0˚49'N., 104˚38'E.).

These channels are marked by buoys and beacons. It is reported that ships drawing 8.7m have cleared Sungei Kolar via these channels.

A channel, which is marked by beacons, leads into Selat Kijang from SE of **Pulau Kelong** (0˚50'N., 104˚39'E.). It passes N of two drying reefs lying a little less than 0.5 mile N and NW of **Pulau Kambat** (0˚48'N., 104˚40'E.), an islet located about 1 mile SE of Pulau Kelong.

A beacon marks the NW drying reef. From there, it passes N of **Pulau Rusa Besar** (0˚47'30"N., 104˚38'30"E.). An 8.2m shoal lies in mid-channel about 0.3 mile WSW of the SW point of Pulau Kelong. Caution is advised in the navigation of this channel, as it has not been thoroughly examined in recent years. A buoy is moored about 0.3 mile NNE of **Pulau Rusa Kechil** (0˚47'30"N., 104˚38'54"E.).

A swept channel from Selat Kijang, dragged to a least depth of 12.8m, leads E and then N to a position NE of **Pulau Mapur** (1˚00'N., 104˚49'E.).

From a position about 0.5 mile NW of Pulau Kambat, proceed ENE for 4 miles until **Pulau Borus** (Boroes) (0˚48'N., 104˚45'E.) bears 150˚. Then steer E for 7 miles until **Pulau Merapas** (0˚56'N., 104˚55'E.) bears 038˚. Then steer NNE until Pulau Marapas bears 112˚. From there the swept channel leads to the N for about 8 miles to its seaward end.

Kijang (0˚51'N., 104˚36'E.) (World Port Index No. 50045), a bauxite port, is situated about 3 miles N of the S entrance of Selat Kijang. Timber products and general cargoes are also handled.

Tides—Currents.—Tidal currents can be strong by Tanjung Tili at the S entrance to Selat Kijang, setting across the channel towards Pulau Siulung. A rate of 3.5 knots has been observed. Off the bauxite terminal the rate can reach 6 knots.

Depths—Limitations.—There is noquay at the bauxite terminal; ships moor alongside dolphins and two jetties. Vessels up to 180m long, with a maximum beam of 27m and a maximum draft of 10m, can be accommodated. There are tidal currents of up to 6 knots at the berth. Numerous wrecks lie stranded on the foreshore within 0.5 mile N and S of the jetties.

The Sea Communication Wharf is 50m in length, with a depth of 8m alongside. The wharf is used for passenger and general cargo vessels.

Plywood is worked at the Korindo Abadi Wharf, which has a length of 200m and a depth alongside of 8m.

Granite barges are worked at the Wirah Indah Kencana Wharf, which is situated 1 mile N of the bauxite terminal. This wharf has a depth alongside of 7m.

Pilotage.—Pilotage is compulsory. Vessels should send their ETA 48 hours and 24 hours in advance. The pilot station for vessels approaching from the W is situated close SSE of No. 4 Lighted Buoy, S of Tanjung Tili. Vessels should arrive no later than 1800.

For vessels approaching from the E, the pilot is embarked 1 mile ESE of Pulau Temborah Laut. Vessels arriving from the E should arrive before 1600.

Permission must be obtained to enter **Selat Kijang** (Kidjang Strait) (0˚50'N., 104˚37'E.).

Signals.—The following tidal signals are shown from the wharf at Kijang:

1. A cylinder, with a cone, point up, above it, indicates that the tidal current is flowing in.

2. A cylinder, with a cone, point up, above it, and a cone, point down, below it, indicates that the tidal current is flowing out.

Anchorage.—Anchorage may be taken, in 29m, with the tangents of **Pulau Saya** (0˚47'S., 104˚56'E.) bearing 095˚ and 187˚; the holding ground is poor.

On the N side of **Tanjung Jang** (Djang) (0˚18'S., 105˚00'E.) are two small shallow bays with sandy beaches.

The E bay affords good anchorage during the Southwest Monsoon to vessels drawing up to 3.7m of water.

Temporary anchorage may be taken on the W side of Pulau Selentang (0˚07'S., 105˚00'E.), in about 20m of water.

At some distance off the NE coast of **Pulau Sebangka** (0˚08'N., 104˚35'E.), good anchorage may be obtained, in depths of 12.8 to 14.6m, sand.

East of **Aloet Island** (0˚04'S., 104˚42'E.), between it and the Kongka Islands, there is a wide space in which there is good anchorage, in depths of about 7.3 to 9.1m, mud and sand.

Good anchorage may be obtained about 2 to 5 miles E of the E end of **Pulau Mesanak** (0˚25'N., 104˚31'E.), in depths of 11 to 14.6m, mud and sand.

On the E side of **Pulau Mapor** (0˚56'N., 104˚55'E.) is a small sandy bay where vessels may anchor, in 9.1 to 11m, about 0.7 mile offshore. As the bottom in parts of this bay is foul, care must be taken to keep **Bare Rocks** (0˚57'N., 104˚52'E.) open E of **Lee Islet** (0˚59'00"N., 104˚51'30"E.), 18m high, off the S end of the bay.

Directions.—Heluptan Reef lies in the direct track of vessels, and the utmost care is necessary to avoid it. A vessel will keep E of it by not going into less than 48m and to the W of it by keeping **Gunung Koeas** (0˚52'N., 104˚35'E.) on Pulau Bintan and **Pulau Beruan** (0˚46'N., 104˚49'E.), 90m high, well in sight, until the latter bears 290˚, which leads well N.

Pulau Teroti (0˚42'N., 104˚47'E.), bearing 270˚, leads S of **Gosong Ara** (0˚47'N., 104˚57'E.) and other shoals.

Pulau Kayuara (0˚49'52"N., 104˚56'20"E.) in range with **Pulau Beruan** (0˚46'N., 104˚49'E.) leads N, and **Pulau Merapas** (0˚56'N., 104˚55'E.), bearing 333˚, leads E of them.

Caution.—In light winds **Heluptan Reef** (0˚37'N., 105˚09'E.) may be distinguished by the discoloration of water, but with a fresh breeze it is difficult to distinguish breakers from the swell except when the tidal current is setting against the wind with a comparatively smooth sea.

8.10 **Pulau Sentut** (1˚03'N., 104˚50'E.), with **Middle Rock** (1˚04'N., 104˚47'E.), **Black Rock** (1˚05'N., 104˚44'E.), and **Pulau Berlangkap** (1˚06'N., 104˚40'E.) lying N and NW of Pulau Mapor, form a sort of chain stretching from outside the dangers off the N coast of that island to the shore of Pulau Bintan. Though there is a wide channel within Pulau Mapor, no vessel without local knowledge should attempt it.

Pulau Gin Besar, Pulau Gin-kecil, and **Pulau Numbing** (Noembing) (0˚45'N., 104˚44'E.) are three islands, which together are about 5 miles in extent, lying from 8 to 13 miles SE of **Gunung Kaus** (0˚52'N., 104˚35'E.), and separated from each other by narrow channels; the channel along the S side of Pulau Gin Besar has depths of 6.9 to 15.5m but its entrances are foul.

Selat Sendara (0˚44'N., 104˚40'E.) is the channel between Pulau Gin Besar and Pulau Gin-kecil on the E and Pulau Telan on the W. In it are some banks with less than 3.7m, and off the coast reef of Pulau Telan are some drying patches.

At its N end off Pulau Gin Besar is **Pulau Rinti** (Rienti) (0˚45'N., 104˚40'E.), with a small islet N of it, both surrounded by reef.

These obstructions and tidal currents combine to make the passage unsafe except to those acquainted with it.

Pulau Teroti (0˚42'N., 104˚47'E.), the S of a cluster of islets lying to the SE of Pulau Numbing, is 34m high and 2.25 miles SE of Pulau Numbing.

Pulau Rusah (Roesah) (0˚42'N., 104˚45'E.), composed of two rocks on a small drying reef, lies about 2 miles W of Pulau Teroti, and there are several rocks above and below- water between these islets and rocks.

Pulau Beruan (Beroean) (0˚46'N., 104˚49'E.) lies 5.5 miles NNE of Pulau Teroti; being 90m high and saddle-shaped, it is conspicuous and easily recognized.

Pulau Merapas (0˚56'N., 104˚55'E.) is the outer and E island off the E side of Pulau Bintan. It is 63m high, covered with trees, and steep-to 0.3 mile offshore.

Pulau Mapor (Pulau Mapur) (1˚00'N., 104˚49'E.) lies with its S extremity about 10 miles N of Pulau Beruan. A prominent 107m high hill stands on the NW point of the island.

Pulau Sentut (Sentoet) (1˚03'N., 104˚50'E.), 44m high and of sugar-loaf form, lies about 2 miles NW of the NE end of Pulau Mapor. It is steep-to on the N side, but a reef extends about 0.5 mile from its S end.

Pulau Berlangkap (1˚06'N., 104˚40'E.) is an islet 27m high, lying about 9 miles NW of the NW end of Pulau Mapor and nearly 2 miles off Tanjung Berlangkap (1˚06'N., 104˚38'E.).

8.11 From Tanjung Berlangkap to **Tanjung Berakit** (1˚14'N., 104˚34'E.), about 8 miles N, the NE coast of Pulau Bintan forms a bay indented with bights and coves. The coast of this part of Pulau Bintan is for the most part fronted by a reef which projects in some places to a distance of 0.5 mile; just N of Tanjung Berlangkap is a ledge of rocks.

Tides—Currents.—The tides at **Tanjung Boetoen** (0˚15'S., 104˚36'E.) within the islets are reported to be diurnal and subject to irregularities.

Springs occur about 3 days after the moon's greatest declination, with a rise of 2.1m; neaps occur at a similar period after the moon has no declination, with a rise of 0.3m.

During the second half of June and December springs rise 2.6m and neaps rise 0.8m; about the same time in March and September springs rise 1.7m, with no perceptible rise at neaps.

The flood current at Tanjung Boetoen runs to the W at a velocity of 2 knots.

The flood current runs in a NNW direction, parallel to Pulau Lingga, Pulau Sebangka, and the other islands, entering the channels between those islands and continuing N.

Off Selat Riau, it meets the flood current which comes S along the E coast of Pulau Bintan and enters the strait.

This flood current passes through Selat Temiang, Selat Merodong, Selat Dempo, and Selat Abang. West of these straits the flood current takes a general SSE direction, or in the opposite direction to the flood currents E of Lingga, passing S through Chempa Strait and along the W coast of Lingga. About 10 miles W of these islands there is not much current.

The flood currents through Selat Temiang, Selat Merodong, and Selat Pangelap meet off Kebat, at the NW end of Temiang, and cause heavy tide rips and eddies in that locality at certain times which it is dangerous to pass through.

The flood current also passes N between Mesanak and **Doejoeng** (0˚21'N., 104˚28'E.), joining that coming W through Selat Merodong.

The flood current sets NNW between Sebangka and Pulau Bakung (Bakong), and also passes W through Selat Dasi (Dasi Strait), and at times can attain a velocity of 4 knots in that strait.

The ebb current through all the channels of straits referred to runs in the opposite direction to that given above, except where two or more currents meet or divide, when the general direction may differ.

In the very narrow channels, which are of no consequence to navigation, the currents often attain a rate of 3 to 4 knots, but in the wider channels they do not exceed 2 to 2.5 knots.

Off Pulau Bintan at the change of the monsoon in April, the flood current runs S for 18 hours, while the ebb runs N for 6 hours. In June the periods are reversed; consequently a current against the Southwest Monsoon will only take place a few hours each day.

During the shifting months of the monsoons the tidal currents are regular, but during their strength the surface current will be always more or less governed by the wind.

The flood current comes from the N, and runs nearly parallel to the E coast of Pulau Bintan, along its S side toward Selat Abang, and to the N in Selat Riau, meeting another flood current from Singapore Strait, near the town of Rhio.

The flood sets to the S along the E coast of Pulau Lingga, and close to Tanjung Jang, its SE end, then it runs W to Selat Penuba (Penoeba), and obliquely across Lingga Bay to Selat Berhala. From Tanjung Jang to Pulau Saya and onward to Selat Bangka its direction is nearly S; another current from about 2 miles S of Pulau Saya sets toward Selat Berhala.

The ebb current is reported to set in the opposite or N direction.

Gosong Castor (Castor Bank) (0˚40'S., 105˚03'E.) is a ridge with a hard sandy bottom lying with its S end about 6 miles ENE of Pulau Saya. A post stands 1.5 miles E of the N extremity of Gosong Castor. It has a least depth of 10.7m, and from 20 to 27m around it.

The bank is 10.5 miles long in a NE-SW direction and 0.25 to 0.5 mile in width within a depth of 18.3m, except at the S end, where it widens to about 3 miles. The bank is famous for a species of red fish, named “Ikan Merah,” from their color.

Caution.—A dangerous wreck, the position of which is approximate, lies sunk about 19 miles off the coast in a position about 40 miles N of **Batakarang Point** (2˚00'S., 104˚45'E.).

Wrecks lie 15.5 miles S and 6 miles ESE of **Pulau Saya** (0˚47'S., 104˚56'E.).

A wreck lies 2.5 miles SSW of **Pulau Berhala** (0˚52'S., 104˚24'E.).

8.12 Cowmans Bank (0˚38'S., 104˚56'E.) lies about 6 miles W of Gosong Castor and parallel to it. It is a narrow bank of hard sand and shells, with mud scattered here and there. It is 10 miles long and has a width of 0.25 to 0.75 mile within the 20m curve and is steep-to; the least depth is 10.7m near its center.

Karang Alangkalam (Ilchester Bank), (0˚27'S., 104˚58'E.) is 6 miles in length within the 20m curve, beyond which it is steep-to. The shallowest spot, 2.3m near its center, lies nearly 9 miles SSW of **Tanjung Jang Light** (0˚18'S., 105˚00'E.).

A narrow bank, 4 miles in length, lies S of Karang Alangkalam; its shallowest spot of 8.8m lies about 12.7 miles SSW of Tanjung Jang Light.

Tanjung Jang Light is obscured over this bank and over the W portion of Karang Alangkalam.

Kepulauan Singkeplaut (Singkep Laoet Islands) (0˚42'S., 104˚28'E.) lies SW of Tanjung Malang (Tanjung Perpat); a shoal extends NE within the 10m curve to a position 10 miles NE of Tanjung Malang.

The central portion, with depths of 1.8 to 5.5m, is 8 miles long, and its N end lies 5.5 miles SSE of **Tanjung Pasingkep** (Pa Singkep) (0˚30'S., 104˚35'E.).

Tanjung Buku (Boekoe) (0˚41'S., 104˚22'E.), the SW point Pulau Singkep, in range with the N end of **Keling Island** (0˚41'30"S., 104˚28'00"E.), bearing 270˚, leads S of these shoals.

At **Tanjung Tija** (Tidja) (0˚28'S., 104˚36'E.), the E point of Pulau Singkep, the 10m curve is about 2 miles offshore, but E of the point a drying bank extends from the coast, and the 10m curve is 5 miles NE of Tanjung Tija. About 5 miles N of that point lies a bank nearly 4 miles long, in an E and W direction, with depths of 2.7 to 5.5m; its E edge is about 5 miles from the coast. The patch on its W edge dries at LW.

On the S side of Pulau Lingga, between **Tanjung Bliung** (Blioeng) (0˚16'S., 104˚31'E.) and **Tanjung Boear** (0˚19'S., 104˚51'E.), the coast forms a shallow indentation, known as **Lingga Bay** (0˚15'S., 104˚40'E.); the bay is about 20 miles wide, with the 5m curve running almost straight across between the points. There are various islets and reefs in the W part of the bay. The NW point of the reef surrounding Kelombok Islet is marked by a beacon.

8.13 Megalang (0˚17'S., 104˚39'E.), the outermost islet in the bay, is overgrown. A few rocky patches lie S of Megalang Islet; among them are **Titi Mengalang** (0˚19'00"S., 104˚39'30"E.), Ular and **Sebangga** (0˚19'12"S., 104˚38'30"E.) and **Sebangga Laut** (0˚19'45"S., 104˚38'15"E.). For other shoal patches in the vicinity, the appropriate chart is the best guide.

Batu Kapal (De Hes Rock) (0˚21'S., 104˚52'E.), a reef on which there is a depth of 1.8m, lies 2 miles offshore, about 3 miles W of **Tanjung Goroh** (0˚20'S., 104˚55'E.); it is marked by tide rips. Tanjung Jang Light is obscured over it.

A shoal, with a depth of 7.8m, lies nearly 1 mile SSE of **Kapas** (0˚08'N., 104˚42'E.).

Karang Busung (Boesoeng) (0˚08'45"N., 104˚41'30"E.), a reef about 1 mile in length in a NE and SW direction, lies about 1 mile NW of Kapas. An 8.7m patch lies about 3 miles W of Karang Busung.

A shoal, with a least depth of 4.1m, lies about 2.7 miles E of **Bakau** (0˚05'N., 104˚45'E.).

Karang Pollux (0˚10'N., 104˚47'E.), with a least depth of 0.5m, lies about 5 miles NNE of Bakau, on the S side of the E approach to Selat Temiang (Temiang Strait). An obstruction is charted 5.5 miles N of Karang Pollux.

Soundings give no indication of this rock; there is no discoloration in the vicinity.

A 4.1m patch lies 0.75 mile offshore, about 6 miles NNW of **Kelombang Rocks** (0˚09'N., 104˚36'E.).

8.14 Limas (0˚15'N., 104˚30'E.), a 79m high island at the N extremity of Sebangka, is connected with it by a reef. A depth of 7.9m lies about 1 mile N of the N point of Limas, and there are rocks above and below-water extending about 1 mile W of the N point.

Madgeburg Shoal (0˚26'N., 104˚35'E.), with a least reported depth of 4.5m, lies about 2 miles NE of the E end of Pulau Mesanak. A depth of 10.1m lies about 4.2 miles ENE of the same point.

An extensive shoal, about 0.5 mile long and with a least depth of 9.1m, lies with its outer edge about 2 miles E of the E end of **Pulau Nyamok** (Njamok) (0˚20'N., 104˚33'E.).

8.15 Heluptan Reef (Admiral Stellingwerf Reef) (0˚37'N., 105˚09'E.), marked by a light, is the outermost of the reefs lying off the SE coast of Pulau Bintan. It is a rock covered with coral, nearly 0.3 mile long, with a least depth of 0.4m and is steep-to.

There are depths of 34.7 to 36.6m fairly close, except at the NE side, where irregular depths of 18.3 to 20.1m extend 2 miles off. A depth of 29m lies about 9.2 miles ENE of Heluptan Reef, and an obstruction lies 33 miles NNE.

The N end of a narrow sand ridge, with depths of 11.9 to 18.3m, steep-to on its E side, lies about 9 miles NW of Heluptan Reef. From the SW end, the bank trends in a SW and W direction for about 33 miles to Pulau Mesanak, at the entrance to Selat Merodong and Selat Riau. In the Northeast Monsoon, when rain and thick weather are experienced, obtaining soundings on this bank will afford a good guide to clear Heluputan Reef and Gosong Ara.

Gosong Ara (Geldria Bank) (0˚47'N., 104˚57'E.) is the outermost danger, lying 13 to 14 miles E of Pulau Gin-besar.

Its NE end lies about 14 miles of the ENE of Numbing, where the bank extends in a SW direction for about 3 miles, having rocky heads with depths of 5.5 to 9.1m, and 27 to 37m close to the E or seaward side.

Gosong Raleigh (Raleigh Bank) (0˚46'N., 104˚54'E.), lies about 3 miles W of the SW end of Gosong Ara, and has a depth of 5.9m over coral bottom. Several shoal patches lie to the NE and SSW. Vessels should pass E of Gosong Ara and Gosong Raleigh.

A patch of coral and sand nearly 1 mile long, with a depth of 6.9m, lies about 5 miles SE of **Pulau Beruan** (0˚46'N., 104˚49'E.).

Kayu Ara (Kaju Ara) (0˚50'N., 104˚56'E.), lying about 2.2 miles WNW of the N end of Gosong Ara, are three low rocks, the highest of which is 4m above HW.

A rocky patch, with a depth of 10.1m, lies about midway between Kayu Ara and the N end of Gosong Ara; there are eddies or tide rips near these dangers.

A sandy shoal, with depths of 8.2 to 11m, lies with its N end about 5 miles W of the W end of **Pulau Merapas** (0˚56'N., 104˚55'E.) and extends about 5 miles SSW.

Rocks extend about 1 mile off the NE end of **Pulau Mapor** (1˚00'N., 104˚49'E.). There are others, some above-water, off its SE end; the outer one, named **Bare Rocks** (0˚57'N., 104˚52'E.), are 16.8m high.

Melibon (1˚01'53"N., 104˚46'32"E.), a pyramidal-shaped islet 26.8m high, lies 0.6 mile NW of the NW end of Pulau Mapor.

Passage Rock (1˚01'30"N., 104˚51'15"E.), 7.9m high, lies about 0.7 mile N of the NE end of Pulau Mapor; there is a rock about 0.5 mile ENE of the same point.

8.16 Middle Rock (1˚03'54"N., 104˚46'37"E.), a pinnacle, awash at LW, and with depths of 20m close-to, lies 3.25 miles WNW of Pulau Sentut.

Black Rock (1˚05'16"N., 104˚44'23"E.), 6.7m high, with a smaller rock close to its S side and depths of 24 to 31m around, lies about 6 miles WNW of Pulau Sentut.

A dangerous sunken rock, withdepths of less than 4.9m, lies about 1.7 miles to the ENE of **Pulau Berlangkap** (1˚06'24"N., 104˚39'40"E.). A wreck is stranded on this rock.

Pulau Saya (0˚47'S., 104˚56'E.), 210m high, is a good radar target at a distance of 19 miles.

Pulau Singkep is of considerable elevation, having on its NE side a range of hills, the summit of which, **Gunung Landjoet** (0˚25'45"S., 104˚30'38"E.), is 515m high.

8.17 Laboe (0˚30'S., 104˚29'E.), the S end of the range, is 437m high. Farther S is **Manindjoet** (0˚34'30"S., 104˚27'45"E.), 170m high. On the W side of the island is **Gunung Bidei** (0˚29'30"S., 104˚20'30"E.), 209m high. The remaining portion is low, with an isolated hill here and there.

A radio mast, 6.7m high, from which an obstruction light is shown, stands about 0.5 mile NNW of the root of the pier at the village of **Dabo** (Kotadabok) (0˚30'S., 104˚34'E.); a buoy marks a wreck which lies off the above pier. A TV mast marked by three lights (fixed yellow) stands close to the coast at Dabo.

The N portion of Pulau Lingga is hilly, the peaks attaining heights of 202 to 226m. On the island's SW part is **Gunung Daik** (Piek van Lingga) (0˚12'S., 104˚33'E.), a remarkable mountain attaining an elevation of 1,206m and split in two; it is visible from a considerable distance in clear weather.

Gunung Sepincan (Gunung Sepintjan) (0˚09'30"S., 104˚34'45"E.), with a flat top, 1,028m high, rises about 3 miles NE of Gunung Daik.

Batu Gajah (Batoe Gadjah) (0˚09'30"S., 104˚35'15"E.) lies on its E slope, the E side of which has a gray Y-shaped patch.

8.18 Tanjung Jang (Djang) (0˚18'S., 105˚00'E.), the E end of Pulau Lingga, is conspicuous, and visible in clear weather from a distance of about 30 miles. A light is shown from an iron framework near a stone dwelling, 20m high, on the point.

A light is shown from an iron frame structure, 33m high, on a hill at the SE end of **Pulau Kentar** (0˚02'N., 104˚46'E.); the island is a good radar target at a distance of 20 miles.

The summit of Pulau Sebangka, near the center of the island, is 156m high, and the hill NE of **Tanjung Gantong** (0˚01'N., 104˚42'E.), the SE extremity of Pulau Sebangka, is 134m high.

Pulau Mesanak (0˚25'N., 104˚31'E.) is a good radar target at a distance of 10 miles.

It was reported that **Pulau Nyamok** (0˚20'N., 104˚33'E.) was a good radar target at a distance of 12 miles.

Gunung Kidjang (0˚55'N., 104˚38'E.), a number of variously-shaped hills, are located on the SE side of Pulau Bintan; the southeasternmost is 242m high.

Gunung Koeas (0˚52'15"N., 104˚34'45"E.), a blunt cone 233m high, about 4 miles SW of Gunung Kidjang, has a summit in the form of a truncated cone.

Temborah (0˚50'N., 104˚39'E.), 141m high, rises on the E side of Pulau Kelong.

Several hills on the islands of Gin-Besar, Ginkecil, and **Numbing** (0˚45'N., 104˚44'E.) are from 61 to 77m high, and one rising about the center of Gin-Besar, is 77m high and has a solitary tree on it; it is a prominent mark when making Selat Riau (Riouw Strait).

8.19 **Pulau Merapas** (0˚56'N., 104˚55'E.) is a good radar target at a distance of 18 miles.

Pulau Mapor (1˚00'N., 104˚49'E.) is a good radar target at a distance of 17 miles.

There are several islets off and near the coast of Pulau Bintan. The most conspicuous of these is **Pulau Nikoi** (Nikvi) (1˚03'N., 104˚43'E.), 61m high. It forms the W side of the N entrance to the channel within Pulau Mapor.

A hill, 110m high, lies about 2.7 miles WNW of **Tangung Berlangkap** (1˚06'N., 104˚38'E.), and another hill, 100m high, rises about 2 miles W of the first-mentioned hill.

Selat Riau (Riouw Strait)

8.20 The route from Selat Bangka to Singapore, E of Pulau Lingga and through **Selat Riau** (0˚55'N., 104˚18'E.) is the one commonly used by vessels proceeding either way between Selat Sunda (Soenda Strait) and Singapore; the route is safe, sheltered, and easily navigable, with lights and beacons on many of the dangers. The route E of Pulau Bintan is exposed in both monsoons, and the fairway is encumbered with many dangers, which renders it necessary for vessels to keep off a considerable distance from land. Selat Riau is available for all classes of vessels, both by day and by night.

Selat Riau, the S limit of which is between **Pulau Mesanak** (0˚25'N., 104˚31'E.) and **Pulau Telan** (Telang) (0˚44'N., 104˚38'E.), is bounded on the E by Pulau Bintan and on the W by the chain of islands, of which **Galang** (0˚45'N., 104˚15'E.), **Rempang** (0˚52'N., 104˚09'E.), and **Batam** (1˚05'N., 104˚02'E.) are the main ones.

Numerous smaller islands and shoals front the main shores on each side of the strait. The strait is about 50 miles in length, in a NW and SE direction, and has depths ranging from 10 to 55m in the fairway, with the least depths being in the S portion of the strait.

The S entrance of the strait is about 17 miles wide for a distance of 11 to 12 miles and then contracts to a width of 3.5 miles between **Pulau Karas-kecil** (Karas-ketjil) (0˚44'N., 104˚22'E.) and the shoals to the S of the **Tapai Islands** (0˚46'N., 104˚27'E.).

About the middle of the strait, and 3.5 miles N of **Pulau Karas-besar** (0˚45'N., 104˚20'E.), is **Pulau Pangkil** (0˚50'N., 104˚22'E.), with dangers extending 5 miles SE; between these and the dangers N of Pulau Karas-besar is the principal channel, about 2 miles wide, with fairway depths of 18.3 to 37m bounded on the W by **Pulau Mubut Laut** (Moeboet Laoet) (0˚49'N., 104˚18'E.), and the islets and dangers within it, off the NE end of Pulau Galang.

The principal dangers are marked by buoys or beacons. The shores of the strait are, for the most part, sparsely populated, the greater portion of the population consisting of Malays, with the remainder being Chinese.

At **Pulau Lobam** (0˚59'N., 104˚15'E.), about 10 miles NW of Pulau Pangkil, the strait is about 2 miles wide between **Johannes Shoal** (0˚57'27"N., 104˚11'32"E.) and **Orion Rock** (0˚58'42"N., 104˚13'24"E.); this is the narrowest part of the strait.

North of **Tanjunguban** (Tanjung Uban) (1˚04'N., 104˚13'E.), the W extremity of Pulau Bintan, the strait rapidly widens to its N entrance, where it is about 10 miles in breadth.

Selat Riau—West Side

8.21 **Pulau Mesanak** (0˚25'N., 104˚31'E.) forms the S side of the entrance to Selat Merodong, and the W side of approach to Selat Riau.

Benan (0˚29'N., 104˚27'E.), 3.5 miles NW of Pulau Mesanak, is the easternmmost island of a group which separates Selat Merodong and Selat Pengelap. It is 2 miles long, tapering at both ends, and is 0.75 mile wide near the middle. The island is easily recognized by a conspicuous hill, it is 67m high, at its SE end. A reef fronts the greater part of Benan, extending from 0.25 to 0.5 mile off the N and NE sides.

Pulau Katanglingga (0˚30'N., 104˚25'E.), l.5 miles NW of Benan, is a bold, bluff-looking island 1 mile long and 50m high at the N end; the S end is low. A reef fronts the greater part of it, extending in some places to a distance of about 0.2 mile. With onshore winds, a heavy sea runs up on the E side of Benan and Pulau Katanglingga.

Pulau Galang (0˚45'N., 104˚14'E.) and **Pulau Galang Baru** (Galang Baroe) (0˚40'N., 104˚16'E.), S of it, both hilly and thickly wooded, are separated by Selat Penjabung. On the E side of these islands are numerous islands and reefs terminating E in Pulau Karas-besar.

Tanjung Maralagan (0˚42'30"N., 104˚18'48"E.), the SE end of Pulau Galang, is high and thickly wooded.

8.22 Dempo Point is the E end of **Korek Rapat** (0˚40.5'N., 104˚21.1'E.), which lies nearly 3 miles SE of Tanjung Maralagan, and is the easternmost islet of those lying in and fronting the bay formed between the two Galang Islands.

Selat Penjabung (Penjaboeng Strait) (0˚42'N., 104˚14'E.), with shores overgrown with mangroves, is only available to small craft with local knowledge.

Pulau Dempo (0˚35'42"N., 104˚18'42"E.), 45m high, lies about l.3 miles SE of the S end of Pulau Galang Baru, and on the N side of the E entrance to Selat Dempo; it is a conspicuous thickly-wooded islet, showing round and bold against the adjacent land, and is one of the most useful objects for recognizing the entrance to both Selat Riau and Selat Dempo when coming from the S.

Pulau Ngual (Ngoeal) (0˚39'N., 104˚15'E.), lying close off the W side of Pulau Galang Baru, is a narrow island 1.5 miles long, fringed by a reef.

Pulau Labun (Laboen) (0˚39'54"N., 104˚13'36"E.), fringed by a reef, lies about 0.5 mile NW of Pulau Ngual, and about the same distance offshore.

Kepulauan Melor (0˚44'N., 104˚11'E.), two in number, lie near the coast of Pulau Galang, about 5 miles NW of Pulau Labun.

Pulau Pandjang (0˚48'N., 104˚09'E.), 2 miles long, lies with its S end about 4 miles NW of Kepulauan Melor.

The W coast of **Pulau Rempang** (0˚52'N., 104˚09'E.), N of Pulau Pandjang, forms the E side of the approach to Selat Bulan, and is fronted by shallow flats to a distance of 4 miles.

8.23 Pulau Karas-besar (0˚45'N., 104˚20'E.), lying about 4 miles N of Korek Rapat, is 3.5 miles long and about 0.7 mile wide; it is hilly, with a flat summit, wooded, and has a reef encircling it extending in places for a distance of 0.25 mile.

Pulau Karas-Ketjil (Karas-Kecil) (0˚44'N., 104˚22'E.), an island marking the SW end of the narrow part of Selat Riau, is 26m high and about 0.3 mile long, E and W, formed by two small hills, and fringed by a reef. On its SW side is a sandy beach with a good landing place.

Tanjung Semandur (Semandoer) (0˚47'36"N., 104˚16'48"E.), the NE end of Pulau Galang, lies 2.75 miles NW of the W end of Pulau Karas-besar, and has on its N side a bight in which there is a village. A reef fronts the point to a distance of 0.25 mile.

Penika Islet (Steen) (0˚46'15"N., 104˚17'15"E.), consisting of some wooded rocks, is surrounded by a reef and lies about 1.3 miles NW of the W end of Pulau Karas-besar.

Pulau Mubut Laut (Moeboet Laoet) (0˚49'N., 104˚18'E.) and Mubut Darat, about 0.5 mile W, lie about 3.7 miles N of the W end of Pulau Karasbesar. Pulau Mubut Laut is 56m high and inhabited; it is the larger and higher of the two islands, and easily distinguished by its prominent position.

It rises to a round peak, with the greatest slope on the E side, while Mubut Darat is considerably lower toward its center and thickly wooded.

Tanjung Sembulang (Semboelang) (0˚51'30"N., 104˚16'06"E.), the E end of Pulau Rempang, is a rather precipitous point overgrown with trees on the W side of the main channel of Selat Riau; the hill within it is 75m high. The point is fronted by a reef to a distance of about 0.1 mile, close to which are depths of 11 to 14.6m.

Pulau Cemara (Tjemara) (0˚55'N., 104˚13'E.), the southernmost of the chain of islands, lies between Pulau Rempang and Pulau Bintan. It is hilly, partially covered with trees, 62m high, about 2 miles long and 0.75 mile wide and fringed by a reef.

8.24 Pulau Tunjuk (Tandjuk) (Toendjoek) (0˚56'36"N., 104˚12'24"E.), lying about 1.25 miles N of Pulau Cemara, is flatter than the latter and is entirely covered with vegetation. It is 0.3 mile in extent and surrounded by a reef which projects about 0.2 mile off the E side; a ridge, with rocky patches, some of which dry, connects these two islands.

Pulau Subangmas (Soebang Mas) (0˚57'N., 104˚10'E.) lies about 2 miles NW of Pulau Cemara; **Pulau Airradja** (Airaja) (Ajer Radja) (0˚58'N., 104˚10'E.), lies close N and is separated by a narrow drying channel at LW. It is the northernmost of the islands lying between Pulau Cemara and the E entrance of **Selat Bulan** (Boelan Strait) (1˚00'N., 103˚56'E.). Both these islands are hilly and covered with tall trees.

Pulau Pentjaras (Pencaras) (0˚58'21"N., 104˚10'48"E.) is a small, round islet lying on the shore reef close to the NE end of Pulau Airradja.

Pulau Nginang (Ngenang) (1˚00'N., 104˚10'E.), a hilly island, located about 2 miles N of Pulau Airradja, with Selat Bulan between, is about 3 miles long, N and S, tapering to the N. A reef fringes the S and E sides of the island, extending to a distance of 0.25 mile.

Pulau Tandjung Sau (Tanjungsau) (Tandjoeng Saoe) (1˚03'N., 104˚10'E.) lies close N of Pulau Ngenang; a hill rises to a height of 70m about 1 mile WNW of its E end. A reef of coral and sand, S of the island's E end, fronts the shore to a distance of 0.2 to 0.3 mile; its S portion forms the N side of **Pedissa Strait** (1˚01'N., 104˚10'E.), the narrow channel between Pulau Tandjung Sau and the Ngenang Islands.

A reef, with a depth of 2m, lies 1.5 miles SE of Pulau Tandjung Sau Light. The reef is marked on its E side by a buoy.

Pulau Sau (Saoe) (1˚03'48"N., 104˚10'54"E.) lies on the NE part of the reef that surrounds Pulau Tandjung Sau; there is a conspicuous red patch on the E side of the island. A flat, with 3.6 to 4.6m of water, extends about 0.5 mile NW of the island.

The E coast of Pulau Batam, from abreast Pulau Tandjung Sau to **Tanjung Babi** (1˚12'N., 104˚06'E.), the W point of the N entrance to Selat Riau, is hilly and completely overgrown, with a few scattered villages; it is fronted by a reef, extending in some places to a distance of 0.75 mile and having on it some large, above-water, reddish-colored rocks. There are also several fishing enclosures on this reef.

8.25 Karang Leman (Rifleman Shoal) (0˚28'30"N., 104˚28'15"E.), lying about 1 mile E of Benan, is a patch of hard sand 0.3 mile in extent, with a least depth of 4.9m.

Terumbu Haai (Haai Reef) (0˚35'30"N., 104˚18'42"E.), with a least depth of 2.4m, lies 0.25 mile SSE of Pulau Dempo; there is an above-water rock about 0.3 mile inshore of the islet. It is well W of the track to Selat Riau.

A depth of 7.3m lies between the S end of a reef that fringes **Pulau Ngual** (0˚39'N., 104˚15'E.) and **Tanjung Koko** (0˚37'12"N., 104˚16'06"E.); a rock, with less than 1.8m, is reported between the above depth and the point.

Penyabung Rock (0˚38'57"N., 104˚13'44"E.), awash, lies about 0.5 mile SW of the N end of Pulau Ngual.

The channel between Pulau Ngual and Pulau Galang Baru is encumbered by several islets and reefs and should not be attempted without local knowledge.

Kepulauan Penjabung (0˚43'N., 104˚13'E.) lie in the W entrance to **Selat Penjabung** (Penjabung Strait) (Penjaboeng Strait) (0˚42'N., 104˚14'E.), with a dry rock at LW, about 0.6 mile to the W of the islets, a sunken rock and a 0.9m shoal lie 183m N and about 0.2 mile SW, respectively, of the drying rock. There are no known dangers outside the 10m curve.

A rock, awash at LW, lies 0.5 mile S of **Pulau Pandjang** (0˚48'N., 104˚09'E.). A 5m depth lies about 1 mile SE of the rock. About 0.6 mile S of the rock is the end of a shoal with depths under 9.1m extending SW from the S point of the W entrance to **Selat Tiung** (0˚48'N., 104˚14'E.). A wreck, dangerous to navigation, lies nearly 1 mile S of the rock.

Hangop Rock (0˚52'42"N., 104˚01'51"E.) lies on the N end of the outer flat about 4 miles W of **Tanjung Klingking** (0˚52'N., 104˚06'E.).

Great Bank (0˚38'N., 104˚19'E.) is located off the E side of Pulau Galang Baru, between Pulau Dempo and **Pulau Batubelobang** (Batu Belobang) (Batoe Belobang) (0˚40'N., 104˚19'E.), within the 10m curve fronting the bight; the bank is 1.5 miles long.

A shoal, with a least depth of 7.9m, lies a little less than 4 miles SE of **Pulau Karas-Ketjil** (0˚44'N., 104˚22'E.); its SW side is marked by a lighted buoy.

About 2 miles N of this buoy, with an intervening depth of at least 10.1m, lies the S tip of another shoal which extends about 4 miles SSW from **Pulau Tapai** (0˚46'N., 104˚27'E.).

A shoal, with a least depth of 8.8m, lies about 2.7 miles SSE of Pulau Karas-Ketjil.

A drying reef, 0.2 mile long, lies about 0.5 mile N of the W extremity of the island, with a similar reef close E. From abreast the latter reef, and extending nearly halfway along the N coast of the island, is flat with depths of from 3.8 to 5.5m, projecting 1 mile from the island; for 0.5 mile farther in the same direction the depths are under 9.1m.

Vessels, when abreast it, should keep the whole of Pulau Karas-Kebil well open of Pulau Karas-besar.

A reef, with a depth of 1.5m, lies 1.5 miles SE of Pulau Tandjung Sau Light.

8.26 Tjassens Bank (0˚44'N., 104˚20'E.) is triangular in shape, with its base, about 4 miles long, on the S side of Pulau Karas-besar; it has depths of from 0.9 to 5.5m. A drying reef lies 1.5 miles SSW of the SE end of the island.

There is a channel on each side of Tjassens Bank, but the N one, crossing the neck of the shoal, has a depth of 3.8m, and is only available for small vessels, the S channel, between Tjassens Bank and **Pulau Tandjung Dahan** (Tandjoeng Dahan) (0˚41'N., 104˚20'E.), is nowhere less than 0.75 mile wide, with depths of from 11 to 14.6m.

Care is necessary, however, when avoiding Tjassens Bank, to give a safe berth to a small reef which lies about 0.3 mile off the NE part of Pulau Tandjung Dahan; when the W end of Pulau Karas-besar bears about 045˚ steer to pass midway between the W extremity of that island and **Penika Islet** (0˚46'15"N., 104˚17'15"E.) to avoid reefs S of the latter.

A dangerous wreck lies about 0.5 mile E of Pulau Karas-Ketjil. A spit, with a least depth of 1.5m, extends about 0.3 mile N of Pulau Karas-Ketjil; a depth of 6.7m lies 0.15 mile S of the E end of the islet.

A shoal, with a least depth of 9.5m, lies about 0.75 mile NNE of Pulau Karas-Ketjil. Two 10.1m patches and an 8.7m patch lie, respectively, about 2 miles E, 1.75 miles ENE, and 2 miles NE of Pulau Karas-Ketjil.

Fish stakes are reported to be situated in the vicinity of the 8.7m patch.

The main channel, previously described, is deep and about 1.2 miles wide between these patches and the islet. Depths of 7.8 to 11m are found between these patches and **Terumbu Rotterdam** (Rotterdam Reef) (0˚46'N., 104˚26'E.).

8.27 Karang Segutji (0˚43'24"N., 104˚22'30"E.) lies 0.9 mile S of Pulau Karas-Ketjil and uncovers. Shoals of 4.9m and 4.6m, steep-to on their E sides, extend about 0.2 mile SW and NNW, respectively, from Karang Segubi.

There is a shoal, with a least depth of 0.2m, about 1 mile E of **Penika Islet** (0˚46'N., 104˚17'E.).

A reef, with depths of less than 3.7m, on which there are some rocks drying at LW. it extends 2 miles S of **Pulau Mubut Laut** (0˚49'N., 104˚18'E.), which will be avoided by keeping the W end of Pulau Karas-besar bearing 192˚.

A shoal with depths of 0.9 to 8.7m extends nearly 2 miles N from both islands. Fishing stakes encumber the area.

A drying reef lies about 1.3 miles S of the W end of Pulau Mubut Laut. The N extremity of Tanjung Sembulang, open of its E extremity, leads E of it, but the W end of Pulau Karas-besar well open of Pulau Mubut Laut, bearing 185˚, is a better mark according to the chart, and it also leads E of the 8.5m patch lying about 2.2 miles E of **Tanjung Sembulang** (0˚52'N., 104˚16'E.). The E side of the 8.5m patch is marked by a lighted buoy.

Gosong Cemara (0˚54'N., 104˚14'E.), lying about 4 miles NW of Tanjung Sembulang and 1.5 miles E of Pulau Cemara, is about 1.3 miles long, NW and SE, with a least depth of 3m.

The E end of **Pulau Mubut Durat** (0˚49'N., 104˚18'E.) open of Tanjung Sembulang leads well E. A beacon marks Gosong Cemara.

A flat, with less than 5.5m, extends for a distance of nearly 1 mile from the SE side of Pulau Cemara; between it and Gosong Cemara the depths are from 6.1 to 9.1m.

An above-water rock, of a reddish color and having on it a conspicuous tree, lies on the shore reef off the NE point of **Pulau Subangmas** (0˚57'N., 104˚10'E.).

8.28 Johannes Shoal (0˚57'27"N., 104˚11'32"E.), lying on the E edge of the 5m curve fronting the bay between the E end of Pulau Subangmas and **Pulau Pencaras** (0˚58'N., 104˚11'E.), has a depth of 3.6m, with 12.8m close outside it.

Tanjung Sembulang, kept open E of **Tanjuk** (0˚57'N., 104˚12'E.), leads E of Johannes Shoal and of the reef extending from Pulau Pencaras.

Nginang Reef (0˚59'33"N., 104˚11'18"E.), small, awash, and usually marked by fishing stakes, lies on the N side of the E entrance to Selat Bulan, about 0.7 mile from the SE side of Pulau Nginang. Depths of 7.3 and 9.1m lie about 0.3 mile SW and NE, respectively, of the reef. The lighthouse on Pulau Tandjung Sau, bearing 354˚, leads E of Nginang Reef; a dangerous wreck lies about 2 miles NNE of the reef.

A shoal, with a depth of 1.5m, lies about 2 miles SSE of the lighthouse on Pulau Tandjung Sau.

A dangerous wreck, position approximate, lies close SSE of the shoal. The light, bearing 338˚, leads between Nginang Reef and the 1.5m shoal.

Tanjung Uban (1˚03'51"N., 104˚13'06"E.), bearing N of 012˚, leads E of it.

Another dangerous wreck, best seen on the chart, lies about 2 miles ENE of the lighthouse on Pulau Tandjung Sau.

An islet, consisting of several rocks above-water, largely overgrown with brushwood, lies 0.5 mile NW of Pulau Tandjung Sau, and is surrounded by a reef which extends SW of it nearly 0.5 mile; the reef dries at LW, and has a rock on it above HW. About 0.5 mile NW of the islet is the S extremity of a narrow steep-to coral reef with a least depth of 0.3m; the N

edge of the reef, which has a depth of 3m, lies about 3 miles NNW of the E extremity of Pulau Tandjung Sau.

A depth of 7.3m lies NW of this extremity, between it and the shore reef, in the fairway of the inshore passage. A 3.7m shoal 0.5 mile in extent is located NE of the islet.

The depths decrease rather quickly under a depth of 18.3m near the dangers just described.

8.29 Malang Orang (Karang Passo) (1˚08'N., 104˚10'E.), an isolated reef, 0.5 mile in extent and which dries at LW, has depths of 9.1 to 14.6m close-to, and is 0.5 mile offshore, with a narrow channel, with depths of 7.3 to 11m between it and the coastal reef; the drying portion lies 0.7 mile SE of **Tanjung Sabang** (1˚08'27"N., 104˚09'15"E.). A beacon is situated on Malang Orang.

Karang Galang (Pan Reef) (1˚09'N., 104˚11'E.), lying in the N entrance of Selat Riau about 3 miles NE of Sabang, is marked by a light; it is visible at LW, when it appears as a ridge of black stones. The reef is 0.6 mile long NE-SW, 0.2 mile wide, and steep-to in most places, with depths of 9.1 to 12.8m close-to.

A shoal, with a least depth of 7.4m, lies about 0.2 mile E of the light on Karang Galang; two 10m depths lie 0.3 mile ESE and 183m S, respectively, of the same light.

A wreck lies on the NW side of Karang Galang; two other wrecks lie 2.5 and 6.5 miles WNW, respectively, of the light on Karang Galang.

8.30 Pasop Reef (1˚11'07"N., 104˚09'07"E.), lying 2.5 miles NW of the light structure on Karang Galang and 1.3 miles offshore, is a coral patch, with a least depth of 1.8m and with depths of 7.3 to 9.1m.

Batu Betata, a small islet, lies on the coastal reef about 2 miles W of Pasop Reef.

There is a passage on either side of Karang Galang; on the W side between the reef and the coast of Pulau Batam, although not so wide as the E or main passage, has general depths of 11 to 14.6m. Vessels with a draft of less than 7.9m can safely use this passage by day. Native pilots seldom use the E passage, where the depths are much greater.

An 8.2m shoal lies about 0.7 mile SW of the beacon on the SW side of Karang Galang. A rocky patch of small extent, with a depth of 7.3m, lies 2 miles SSW of the light on Karang Galang.

Mariners will find no difficulty in proceeding by either channel aided by the chart. The depths in the E channel are too irregular to admit of any useful description here, but the light structure on Karang Galang will always point out the position of that danger in time to give it a proper berth.

Aspect.—Pulau Mesanak (0˚25'N., 104˚31'E.) and the 186m peak on **Merodong** (0˚24'N., 104˚27'E.) are useful marks from the offing in making Selat Riau.

The peak on Merodong, when seen from the S, presents a conical appearance, and, being the only hill of this feature in the vicinity, is conspicuous. It is one of the principal objects which will enable a stranger to identify the entrance to Selat Riau, for it can nearly at all times be seen over Pulau Mesanak as the strait is approached.

The hill, from the peak, forms a shoulder to the NW and gradually slopes in that direction, so that after Pulau Mesanak is passed the conical shape disappears.

Pulau Gin-Besar, Pulau Gin-Ketjil, and **Pulau Numbing** (0˚45'N., 104˚44'E.), on the opposite side of the approach to Selat Riau, are also good marks.

The shores of Selat Riau are heavily wooded and at various places small villages are situated.

Another good mark is **Tafelberg** (Bukit Peg Datar) (0˚41'28"N., 104˚13'26"E.), a table-topped mountain rising to a height of 182m, on the W coast of Pulau Galang-Baru.

A light is shown on the SE side of **Pulau Karas-Kebil** (0˚44'N., 104˚22'E.).

Range lights situated on Pulau Tunjuk, lead through the N entrance of Selat Riau, but the beacons on which the lights are shown are difficult to recognize.

A light is shown on the E end of **Pulau Tandjung Sau** (1˚03'N., 104˚10'E.).

A light is shown on the NE end of **Karang Galang** (1˚09'N., 104˚11'E.).

Anchorage.—Good anchorage may be obtained on the bank that extends about 4 miles E of **Benan** (0˚29'N., 104˚27'E.), in depths of 10.1 to 18.3m.

Temporary anchorage may be obtained on and within **Great Bank** (0˚38'N., 104˚19'E.) for vessels of light draft; the bank has a least depth of 3.2m.

Good anchorage may be obtained S of **Cemara Bank** (0˚54'N., 104˚14'E.) during the Southwest Monsoon, in 9.1m, with the E end of **Pulau Mubut Laut** (0˚49'N., 104˚18'E.) just open of **Tanjung Sembulang** (0˚52'N., 104˚16'E.), bearing 135˚, and **Pakaul Islet** (0˚52'06"N., 104˚14'42"E.) bearing 180˚.

Directions.—The E end of **Pulau Karas-Ketjil** (0˚44'N., 104˚22'E.) open off **Dempo Point** (0˚40'37"N., 104˚20'57"E.), the E end of Korek Rapat bearing 020˚, leads E of **Terum Haai** (0˚35'N., 104˚39'E.).

The lighthouse on **Pulau Tandjung Sau** (1˚03'N., 104˚10'E.) in range with the E end of **Pulau Sau** (1˚04'N., 104˚11'E.), bearing 174˚, leads E of the dangers in the vicinity of **Van Goghs Islet** (1˚04'N., 104˚10'E.), and **Malang Djarum** (1˚05'52"N., 104˚13'15"E.), an islet off the E shore bearing 104˚, leads N.

The lighthouse on Pulau Tandjung Sau, in range with the E end of Pulau Sau, bearing 174˚, is a good mark for passing between Karang Galang and Pasop Reef.

Tandjung Butan (Tandjung Boetan) (1˚07'N., 104˚09'E.), on the E coast of Pulau Batam, bearing 192˚, also leads E of Batu Betata. The lighthouse on Pulau Tandjung Sau, bearing 186˚, leads E of Karang Galang and Batu Betata, and when **Pulau Nongsa** (1˚12'N., 104˚05'E.) is open of **Tanjung Babi** (1˚11'N., 104˚06'E.), a vessel will be N of them and in Singapore Strait.

Selat Riau—East Side

8.31 Pulau Telan (Telang) (0˚44'N., 104˚38'E.), the SW point of which forms the SE limit of Selat Riau, is irregularly-shaped and nearly 5 miles long, NE and SW, and about 1 mile wide. It is divided into two parts and may be identified by a square hillock on its S end, 63m high, which, with a sharper peak W of it, forms a saddle; the land from here to the W end is the same elevation.

Pulau Mantang (0˚47'N., 104˚33'E.) and **Pulau Senajolong** (0˚47'N., 104˚37'E.), separated by the narrow channel **Selat Mara Limau** (0˚47'N., 104˚35'E.), are together about 8 miles long, E and W, 1.5 miles wide, and lie NW of Pulau Telan. The channel is navigable only by small craft as the entrance is shallow.

Pulau Mantang, the W island, is low, overgrown with mangroves, especially on the S coast, and encircled by a reef that dries. The W side of the island is foul to a distance of about 0.2 mile. On the N side of the island are the villages of Baru, Mantang, and Riouw.

Between Tanjung Punggung, the SW end of Pulau Mantang, and the SW end of Pulau Senjolong, is a bay fronted by a fringe of reef and a shallow bank extending in places nearly 0.75 mile upon which the latter lie detached patches of reef.

Selat Telan (Selat Telang) (Telang Strait) (0˚45'N., 104˚37'E.), between Pulau Senjolong and Pulau Telan, is about 2 miles wide. Another channel lies between Pulau Mantang and Pulau Senjolong on the S and the coast of Pulau Bintan to the N. These channels should only be used by vessels with local knowledge.

Pulau Ranggas (0˚45'N., 104˚29'E.), a small rock island, thickly wooded and 50m high, is about 0.7 mile long and 0.2 mile wide; it lies about 2 miles WNW of Tanjung Punggung.

From a distance this island looks very much like Southwest Hill on the SW end of Pulau Mantang. There is a channel between Pulau Ranggas and Pulau Mantang, but it is not advisable to use it without local knowledge.

8.32 Pulau Belading (0˚47'45"N., 104˚29'15"E.), lying about 2.2 miles N of Pulau Ranggas, is small, conspicuous, and covered with trees; it is surrounded by a reef which extends about 0.2 mile S.

Eastward of Pulau Ranggas and Pulau Belading are several other islands lying off Pulau Mantang; they are wooded, but lower than Pulau Belading.

Pulau Tapai (Tapai Islands) (0˚46'N., 104˚27'E.) are a cluster of five round islets, covered with vegetation and lying on coral ledges, between 2 to 3 miles W of Pulau Ranggas, on the E side of the entrance to Selat Riau. The E group, consisting of three and the W of two, both lying on drying reefs, are separated by a channel.

When approached from the S these islets, as they rise above the horizon, present very much the appearance of the hats in use among the Malays.

The NW and the E islands are the largest of the group; the former is 25m high while the latter is 40m high.

Pulau Pangkil (0˚50'N., 104˚22'E.), attaining an elevation of 48m, is about 2 miles in length in a N and S direction and 0.5 mile in breadth; it is hilly, wooded, and lies on the E side of the main channel of Selat Riau, abreast Pulau Mubut Laut.

It is surrounded by a reef which extends from 0.25 to 0.5 mile from the shore; near its SW point there is a narrow, sandy beach and a village. A light is shown from the SW point of Pulau Pangkil.

8.33 Pulau Soreh (0˚51'22"N., 104˚23'27"E.), lying NE about 2 miles ENE of the NE end of Pulau Pangkil, is a small, low islet inhabited and covered with coconut trees; it is surrounded by a narrow sandy beach and a reef which extends to the distance of 0.25 mile in places.

Pulau Dompak (0˚53'N., 104˚27'E.), 4 miles long and about 2 miles wide, is separated from the W coast of Pulau Bintan by **Selat Dompak** (Dompak Strait) (0˚53'N., 104˚28'E.), a narrow channel only available to boats.

The land in the vicinity of the channel is quite hilly surrounded with tall trees as opposed to low land at the W extremity of the channel. Dompak Village is situated at the E extremity of the channel near **Tanjung Rambut** (0˚52'03"N., 104˚29'24"E.). Dangerous wrecks, best seen on the chart, lie to seaward of this point.

Pulau Basing (0˚51'24"N., 104˚25'36"E.) and **Pulau Sekatap** (0˚51'12"N., 104˚27'30"E.), two low and wooded islets, lie off the S shore of Pulau Dompak, both being on a reef; the former islet is inhabited.

Tanjung Pinang (0˚55'N., 104˚27'E.), located N of Pulau Dompak, was formerly Rhio Island. The town and harbor of Tanjungpinang are situated at its NW end.

8.34 Pulau Penyengat (Pulau Penjengat) (0˚56'N., 104˚25'E.) is a hilly thickly wooded island, located 1 mile W of Tanjungpinang; it is about 1 mile in length, 0.3 mile in breadth, and surrounded by a reef to the distance of 0.2 mile.

A conspicuous tree, the top of which is 38m in height above HW, stands on a hill at the W end of **Pulau Penyengat** (0˚56'N., 104˚25'E.).

The island is connected with Senggarang, N of it, by a flat with a depth of about 0.3m at LW, within which is Tanjungpinang inner roadstead.

A 2.2m patch lies 1.25 miles SW of the SW extremity of Pulau Penyengat, with a 3.3m patch about 0.1 mile E.

An obstruction lies about 2 miles SSW of the SW end of Pulau Penyengat.

Senggarang (0˚58'N., 104˚26'E.) is separated from Pulau Bintan by a narrow channel filled up with mud and overgrown with mangroves. The W end of Senggarang projects some 3 miles NW of Tanjungpinang.

There is a large Chinese village on the S part of Senggarang, opposite the town of Tanjungpinang. An obstruction lies 0.75 mile NNW of the town.

8.35 Tanjungpinang (Rhio Town) (Riouw) (0˚55'45"N., 104˚26'45"E.) (World Port Index No. 50040), the chief town of the district, and the head of the government division of Bintan, is situated on the NW point of the peninsula. Fort Crown Prince (Krooprins) stands on a 71m high hillock located S of the town.

A pier extends about 0.15 mile NW of the town, with a flagstaff standing on the end of the pier head. At the root of this pier lies the harbor master office. Two other piers extend into the Sungai Carang just E of the flagstaff pier.

A pier, 750m in length with a T-head, projects WSW from the shore at **Tanjung Batuhitam** (0˚54'N., 104˚26'E.), which is located 1.5 miles S of the flagstaff.

A light is shown on the N side of **Tanjung Batuhitam** (0˚54'N., 104˚27'E.).

Pilotage is compulsory. The pilot boards 2.5 miles WSW of the Tanjung Batuhitam pier.

Ferry Terminal at Tanjungpinang

Vessels exceeding 3.7m in draft may anchor SW of **Pulau Penyengat** (0˚56'N., 104˚25'E.), in about 6.4m ,with the whole of **Pulau Los** (0˚57'N., 104˚25'E.) open W of Penyengat and the town pier open eastward of Penyengat.

The depths decrease gradually to the 5m curve; the bottom consists of soft mud.

With S and W winds, a considerable sea sets into the outer roadstead, and it becomes difficult to load or discharge cargo there. Toward the middle of the day, the wind generally goes down except in July, August, December, and January.

Two lighted beacons, in range 004˚, are shown near a wharf (0˚56'30"N., 104˚26'30"E.) on the S side of Senggarang.

Pulau Los (0˚57'21"N., 104˚24'30"E.), about 0.5 mile W of the W end of Senggarang, is small, wooded, and low at the sides, but in the center is a hill 41m high; the islet is surrounded by a narrow reef on which there are some rocks.

8.36 Pulau Ujan (1˚00'N., 104˚23'E.), 18.3m high, is a somewhat flat island, overgrown with trees; it is separated from the S coast of Pulau Bintan by a narrow boat channel. On the SE side of the island is the village of Pengudjan. A bank of mud, sand, and drying rocks extends about 0.5 mile S of the island; a sandy spit extends nearly the same distance E from the SE end.

Teluk Bintan (Bintan Bay) (1˚01'N., 104˚26'E.) indents the coast to the E of Pulau Ujan, into which several small rivers discharge. Kapal and **Ketir** (1˚00'N., 104˚26'E.) are two low, wooded islets lying on a bank that dries on the E side of the entrance to the bay.

The S coast between Pulau Ujan and Pulau Lobam, about 7 miles W, is low and wooded; a bank extending off it dries at LW for a distance of 1 mile in places.

Pulau Terkulai (Terkoelai) (0˚57'N., 104˚21'E.), lying about 3 miles SW of Pulau Ujan, is low, flat, sandy, and surrounded by a reef which in places extends nearly 0.5 mile; it is about 0.6 mile in length in an E and W direction, overgrown with trees, and has coconut palms on its W side.

Pulau Loban (Pulau Lobam) (0˚59'N., 104˚15'E.), located about 0.5 mile off the SW part of Pulau Bintan and separated from it by a channel with depths of 9.1 to 29.3m, is highest on the W side. A group of trees stand on the NW hill, the highest of which, with a conspicuous wide flat top, is above the water.

The middle and E parts are lower and partly covered with mangroves, with mangrove lined channels running through them.

Pulau Lobam-Ketjil (Lobam-Kecil) (0˚58'51"N., 104˚13'51"E.), W of Pulau Loban, is hilly and wooded; the island appears as three peaks when viewed from N.

A reef, which is steep-to, almost surrounds the islands and extends in places to the distance of 0.3 mile. On the N side there is a narrow sandy beach and a village; another village, the houses of which may be seen from the strait, is situated on the S side of the island.

8.37 Pulau Buan (Pulau Buau) (Pulau Boeau) (1˚03'N., 104˚14'E.), flat at its N end and rising to an elevation of 28m near its S end, fronts the bight between **Tanjung Talu** (1˚01'N., 104˚14'E.) and Tanjung Uban, about 3 miles NNW; it is thickly wooded and with the exception of a round lump which rises in its center. It is reported to be lower than the adjacent land. There is a white rock on the reef on its W side.

The island is bordered by a reef to a distance of about 0.1 mile. A light is exhibited from the N end of the island.

There is a reef, with a depth of 2.1m, 0.5 mile N of Pulau Buan.

Tanjung Uban (Tanjunguban) (1˚04'N., 104˚13'E.) (World Port Index No. 50030) is situated on the W coast of Pulau Bintan at the N entrance of Selat Riau. Tanjung Uban is primarily an oil terminal for trans-shipping oil owned by P. T. Stanvac Indonesia.

There are six T-headed berths which accommodate vessels up to 243m in length. These jetties, numbered 1 through 6 from the N, vary in length. Jetty 1 and Jetty 2 can handle LPG products and have 17.4 and 11.7m alongside, respectively.

The naval base at Mentigi, S of the above berths, comprises two jetties, each 100m in length, and lying perpendicular to the shoreline.

Some oil tanks, with a boiler house, stand close N of **Tanjung Uban** (1˚04'N., 104˚13'E.); three tall chimneys are plainly visible when approaching from either N or S; radio masts stand about 0.5 mile S of the chimneys.

An unofficial light is shown from the head of each of the petroleum piers at Tanjung Uban.

A beacon, with a red cylindrical topmark, stands on the shore reef about 1 mile N of Tanjung Uban.

Pilotage for berthing is reported to be compulsory for all vessels. Advanced notice of 72 hours must be given. Vessels berth between the hours of 0600 and 1800 and unberth at any time. The pilot boards 1.25 miles SW of the S pier. For vessels arriving from the N the pilot boards in position 1˚15.1'N, 104˚12.0'E.

There is good anchorage, but currents are strong. Anchorage is inadvisable W of the piers at Tanjung Uban because of poor holding ground in the vicinity, the existence of a telegraph cable in the area, and the fact that the line of range lights on **Tanjuk** (0˚57'N., 104˚12'E.) lies close to the Bintan coast here.

Quarantine formalities should be carried out at **Sambu Road** (1˚10'N., 103˚53'E.) before arrival at **Tanjung Uban** (1˚04'N., 104˚13'E.).

Caution is necessary when docking at Tanjung Uban as a reef lies parallel to the dock, and an undercurrent frequently sets in the opposite direction to the main surface current.

8.38 Malang Djarum (1˚06'N., 104˚13'E.) is a small islet, covered with low trees, lying about 2 miles N of Tanjung Uban, on the edge of the reef fronting the shore, which extends about 0.4 mile off.

Sekerah (1˚07'15"N., 104˚14'40"E.), a wooded islet about 24m high, lies 2 miles NE of Malang Djarum and close off **Tanjung Sebung** (1˚07'N., 104˚15'E.).

The shore reef which fronts the coast from Tanjung Uban extends about 0.3 mile outside Sekerah. To the NE it blocks the whole of **Teluk Sebong** (Sebung Bay) (1˚09'N., 104˚17'E.), between Sekerah and Tanjung Tondang, about 6 miles ENE; the bay is encumbered with reefs.

Tanjung Tondang (1˚11'N., 104˚19'E.), the NW end of Pulau Bintan and the NE limit of Selat Riau, is a rocky, wooded point.

Pulau Tondang (1˚10'45"N., 104˚18'37"E.) lies a little more than 183m W of Tanjung Tondang and S of this islet there is a rock on which there are palms. Panjang islets or rocks lie on the shore reef SE of Tanjung Tondang.

Tides—Currents.—The tidal currents in **Selat Telan** (0˚45'N., 104˚37'E.), the channel S of Pulau Mantang and Pulau Senjolong, and the channel N of the same islands run with considerable strength; there are overfalls or tide rips.

The current runs at the rate of about 5 knots in the channel in the vicinity of Tanjung Uban, and about 2 to 5 knots at the berths at the loading station.

The tide in the China Sea comes from the N; and being divided by Pulau Bintan, sweeps around its shores and flows into Selat Riau at both entrances, the current from Singapore Strait at the N end meeting that from the S, NE of **Terumbu Soreh** (0˚53'N., 104˚23'E.).

The tidal currents in the S approaches to Selat Riau E of Pulau Lingga and the other islands has the flood current running NNW more or less parallel to the islands, with indrafts into the several straits, and the ebb in the opposite direction.

In the N entrance, on the W side, a portion of the flood current entering the strait is deflected between Malang Orang and **Karang Galang** (1˚09'N., 104˚11'E.) and runs as an eddy to the NW, with the flood to Singapore, or in the reverse direction to the flood current entering the main passage of Selat Riau.

The ebb takes the reverse direction, circling S of Karang Galang, where it joins the main current ebbing NE. This must be guarded against when near Karang Galang.

The main body of the S current follows the trend of the W shore past the **Karas Islands** (0˚44'N., 104˚22'E.) and turns gradually to the W into Selat Dempo, much of it diverging to the S through the channels dividing the several groups of islands lying between **Pulau Mesanak** (0˚25'N., 104˚31'E.) and Selat Dempo, and a portion turning off to the NW in the direction of the Karas Islands.

This is joined by the currents flowing through Selat Telan and adjacent channels.

To the E of Pulau Pangkil, between it and the Pulau Tapai, the flood current from the N entrance is met by the flood current coming around the E side of Pulau Bintan and through Selat Telan and adjacent channels, which curves around Pulau Mantang, and thence taking a NW direction.

The direction of the flood current at Tanjung Pinang and N into Teluk Bintan is N. The flood current at Pulau Terkulai runs SE, toward Tanjung Pinang. The current sets W through Selat Bulan and Selat Tiung, on the W shore of Selat Riau.

The monsoons and currents of the China Sea very much affects the regularity of the currents, which are strong, and at springs rush with considerable velocity through the channels among the islands, forming numerous eddies and stirring up the mud.

In the narrow N part of Selat Riau, abreast Tanjung Uban, this is particularly the case, the current running from 3 to 4 knots, and sometimes even 4.5 and 5 knots.

A reef fringes the W end of **Telang Besar** (0˚44'N., 104˚38'E.) to a distance of about 0.2 mile, with depths of 11 to 12.8m close-to; a patch of 6.9m lies 0.35 mile W of the W extremity of the island.

Terumbu Hendrik Jan (Hendrik Jan Rock) (0˚41'15"N., 104˚37'45"E.), a small but dangerous pinnacle, with a depth of 3.2m, and 14.6 to 18.3m close-to, lies 0.3 mile SSE of the SE point of Pulau Telan. A patch with a depth of 8.2m lies about 0.4 mile SW of the rock.

A rock, which dries at LW springs, lies about 0.5 mile E of the E end of **Pulau Senjolong** (0˚47'N., 104˚37'E.).

Gosong Thomas (Thomas Bank) (0˚44'18"N., 104˚34'39"E.), a patch 0.4 mile in extent, with a depth of 5m, lies about 0.7 mile WSW of **Pulau Serai** (0˚44'45"N., 104˚35'21"E.).

There is a ridge with 7.3m of water lying 0.6 mile W of Gosong Thomas.

8.39 Selat Telang (0˚45'N., 104˚37'E.) has varying depths of 26 to 44m in mid-channel and from 9.1 to 16m near the shore on either side. Some reefs lie at the E end of the channel N of the E extremity of Telang Besar, rendering it somewhat intricate; it should only be used by those thoroughly acquainted with it.

The channel N of **Pulau Mantang** (0˚47'N., 104˚33'E.) and Pulau Siulung, and the coast of Pulau Bintan N of **Pulau Bunut** (0˚47'45"N., 104˚35'00"E.) has several islands and reefs lying in places 2.5 miles from Pulau Mantang.

The farthest W of these are **Pulau Belading** (0˚48'N., 104˚29'E.) and Alligator Reef, about 1.2 miles S. Vessels should not pass E of a line drawn from them to **Pulau Ranggas** (0˚45'N., 104˚29'E.).

Two reefs, Malang Berdaun and Karang Pasir, lie on the N side of the channel. The entrance to this channel, between Karang Pasir and Pulau Belading, is 1.5 miles wide, with depths of from 7.3 to 9.1m, but E of **Pulau Antu** (0˚48'12"N., 104˚31'51"E.), the reported depths in mid-channel increase to about 12.8 to 26m.

Enam Village and the river of that name are situated on the Bintan coast N of Pulau Bunut, and a rock that dries lies about 0.2 mile SW of the river entrance.

All the coast is wooded but not high and at the E end of the channel are several islands and reefs, which makes local knowledge required. A number of the reefs are marked by fishing stakes.

A 5.5m patch lies about 0.6 mile WNW of the N end of Pulau Ranggas; another 5.5m patch lies about 0.5 mile SW of the same point.

8.40 Alligator Reef (0˚46'27"N., 104˚29'06"E.), dry at LW, lies about 1 mile N of Pulau Ranggas, and is about 0.25 mile in extent, with depths of 7.3 and 9.1m close-to. A shoal, with a least depth of 1.5m, lies between the reef and Pulau Mantang.

Several reefs, drying at LW, lie S of a line joining Pulau Belading and Pulau Antu; their positions are sometimes indicated by fishing stakes. North of the line joining the above islands, the channel is clear.

Eastward of Pulau Antu are **Pulau Kekip** (0˚47'45"N., 104˚33'45"E.) and **Pulau Bunut** (0˚47'30"N., 104˚35'00"E.), separated from Pulau Mantang by a narrow channel, in which there are depths of less than 7.3m; the two islands are entirely overgrown. A 7.3m shoal, marked by a black conical buoy, lies nearly 1 mile ENE of the E end of Pulau Antu.

8.41 Malang Berdaun (0˚49'54"N., 104˚28'54"E.), lying on the N side of the N channel about 2 miles N of Pulau Belading on the S side, is awash at LW, about 0.3 mile in extent, and forms, with that island, the W entrance to the channel between Pulau Mantang and the coast of Pulau Bintan. It lies on the outer edge of the shallow bank which extends nearly 1 mile from the coast of Pulau Bintan at **Tanjung Motjoh** (Tandjoengmotjoh) (0˚50'N., 104˚30'E.). **Karang Landjut** (0˚50'21"N., 104˚29'12"E.), which dries, lies between Malang Berdaun and the shore.

Karang Pasir (0˚49'30"N., 104˚29'48"E.), lies 1 mile ESE of Malang Berdaun, with a spit having depths of 2.7 to 3.7m, extending 1 mile E from it. To the W of these reefs there are several large fishing enclosures, erected on the edge of the shore bank, which can be seen from some distance.

A small coral reef, which dries at very LW, lies 0.5 mile NNW of the W islet of **Pulau Tapai** (0˚46'N., 104˚27'E.). A shoal, about 0.5 mile long, N and S, with a least depth of 5m, lies with its outer edge lying 0.75 mile SE of the E islet of Pulau Tapai.

A shoal, with depths of 6.9 to 9.1m, extends SSW for about 4 miles from Pulau Tapai; this shoal lies near the E side of the fairway of Selat Riau and should be given a wide berth by vessels of deep draft, as less water might exist.

A 7.8m shoal, marked by a lighted buoy, lies about 5 miles SW of **Pulau Renggas** (0˚45'N., 104˚29'E.).

8.42 Terumbu Rotterdam (Rotterdam Reef) (0˚46'15"N., 104˚25'30"E.), about 0.75 mile W of the W islet of Pulau Tapai, is the southernmost of the shallow dangers bounding the S entrance of Selat Riau. It consists of sand and rocks, and has a least depth of 2.7m, with 5.5 to 9.1m around it; it is not marked by discoloration.

A beacon, surrounded by two red cylinders, stands on the W side of the reef.

A 7.8m shoal lies about 2 miles to the N of Terumbu Rotterdam.

A shoal composed of sand and stones, with a depth of 5.6m, lies about 0.3 mile WNW of Terumbu Rotterdam with the N end of the W islet of Pulau Tapai bearing 101˚, distant 2 miles, and the light structure on Pulau Karas-Ketjil bearing 214˚.

8.43 Dutch Shoal (0˚47'48"N., 104˚24'15"E.), 0.25 mile in extent, with 5.5m, and 11 to 12.8m close to its W side, lies about 1.3 miles SE of the SE end of Pulau Pangkil.

An 8.5m shoal lies about 1 mile W of the middle of the W side of Pulau Pangkil. A flat, with less than 5.5m, extends about 0.7 mile off the NW part of Pulau Pangkil; the 10m curve is nearly 1.3 miles from the island.

Pangkil Reef (0˚51'24"N., 104˚21'57"E.), a patch of rocks which dries at LW, is about 0.25 mile in diameter and lies about 0.6 mile N of Pulau Pangkil.

Rupels Reef (0˚49'40"N., 104˚23'09"E.), which dries at LW, is about 0.2 mile in extent and lies 1.5 miles SE of the NE end of Pulau Pangkil. A narrow ridge on which the depths are less than 5.5m extends about 0.7 mile S from Rupels Reef.

A flat, with depths of 3.7 to 9.1m, extends about 2 miles SE of **Pulau Soreh** (0˚51'N., 104˚23'E.). A lighted buoy marks the E side of a 5.5m shoal lying about 0.7 mile ESE of the same island; a dangerous wreck lies off the NE side of Pulau Soreh.

One of the reefs of **Terumbu Soreh** (Soreh Reefs) (0˚53'N., 104˚23'E.) lies about 1.3 miles NNW of Pulau Soreh; it is about 0.3 mile in diameter, with depths 7.3 to 14.6m in the passage between. About 1 mile NW from this detached reef is the SE end of the largest of Terumbu Soreh; it is a narrow strip of sand and coral about 1.3 miles in length in a NW and SE direction, and surrounded by a flat with depths of 3.7 to 5.5m, with 9.1 to 12.8m close-to. They are covered at HW.

Patches of less than 5.5m extend 1 mile SE of **Pulau Basing** (0˚51'N., 104˚26'E.); E of it there is a reef which dries at LW.

From Pulau Basing, a bank with 2.7 to 5.5m near its edge, and 12.8 to 16.5m at a short distance, extends in a N direction, trending about 0.3 mile W of **Tanjung Setumu** (0˚52'24"N., 104˚25'15"E.), and then to Pulau Penjengat. A buoy is moored about 1 mile S of Tanjung Setumu. This buoy marks the edge of the coastal bank which extends from the W side of Setumu.

The navigable channel between Setumu and Pulau Soreh is about 0.7 mile wide, and is used by vessels bound to Tanjungpinang from the S.

An obstruction, marked by a beacon, lies about 0.5 mile S of the SW extremity of Pulau Penjengat.

A wreck, with a depth of 2.2m and marked by a buoy, lies sunk in the outer roadstead in a position 2.5 miles W of the light at **Tanjung Batuhitam** (0˚54'18"N., 104˚26'33"E.).

8.44 Teluk Bintan (1˚01'N., 104˚26'E.) is shallow, with the exception of a narrow channel from 0.25 to nearly 0.5 mile in breadth with a depth of over 5.5m, that commences abreast Pulau Penjengat, and runs for a short distance into it.

An isolated shoal, with a depth of 3.2m, lies nearly 0.5 mile outside the 5m curve, about 2 miles SE of the light structure on **Pulau Terkulai** (0˚57'N., 104˚21'E.); several patches, on which there are depths of 8.7m, lie within 1 mile W of the shoal. A buoy marks the SW side of the 3.2m shoal.

An isolated shoal, with a depth of 7.8m, lies about 4 miles SW of the light on Pulau Terkulai.

Two piles are situated about 1.7 miles SW of the light on Pulau Terkulai.

An isolated shoal, with a depth of 6.9m, lies about 6 miles SSW of the light on Pulau Terkulai; a lighted buoy is moored close E of the shoal.

A rock, always visible, lies on the reef extending NW of **Pulau Lobam-kecil** (0˚59'N., 104˚14'E.); outside it are two rocks, awash.

Isabella Bank (0˚57'N., 104˚16'E.), located S of Pulau Lobam, is 0.7 mile in length, E and W, 0.2 mile in breadth, and has 1.8 to 3.7m. A spit, with 5.5 to 7.3m, stretches from its E extremity nearly 1 mile in an ESE direction.

The depths at a short distance from the S side of the bank are about 11m but its SW edge is steep-to, there being 20m at a short distance. A beacon stands near the center of the bank.

8.45 Orion Rock (0˚58'42"N., 104˚13'24"E.), lying on the E side of the fairway of Selat Riau, W of Pulau Lobam, is about 30m in extent, with a least depth of 4.6m and 11 to 14.6m close around it. It lies 0.4 mile W of the W end of Pulau Lobam-Ketjil.

Plasit Reef (1˚01'N., 104˚14'E.), which dries, lies about 0.5 mile SW of Tanjung Talu, on the S side of a shoal 0.25 mile in extent. Two patches of reef, together nearly 1 mile in length and dry in places at LW, lie with their W extremity about 0.2 mile S of Plasit Reef; between these reefs and a reef with 1.8m, NW of Pulau Lobam, there are charted depths of 8.2 to 16.5m. A rocky patch, dry at LW, lies 0.3 mile N of Plasit Reef and the same distance offshore.

These dangers, which consist of sand and rock, are dry at LW and steep-to; between them and Pulau Bintan there is a channel about 0.2 to 0.3 mile in width, with depths of about 18.3m, then continuing NE of Pulau Lobam with depths of about 9.1 to 27m.

This channel leads S into Selat Riau, passing between the reef extending E of Pulau Lobam and **Irene Bank** (0˚59'N., 104˚17'E.).

Malang Senggera (1˚04'45"N., 104˚13'00"E.) is a ledge of flat rocks, which only covers at the highest tides, lying 0.2 mile offshore, about 1 mile N from Tanjung Uban. The reef fronting the shore extends 183m outside them, and at LW dry heads of rocks will be seen on this reef extending nearly as far as Tanjung Uban.

Malang Ladi (1˚05'12"N., 104˚13'00"E.) a group of rocks on the shore reef at 0.5 mile N of Malang Senggera, are above HW.

A patch of rock, with less than 1.8m of water, lies almost 1 mile NNE of **Malang Djarum** (1˚05'52"N., 104˚13'15"E.), which here lies 1 mile off the shore and is steep-to; it should be given a good berth.

There is a 12.8m patch lying 1.75 miles NW of Tanjung Sebong; an 11.9m patch lies 1.75 miles NNW of the same point. A 10.1m shoal lies 2.75 miles NNW of Tanjung Sebong.

Netscher Shoal (1˚09'N., 104˚15'E.), the outer part of which lies about 1 mile outside the edge of the shore reef, is about 0.5 mile in diameter, composed of hard sand and coral, and has a patch, with less than 1.8m on its NW edge.

This shoal spot lies 1.5 miles NNE of the W extremity of Sekerah. Close to the W side of this danger there are depths of 11.0 to 14.6m; it should be given a wide berth.

8.46 Crocodile Shoal (1˚11'N., 104˚17'E.), a small patch of hard sand, with a depth of 5.5m, lies about 2 miles W of Tanjung Tondang. A rocky patch, consisting of three rocks, 0.75 mile SW of Crocodile Shoal; the westernmost rock lies 3 miles WSW of the N extremity of Tanjung Tondang. The two W rocks, are 183m apart, have depths of 2.1 to 2.4m. The E rock, which is smaller, has a depth of 3.7m. About 0.2 mile S of the W rock, there is a patch of 7.3m.

Batu Senukuh (1˚09'22"N., 104˚16'E.), the farthest offshore of the above rocks in Teluk Sebong, is 3m high and lies about 3 miles SE of the W end of Sekerah.

Batu Bunung (1˚08'37"N., 104˚15'58"E.), a rock which dries 1.8m, lies 0.75 mile S of Batu Senukuh.

There are other isolated rocks in Teluk Sebong, which can best be seen on the chart.

Southwest Hill (0˚44'36"N., 104˚30'56"E.) rises to a height of 81m on the SW end of Pulau Mantang; it is wooded and appears as a double-peaked hill when seen from the S.

A light is shown from **Tanjung Punggung** (Poenggoeng) (0˚44'30"N., 104˚30'45"E.), the SW end of Pulau Mantang; the point is a good radar target at a distance of 10 miles.

Siulung Hill (0˚45'24"N., 104˚35'15"E.) rises to a height of 126m near the SW end of Pulau Siulung. It rises abruptly on its N side and terminates S in a bluff point.

Pulau Serai (0˚45'N., 104˚35'E.), 20m high and inhabited, lies close S of the SW end of Pulau Siulung.

At a distance of 12 miles to the S, both Siulung and Southwest Hills, owing to the land between them being low, appear as islands.

8.47 Gunung Bintan-besar (1˚04'N., 104˚27'E.) and **Gunung Bintan-ketjil** (1˚07'N., 104˚27'E.), N of Teluk Bintan, are useful landmarks in approaching Singapore Strait from the China Sea and are visible over a large portion of Selat Riau.

A light is shown near the W end **Pulau Terkulai** (0˚57'N., 104˚21'E.).

A light is shown on the SW end of **Pulau Lobam-Ketjil** (0˚59'N., 104˚14'E.).

Directions.—The summit of **Pulau Lobam** (0˚59'N., 104˚15'E.) open of the W end of Pulau Pangkil, bearing 328˚ is a good mark to clear the W edge of the triangular-shaped bank that lies SE of **Pulau Pangkil** (0˚50'N., 104˚22'E.).

The lighthouse on **Pulau Terkulai** (0˚57'N., 104˚21'E.), bearing 085˚, leads to the S of **Isabella Bank** (0˚57'N., 104˚16'E.); the lighthouse on **Tanjungsau** (1˚03'N., 104˚10'E.), in range with, or open of, the W end of Pulau Lobam-Ketjil, about 330˚, leads well to the W of Isabella Bank.

For clearing **Orion Rock** (0˚59'N., 104˚13'E.), the light structure on Pulau Tanjungsau bearing N of 338˚, or **Tanjung Uban** (1˚04'N., 104˚13'E.), bearing 002˚, leads W, and the SE extremity of Pulau Lobam, bearing N of 090˚, leads S of the rock.

Tanjuk (0˚57'N., 104˚12'E.) front range light, in sight at night, leads W of Orion Rock through the fairway of Selat Riau.

For clearing **Plasit Reef** (1˚01'N., 104˚14'E.), Pulau Lobam-Ketjil, bearing 161˚, or E of that bearing, or Tanjunguban, bearing E of 000˚, leads W of the reef and all dangers.

For clearing **Crocodile Shoal** (1˚11'N., 104˚17'E.), Sekerah, bearing 192˚, leads W of the shoal and the patches SW; the N end of **Tanjung Pergam** (1˚11'24"N., 104˚20'24"E.), bearing 088˚, leads N of the shoal and the 5.9m patch 0.6 mile ENE.

For clearing all the dangers N of **Malang Djarum** (1˚06'N., 104˚13'E.), Pulau Tanjungsau Light, bearing S of 209˚, leads W of the dangers.

8.48 Transiting Selat Riau from S presents few difficulties. The normal care and prudence required in narrow waters should suffice in the fairway. Some difficulty has at times been experienced by strangers in recognizing the entrance to Selat Riau on account of the numerous islands in its vicinity.

The high conical peak of **Merodong** (0˚24'N., 104˚27'E.) should be made out as soon as possible, that being the first conspicuous object on approaching the strait. If this can be discerned no difficulty will be found in making out the other points as the vessel is on its way to proceed.

Pulau Dempo (0˚36'N., 104˚19'E.), and Tafelberg Hill on that island, on the W side of the strait, the prominent hill on the SW end of Pulau Mantang, **Pulau Telang** (0˚44'N., 104˚38'E.), and **Pulau Gin-besar** (0˚45'N., 104˚44'E.), with a flat peak near its center, on the E side of the strait, will, at a distance of 14 miles, readily show the approach to the strait, while at a nearer distance **Pulau Karas-kecil Light** (0˚44'N., 104˚22'E.), **Pulau Tapai** (0˚46'N., 104˚27'E.), **Pulau Ranggas** (0˚45'N., 104˚29'E.), and other islands can not fail to point out its entrance.

A vessel intending to proceed through the strait should, from a position about 13 miles E of **Tanjung Jang** (0˚18'S., 105˚00'E.), the E end of Pulau Lingga and from which a light is shown, steer 329˚ for about 39 miles to a position about 8 miles NE of **Pollux Rock** (0˚10'N., 104˚47'E.). From this position a course of 312˚ leads into the middle of the S entrance of Selat Riau.

Care should be taken to guard against the strong tidal currents often encountered in this area.

From a position in the middle of the S entrance, about 6 miles SW of **Tanjung Punggung** (0˚45'N., 104˚31'E.), steer to pass W of the spit extending into the swept channel from the east shore.

The outer edge of this spit is marked by a lighted buoy situated about 4 miles SE of Pulau Karas-kecil Light in a depth of about 7.8m. From close W of the outer end of the spit shape a course to pass about 1 mile off Pulau Karas-kecil Light.

From abreast Pulau Karas-kecil Light, shape courses through the fairway to pass about 1.2 miles W of Pulau Labam-Ketjil, a distance of 17 miles, observing that the E end of Pulau Mubut Laut, bearing 183˚, with the W end of **Pulau Karas-besar** (0˚45'N., 104˚20'E.) just open, astern, until the N extremity of **Tanjung Sembulang** (0˚52'N., 104˚16'E.) bears S of 259˚, leads E of the 8.7m patch near the fairway.

Tanjuk Light structures in range astern lead W of Orion Rock and E of a 1.5m shoal and wreck, situated on the W side of the channel about 1.2 miles E of the N end of **Pulau Ngenang** (1˚00'N., 104˚10'E.) and E of **Karang Galang** (1˚09'N., 104˚11'E.), but they are not easily picked up from a distance when approaching from the N and are obscured by coconut trees when approaching from the S.

From abreast Orion Rock, steer with Tanjung Uban bearing 002˚ until abreast the S end of **Pulau Buan** (1˚03'N., 104˚14'E.) to pass between it and the 1.5m shoal off the N end of Pulau Ngenang; then alter course to pass from 0.5 to 0.75 mile W of Tanjung Uban, steering to pass E of Karang Galang Light.

A dangerous wreck is reported to lie about 0.6 mile W of Tanjung Uban.

The mark used for passing E of Karang Galang is Pulau Tanjungsau Light, bearing 186˚, or **Bukit Pelali** (1˚24'N., 104˚12'E.) on the Malay Peninsula, W of 000˚.

A vessel will be clear of **Batu Betata** (1˚11'N., 104˚09'E.) when **Pulau Nongsa** (1˚12'N., 104˚05'E.) opens N of **Tanjung Babi** (1˚12'N., 104˚06'E.), bearing 279˚, and may then shape course for Singapore Road or the China Sea.

The channel W of Karang Galang is used sometimes in preference to the channel to the E.

8.49 **Pulau Tanjungsau Light** (1˚03'N., 104˚10'E.), in range with the E end of Pulau Sau, bearing 173˚, leads through nearly in mid-channel W of Karang Galang and E of **Batu Betata** (1˚11'N., 104˚09'E.).

At night, sufficient lighted aids exist to permit negotiation of Selat Riau at night with no untoward difficulty. Frequent cross bearings should enable the navigator to remain in the swept channel, which is more than 1 mile wide throughout, and to follow directions given above.

The **Tanjuk Range Lights** (0˚57'N., 104˚12'E.) indicate a course clear of dangers near the fairway in the N section of the strait.

Selat Riau from N, for vessels leaving Singapore at HW, or about the first quarter of the ebb or E current, and taking about 4 hours to reach the entrance of Selat Riau, will probably carry a fair tidal current through both straits, but no dependence can be placed on it.

The directions previously given in paragraph 8.49 for proceeding N through Selat Riau, if reversed, will suffice for proceeding S. Deep draft vessels should pass E of Karang Galang.

8.50 Eastern Channel through Selat Riau can be used by small vessels proceeding through a swept channel in the S part of the E side of the strait. The least depth in the fairway of this channel is 6.9m.

Pilotage.—Pilots for **Sungei Kolak** (Kijang) (0˚51'N., 104˚36'E.) are embarked about 2 miles NW of the W end of **Setumu** (0˚53'N., 104˚27'E.). The pilot boat is reported to be a small black launch.

There is a port radio station at Tanjungpinang. There is frequent sea communication with Singapore. Kijang Airport is situated 5.5 miles E of the town.

Anchorage.—There is good anchorage between **Gosong Thomas** (0˚44'N., 104˚35'E.) and Southwest Hill, about 4 miles W, in depths of 11 to 14.6m, with shelter from N winds, but vessels should not anchor in depths of less than 9.1m, as within that depth the bottom becomes irregular.

The usual anchorage for a large vessel is in about 25.6m, sand and good holding ground, with Pulau Tanjungsau Light bearing 248˚ and the head of the northernmost pier bearing 008˚.

Care must be exercised to anchor with a long scope of chain due to the strong currents in the channel.

There is safe anchorage in Teluk Sebong, in 7.3m, sand and mud, about 1 mile ENE of **Batu Senukuh** (1˚09'22"N., 104˚16'00"E.).

Caution.—Several shallow patches lie in **Selat Sendara** (0˚44'N., 104˚40'E.), between Pulau Telan and the Gin Islands

but they all, except for **Terumbu Hendrik Jan** (0˚41'N., 104˚38'E.), lie out of the ordinary track of vessels, and are dangerous only in the event of this channel being mistaken in thick weather for the entrance to Selat Riau.

Vessels should give these islands a berth of 2 miles in passing and not bring **Pulau Teroti** (0˚42'N., 104˚47'E.) E of 080˚ until Southwest Hill on Pulau Mantang comes well open of Pulau Telan, bearing about 304˚, or N of that bearing.

North to Singapore Strait from Selat Bangka via Selat Berhala and Selat Durian—Alternate Inner Route

8.51 **Tanjung Jabung** (Djaboong) (1˚00'S., 104˚22'E.), the SW limit of the Inner Route, is conspicuous, and partly overgrown with trees. Like most other parts of the Eastern coast of Sumatera, it is low land and is fronted by a mud bank to various distances, as best seen on the chart. A light is shown from Tanjung Jabung.

Pulau Berhala (0˚52'S., 104˚24'E.) is a rocky island largely covered with high trees. Two bare peaks, each 91m high, rise on the W side of the island; the island is inhabited. It lies in the middle of Selat Berhala, nearly between Tanjung Jabung and Tanjung Buku, the SW end of Pulau Singkep. Except on the W side, the island is surrounded by a reef which dries at LW, and extends for a distance of 0.2 mile from the E side. A light is shown from Pulau Berhala.

Anak Berhala (0˚51'S., 104˚25'E.), a wooded islet, lies about 0.5 mile NE of Pulau Berhala.

Anchorage is available 0.5 mile N and W of Pulau Berhala, in depths of 13 to 15m. If anchoring N of the island, care must be taken not to go to far to the E as a drying rock lies 0.4 mile N of the NE point of the island.

The channel N of Pulau Berhala to Pulau-pulau Singkeplaut, 10 miles NE, is not recommended; it is not safe, on account of uncharted dangers that probably exist and the rocks in it. Pulau Berhala Light, which is situated on the S side of the island, is not visible throughout the channel transit.

A stranded wreck lies on a previously uncharted pinnacle of rock approximately 3.5 miles NE of Pulau Berhala Light.

Several dangerous wrecks, best seen on the chart, lie NE of Tanjung Jabung and SW of Pulau Berhala.

8.52 **Selat Berhala** (Berhala Strait) (0˚57'S., 104˚24'E.), the channel S of Pulau Berhala, being generally free from danger, is consequently more frequented; the least depth charted is 6.9m. The shallow mud fronting the coast W of Tanjung Jabung extends some 4 miles N of **Berbak** (1˚03'S., 104˚14'E.), an island lying about 9 miles W of the point. It is steep-to beyond the 5m curve, and must be given a wide berth.

Pulau Singkep (0˚30'S., 104˚30'E.) forms the N side of the entrance to Selat Berhala, N of Pulau Berhala. The island's E portion extending E of **Tanjung Malang** (0˚39'S., 104˚30'E.) has been described in paragraph 8.3.

Teluk Baruk (Baroek Bay) (0˚38'S., 104˚26'E.) lies between Tanjung Malang and Tanjung Buku, the S extremities of Pulau Singkep. It is about 6 miles wide and 4 miles in length to its head from abreast the 10m curve, within which line the depths are reduced to 3.7m and less over the greater portion of it.

Tanjung Buku (0˚41'S., 104˚22'E.) has the prominent hill Gunung Buku, 137m high, on it. Bukit Porok, about 2.7 miles N of Tanjung Buku, has a sharp peak about 149m high.

Kepulauan Singkeplaut (Singkep Laoet Islands) (0˚42'S., 104˚28'E.), lying on a drying reef E of Tanjung Buku and fronting Teluk Baruk, consists of Pulau Keling, Pulau Tengah, Pulau Lalang, and Pulau Singkeplaut, as well as a few above-water rocks. A conspicuous tree is reported to stand on Pulau Singkeplaut.

The coast from Tanjung Buku to **Tanjung Sebayur** (Sebajoer) (0˚29'S., 104˚15'E.) trends NNW and NW for 14 miles; the latter point is on the E side of the entrance to Selat Sebayur, and is also the W end of Pulau Singkep.

Mentigi (0˚30'S., 104˚15'E.), on the S side of Tanjung Sebayur, is 110m high. Gunung Bidei, 209m high, lies 5 miles further E. Between Tanjung Buku and Tanjung Sebayer, above and below-water rocks extend up to 1 mile from the coast.

James Rock (0˚39'S., 104˚19'E.), a pinnacle with a least depth of 0.3m, lies 3.5 miles NW of Tanjung Buku.

8.53 **Pulau Serak** (0˚40'S., 104˚14'E.), a low and wooded islet, lies about 7 miles WNW of Tanjung Buku, it is located on a shoal, which, under the depth of 9.1m, extends 2 miles SE, 1 mile N, and about 0.7 mile off either side. Oekol (Pulau Ukol), located about 0.5 mile W of the S end of Pulau Serak, lies on this shoal, as do also several rocks, both awash and above-water.

Pulau Pengelap (0˚37'S., 104˚15'E.), low and wooded, lies about 2.7 miles NNE of Pulau Serak, on the E edge of a reef which is steep-to, extending 2 miles NW and 1 mile SE; the islet is surrounded by rocks and stones and is overgrown with vegetation. Shoal depths of 5.9 and 8.7m, lie, respectively, 2.3 miles W and 3.5 miles NW of Pulau Pengelap.

Pulau Alangtiga (0˚31'S., 104˚02'E.), 79m high, lying about 30 miles NW of Pulau Berhala, is the central of a group of three small, thickly-wooded islands fringed by reef, and some rocks above-water.

Pulas Beralas (0˚30'S., 104˚02'E.), 69m high, lies about 1 mile N of Pulau Alangtiga.

Pulau Muci (Mubi) (0˚32'S., 104˚02'E.), 81m high, lies 1 mile S of Pulau Alangtiga. These islands may be passed at a prudent distance on their W side. A light, from which a racon transmits, is shown from Pulau Muci.

A small coral reef, with a least depth of 4m, lies 6.5 miles NE of Pulau Muci. Shoals, with depths of 5 and 10.1m lie, respectively, 1 mile ENE and 6.5 miles NNW of Pulau Muci.

Posik (0˚23'S., 104˚12'E.) is the central and principal island of a group which lies off the NW side of Pulau Singkep, and is separated by Selat Sebayur.

Other islands in the vicinity of Posik include Bandahara, Sempeng, **Rusukbuaya** (Roesoek Boeaja) (0˚21'S., 104˚09'E.), Nibung, Pajang, and Noja, as well as smaller islets and above and below-water rocks. The whole group is located on the same triangular reef, with boat passages between some of them; they are of little importance, and sparsely populated.

Pulau Silenseng (Pulau Silinseng) (0˚18'S., 104˚07'E.), nearly 3 miles NW of Rusukbuaya, consists of two islets connected by a reef, dry at LW; it is surrounded by a reef which extends about 0.5 mile from its W side.

A shoal, with a least depth of 7.3m, lies midway between Ruskbuaya and Pulau Silenseng. Another shoal, with a depth of 10m, lies 3 miles ENE of Pulau Silenseng.

Pulau Bunta (0˚16'S., 104˚07'E.), a small, wooded islet, lies 2 miles N of Pulau Silenseng and is surrounded by a reef which extends about 0.2 mile in places; it is steep-to beyond.

8.54 Selat Sebayur (Sebajoer Strait) (0˚25'S., 104˚15'E.), between the NW side of Pulau Singkep and the Posik group of islands, is a fairly good but narrow channel, requiring local knowledge or the assistance of a native pilot; it is entered from the S between Tanjung Sebayur and a flat that extends about 4 miles S of Bandahara, on which are some patches that dry.

Tanjung Irat (0˚24'S., 104˚16'E.), on the E side, is located 5.5 miles N of Tanjung Sebayur. The strait is divided by a long, steep sandbank on the N point of which lie two rocks, named **Malang Bang** (0˚24'S., 104˚16'E.) which are only visible at LW; a patch that dries lies on the W elbow of the bank, about midway between the two points.

Both channels are navigable; the W is the broader of the two. The E, being straight, is stated to be the easier navigated.

About 1 mile S of Tanjung Irat is **Tjoekas** (0˚26'S., 104˚16'E.) and the river of that name, the bar of which is nearly dry at LW; it is used only by junks or boats.

Rapang (0˚23'S., 104˚16'E.), a small islet with a sharp, wooded hill, lies 1 mile NW of Tanjung Irat; near it is the narrowest part of the strait. A steep-to bank, as defined by the 5m curve, forms the W side of the channel. It extends about 5 miles SW from Rapang and joins the flat, described above, which extends S of Bandahara.

From **Tanjung Jabung** (1˚00'S., 104˚22'E.), the coast of Sumatera trends sharply to the W, forming the delta of the Djambi River and **Djambi Bay** (1˚00'S., 104˚00'E.); this coast is fronted by a mud bank which in places extends 5 miles off.

The **Djambi River** (Batang Hari) (1˚16'S., 104˚05'E.), the largest river in Sumatera, has two principal mouths used by shipping, named **Kuala Berbak** (1˚04'S., 104˚12'E.) and **Kuala Niur** (1˚01'S., 103˚49'E.).

Vessels should not enter Kuala Niur without local knowledge; the buoys and beacons may be shifted in accordance with the changes in the channel and therefore it is advisable to employ a pilot.

Pilotage in Kuala Niur is compulsory for vessels between **Muarasabak** (1˚08'S., 103˚51'E.) and **Djambi** (1˚35'S., 103˚37'E.). Requests for pilotage should be made at least 24 hours before arrival at Muarasabak.

The coast W of Kuala Niur is low and marshy; several streams of no importance to shipping run into the sea, and the coast is sparsely populated.

The entrance to the Sungai Tungkal (Soengei Toengkal) is located about 24 miles NW of Kuala Niur.

Tanjung Labu (Tandjoeng Laboe) (0˚47'S., 103˚29'E.), the N point of the entrance, has a drying mud flat that extends about 2 miles off.

The **Sungai Retih** (Reteh River) (0˚40'S., 103˚25'E.) discharges by four mouths, 8 to 12 miles NW of Tanjung Labu.

These mouths are formed by three islands; the middle and largest is **Pulau Kijang** (Kidjang) (0˚40'S., 103˚21'E.). Off these mouths the 5m curve is 6 miles from the coast, and the channels which lead to them are between or over drying mud banks extending to the E from the islands; there is not more than 1.2m at LW.

8.55 Selat Indragiri (Indragiri River) (Batong Kwantan) (0˚20'S., 103˚18'E.) penetrates in its upper reaches far into the Padang uplands.

Its principal mouth is the **Kuala Lajau** (0˚25'S., 103˚36'E.), which is the most serviceable channel for larger vessels.

Vessels with a maximum length of 60m and a maximum draft of 4m can be taken across the bar of the Kuala Lajau; this depth can be maintained for about 30 miles upriver. An abandoned customs station stands on the S side of the entrance to Kuala Lajau; a village, built on piles, stands on the N side.

Teluk Kualacenaku (Amphitrite Bay) (0˚08'S., 103˚42'E.) is about 20 miles wide between **Tanjung Bakau** (0˚20'S., 103˚47'E.) and **Tanjung Dato** (0˚00', 103˚49'E.), a low headland, and about 17 miles long to the mouth of the several rivers of which it is the estuary. The coast is everywhere low and marshy, and the greater portion of the bay is very shallow.

The coast affords no conspicuous landmarks, being completely overgrown by trees, which are all of one kind.

Vessels approaching the bay from the E, when Tanjung Dato or Tanjung Bakau are not visible, may be set considerably N or S by the tidal currents; these tidal currents may attain a rate of 2.5 knots.

The outer edges of the mud banks extending from the entrance points of the bay are steep-to, having depths of 18.3 to 20.1m within 0.5 mile of the 5m curve in places; these mud banks should be given a wide berth. Fishing enclosures may be seen on the shallow banks in various parts of the bay.

From Tanjung Dato the coast trends N for 11.5 miles to the SE end of **Kateman Island** (0˚16'N., 103˚41'E.), which is about 13 miles long in a NW and SE direction, and is separated from Sumatera by Selat Pedada, the mouth of which is about 64m wide and dry at LW.

The entrance to the **Sungai Kateman** (0˚21'N., 103˚37'E.), which lies at the NW end of Kateman Island, is entered between Tanjung Jongkir and the coast of Sumatera; however, this river is of no importance to general shipping.

8.56 Pulau Burung (Boeroeng) (0˚26'N., 103˚34'E.), 4 miles NNW of the entrance of the Sungai Kateman, is low, wooded, and separated from the Sumatera coast by a narrow channel; a drying bank extends from 1 to 2 miles from the ends of the island. Kateman Island and Pulau Burung are difficult to distinguish from offshore.

An obstruction was reported to lie about 4 miles ENE of the SE extremity of Pulau Burung.

On the E shore, **Pulau Selayar** (Selajar) (0˚18'S., 104˚26'E.) is about 6 miles long, E and W, and 2.5 miles wide.

It lies between Pulau Singkep and Pulau Lingga, dividing the passage into two channels, named Selat Penuba and Selat Lima. A reef extends about 1 mile SE of Penuba, a village at the SE end of Pulau Selayar. A hill rises to a height of 300m on the W side of the island.

Selat Penuba (Penoeba Strait) (0˚20'S., 104˚26'E.) is deep, but is obstructed at its W end and is not used by shipping.

Tengah Islet (0˚20'S., 104˚31'E.), about 30m high, is located on a reef in the E fairway of Selat Penuba, about 1 mile SE of the E point of Pulau Selayar.

Serang Islet (0˚21'S., 104˚31'E.), about the same height as Tengah, lies about 1 mile SE, just within the 5m curve off the S side of the strait.

8.57 Selat Lima (Lima Strait) (0˚16'S., 104˚26'E.), between the N side of Pulau Selayar and the S coast of Pulau Lingga, is a deep channel; parts of the shores are steep-to.

Pulau Pandan (0˚15'S., 104˚21'E.), a wooded mass of ironstone, lies off the W entrance of Selat Lima. Sunken rocks extend about 0.2 mile S and E of the islet; otherwise the water around it is deep.

Kepulauan Lima (0˚16'S., 104˚27'E.), lying nearly in the middle of the strait, consists of Yu, Panjang, Buntar, and Lima; they are hilly and wooded. Only Lima is inhabited.

About 0.5 mile ENE of Lima is a small, low, stony cay, which is overgrown with brushwood, and is steep-to.

Tanjung Labuandadong (0˚12'S., 104˚25'E.), the NW point of the entrance to Selat Lima, is fairly steep-to; Pulau Labuandadong lies close off the point.

Entering Selat Lima from W, pass on either side of Pulau Pandan and to the N of Keputauan Lima, taking care to avoid the cay ENE of Lima.

The cay, in range with Tanjung Labaundadong bearing 305˚, astern, leads SW of the reef extending SW of **Tanjung Bliung** (0˚16.5'S., 104˚31.5'E.).

The W coast of Pulau Lingga trends N about 4 miles from Tanjung Labuandadong to **Pulau Pulon** (0˚09'S., 104˚27'E.); the latter point is very conspicuous, and from it the coast trends NNE for 12 miles to Selat Dasi.

Pulau Pulon (0˚09'15"S., 104˚27'00"E.) lies about 2 miles NE of Tanjung Datuk; the islet is prominent with a sharp peak.

Selat Dasi (Dasi Strait) (0˚00'30"N., 104˚29'30"E.) is a passage 4 miles long, separating Pulau Lingga from Pulau Bakung N of it. There are several islets and rocks in the fairway of the strait, and it is only available to vessels with local knowledge.

Pulau Bakung (Bakong) (0˚06'N., 104˚26'E.) lies close to the NW end of Pulau Lingga, from which it is separated by Selat Dasi, and has some fairly high hills. The SW coast of the island trends in a NW direction, the shore being fronted to a short distance by a reef.

Close to the NW extremity of Pulau Bakung lie a number of islets and reefs, extending about 8 miles NW, of which **Karoti** (0˚13'N., 104˚19'E.) is the northwesternmost.

The space between that island and **Pangele** (0˚09'38"N., 104˚24'07"E.), the N end of Pulau Bakung, is blocked by islets and reefs.

Pulau Cempah (Tjempah) (0˚09'N., 104˚19'E.) is irregularly shaped, hilly and about 5 miles long and 2 miles wide. It is separated from the NW part of Pulau Bakung and **Blandok Besar** (0˚11'N., 104˚20'E.) and Karoti by **Selat Cempah** (Tjempah Strait) (0˚09'N., 104˚20'E.), 2 miles wide, which has general depths of about 24m.

Pulau Cempah is fairly steep to on its E and SE sides; the summit of the island, 116m high, is to be found in its N part.

8.58 Pulau Laut (0˚11'N., 104˚17'E.) lies close NW of the N end of Pulau Cempah, and **Pulau Gentong** (0˚09'N., 104˚17'E.), fringed by a reef, lies near the NW side of Pulau Cempah.

Pulau Buaya (Boeaja) (0˚11'N., 104˚13'E.) lies about 3 miles W of Pulau Cempah; in the channel separating them are several islets which can best be seen on the chart.

Pulau Buaya has the shape of an alligator when seen from the N; it is surrounded by a narrow reef. The summit of the island, located in its SE part, rising to a height of 228m, has been seen in clear weather at a distance of 30 miles.

Pulau Sikeling (Si Keling) (0˚08'N., 104˚14'E.), 91m high and about 1 mile long, lies 1 mile S of Pulau Buaya.

Blanding (0˚09'N., 104˚12'E.) lies about 1 mile NW of Pulau Sikeling; it is the S of three islands located on a reef that extends about 4 miles NW.

Lobam (0˚10'N., 104˚11'E.), 84m high, lies on the N part of this reef. Turka lies between Blanding and Lobam.

The Temiang group of islands, with the other islands and dangers between Pulau Buaya and the Merodong Islands, lie far to the E of the usual track of vessels bound through Selat Durian. This group is composed of four large and several small islands, lying to the NW of Pulau Bakung and Pulau Sebangka, and separated from those islands by a narrow channel, which appears to be obstructed by rocks, best seen on the charts.

8.59 Pulau Temiang (0˚20'N., 104˚23'E.), the largest and northernmost of the group, is 7.5 miles in length, 3 miles in breadth, and irregularly-shaped, with the NE side being nearly straight; at the NW end there is a deep inlet, and there is also one at the SE end; in the latter there are two small villages.

This island is mostly composed of high hills, and near the W end on some tableland is Mount Benaya, with three tops close together, the middle one being 224m high. Mount Piang, with two conspicuous peaks, is on the S portion of the island; the ridges of hills on the NE side are 156 to 174m in height.

The three other principal islands, which lie close SW and W of Pulau Temiang are Pulau Batang, Pulau Benku, and Pulau Saga. An isolated 195m high hill stands on the NW end of Pulau Batang.

Middle Rock (0˚20'N., 104˚27'E.), which dries and generally breaks, lies in the SE entrance of Selat Temiang, about 1.7 miles NE of the E extremity of Pulau Temiang. It is generally marked by tide rips and may be passed on either side, but it is preferable to pass to the N.

Ompak (0˚15'N., 104˚19'E.), 66m high, about 2 miles SW of Pulau Saga, is the largest of the chain of islets and reefs running roughly parallel to the SW coast of Pulau Saga. The chain extends for about 1.2 miles SE and 0.75 mile NNW.

A rock, with a depth of less than 2m, was observed to lie 1 mile S of the S extremity of Ompak and was marked by a mast.

8.60 Pintu (Pintoe) (0˚23'N., 104˚19'E.), 125m high, lies close off the NW end of Pulau Temiang; beyond it is **Kebat** (0˚23'N., 104˚18'E.), 65m high.

Pompong (0˚22'N., 104˚15'E.) lies about 2.25 miles WSW of Kebat; it is about 0.5 mile in diameter, is surrounded by a reef, and has a 124m high hill in its center. An above-water rock, surrounded by a reef lies 1 mile SE of the island; an isolated reef lies 0.4 mile S of the SE extremity of the island.

Dua (Doea) (0˚24'N., 104˚22'E.), located about 3 miles E of Pintu, lie at the junction of Selat Merodong and Selat Temiang. They are two islands, each circled by a reef extending 0.25

mile from the shore in places. The S island, the higher of the two, rises to 35m.

The Titampan group of islands, located NW of the Merodong group, occupies an oval space about 6 miles in length, E and W, and nearly 5 miles in breadth. It comprises several islands, islets, and rocks, which are separated from each other by narrow channels which are obstructed by reefs.

Titapan (0˚27'N., 104˚23'E.), the SW island and most conspicuous of the group, is rocky on its N and S sides and has two hills; the N hill is sharp and 108m high.

Benan (0˚29'N., 104˚27'E.) and **Katanglingga** (0˚30'N., 104˚25'E.) form the E limit of the group. A 5.5m patch, which is steep-to, lies about 0.4 mile SW of Titapan.

Selanga Islets (0˚30'N., 104˚21'E.), three in number, lying on the SE of Selat Pengelap, are small but elevated and conspicuous; the S islet is 35m high. With an opposing wind and current, a troublesome sea may arise in this area.

The Pangelap group of islands separates Selat Pangelap from Selat Abang.

8.61 The **Alor Islands** (0˚28'N., 104˚18'E.), the southernmost of the Pengelap group, consist of some rocky islets lying on a reef; the southernmost islet is 46m high.

Pengelap (0˚30'N., 104˚17'E.), the largest of the group, is about 3.3 miles long, N and S, 0.5 mile wide, wooded, and moderately elevated, attaining a height of 80m in the N part; the island is fringed by a reef, which projects in places on the E coast to a distance of 0.25 mile, but on the W coast to a less distance.

Udiep (Oediep) (0˚32'N., 104˚18'E.), an islet 39m high, thickly wooded, and surrounded by a reef, lies about 1.3 miles E of the N end of Pengelap, and in the channel of Selat Dempo.

Dedap (0˚30'N., 104˚16'E.), about 2 miles long, NW and SE, and about 0.3 mile wide, lies about 1 mile W of Pengelap.

Sawang Islets (0˚30'30"N., 104˚14'45"E.) lie in Selat Abang, about 0.5 mile NW of Dedap.

Off **Pulau Mutyi** (0˚32'S., 104˚02'E.), the prevailing winds cause great irregularity in the tidal current; the rate was observed to be 2 knots.

Outside **Teluk Kualacenaku** (0˚08'S., 103˚42'E.), the flood current sets to the S and ebb to the N.

In the bay, to about 4 miles from the shore, the flood sets to the W, S of **Tanjung Dato** (0˚00', 103˚49'E.), and continues from S to SW between **Pulau Busung** (Boesoeng) (0˚08'S., 103˚36'E.) and **Pulau Jawang** (Tjawang) (0˚06'S., 103˚33'E.) into **Batang Toeaka** (0˚12'S., 103˚27'E.), but S of Pulau Busung this current sets SW into **Batang Terboeng** (0˚17'S., 103˚29'E.).

The flood also sets SW, or on to the NE edge of the 5m curve, 9 miles S of Tanjung Dato. The ebb from abreast Pulau Busung sets to the N and then continues to the E along the coast to the S of Tanjung Dato. In the middle of the bay, the ebb sets to the E. The greatest rate of the tidal current observed was 3 knots.

In **Selat Lima** (0˚16'S., 104˚26'E.) the flood sets W and the ebb E. On the W coast of Pulau Singkep and Pulau Lingga the flood current runs to the S and W and the ebb to the N and E, but near the SW coast of Pulau Singkep between **Tanjung Buku** (0˚41'S., 104˚22'E.) and **Tanjung Sebayur** (0˚29'S., 104˚15'E.) the flood sets N as an eddy and the ebb S at the rate of 1.75 knots. The greatest rates of the tidal currents observed were, as follows:

1. Near **Pulau Mutyl** (0˚32'S., 104˚02'E.) and at the Pulau Alangtiga—1.75 knots, with the flood setting S and the ebb setting N.
2. Selat Sebayur—2.25 knots.
3. Selat Penuba and Raja Bay—0.25 knots.
4. Selat Lima—1.5 knots.
5. South coast of Pulau Lingga—1.75 knots, with the flood setting W and the ebb setting E.

In Selat Dasi, the tidal currents run at a rate of 4 to 5 knots, with the flood setting to the W.

In Selat Cempah, the flood current sets N and the ebb sets S.

8.62 Depths of 5.5m and 5.9m lie as far as 12 miles SE and 13 miles SSE of **Tanjung Jabung** (1˚00'S., 104˚22'E.), in positions as far as 6.75 miles offshore. A 10.1m patch lies 7 miles NE of the same point.

Caution.—A wreck, with 6.9m, and a wreck, with 9.6m, lie 5.75 and 10 miles ENE, respectively, of Tanjung Jabung; numerous dangerous wrecks, best seen on the chart, exists SE of the same point.

A reef, numerous rocks, islets, and depths under 9.1m, which can best be seen on the chart, surround **Pulau Berhala** (0˚52'S., 104˚24'E.). An 8.7m patch lies 2 miles SE of Pulau Berhala; a 5.5m shoal lies 1.25 miles NW of the same island.

A 9.6m shoal lies 5.5 miles SE of the light shown on the southernmost islet S of Pulau Berhala.

8.63 **Middle Rocks** (0˚48'S., 104˚26'E.), partly dry at LW, lie 3.75 miles NE of Pulau Berhala; a small rock, with 3.7m of water, and steep-to, is located about 0.3 mile NW of Middle Rocks. Another rock is reported to lie a considerable distance E of Middle Rocks, but its position has not been determined.

Pollux Rocks (0˚48'S., 104˚28'E.), consisting of two heads, nearly awash at LW, and steep-to, lie in an E and W direction, 0.2 mile apart. The E rock is located about 2 miles NE of Middle Rocks. They are not distinguishable by breakers, but only by ripples during the strength of the tidal currents.

A stranded wreck 0.4 mile S of the E of the two Pollux Rocks is reported to be conspicuous.

Sikh Shoal (0˚46'S., 104˚11'E.), with a depth of 4.6m, lies about 15 miles WNW of Pulau Berhala Light. To the S of this shoal are depths of 7.8m and 9m. A partially-submerged wreck is reported to lie about 8.7 miles W of Sikh Shoal.

Karang Speke (Speke Rock) (0˚37'S., 104˚06'E.) lies 8.5 miles WNW of the N end of Pulau Serak; it is circular, about 91m in diameter, and dries. The rock is marked by a lighted beacon. A 5.5m shoal lies about 5 miles WSW of the rock.

Tanjung Buku (0˚41'S., 104˚22'E.), in range with Pulau Serak bearing 100˚, leads S of Karang Speke.

Pulau Muci (0˚32'S., 104˚02'E.) bearing 330˚ leads W of Karang Speke.

Atkin Rock (0˚33'S., 104˚02'E.), 1 mile ESE of Pulau Muci Light, is a small pinnacle, circular in form, about 27m in extent, which dries and is steep-to; when covered, unless the tidal current is running strongly, there is no indication of it.

Two wrecks lie stranded in a position about 5 miles NW of the W entrance to **Kuala Berbak** (1˚04'S., 104˚12'E.).

A dangerous wreck, position approximate, with a mast showing, lies about 8 miles NNW of **Tanjung Solok** (1˚00'S., 103˚49'E.), the W entrance point of Kuala Niur.

8.64 **Karang Cuhoorn** (0˚26'S., 103˚41'E.), a narrow drying bank about 2 miles long, lies on the bar across the mouth of Kuala Lajau. A dangerous wreck, position approximate, lies E of Karang Cuhoorn and is best seen on the chart. The wreck of a sailing vessel with part of the mast showing lies about 11 miles NNE of **Tanjung Bakau** (0˚20'S., 103˚47'E.).

The W end of **Selat Penuba** (0˚20'S., 104˚26'E.) is obstructed by a bar over which there are depths of 4 to 5.8m about 2 miles SSE of the W end of Pulau Selayar. Sunken rocks extend about 1 mile NW of **Pelang** (0˚21'S., 104˚26'E.).

A beacon marks the outer rock, which has a depth of 0.9m. Because of the numerous obstructions in Selat Penuba, Selat Lima, N of Pulau Selayar, is preferred.

A bank, with depths of less than 9.1m, lies offshore between **Tanjung Labuandadong** (0˚12'S., 104˚25'E.) and Pulau Pulon; there is a least depth of 4.6m on the N part of the bank.

A 6.8m patch lies about 6 miles N of **Pulau Pulon** (0˚09'S., 104˚27'E.); depths of less than 9.1m extend about 2 miles NNW of this patch. A 7.7m patch lies about 0.8 mile E of the above patch; there are patches of 9.1m, steep-to and best seen on the chart, near Selat Dasi.

Depths of 0.5 to 9.2m extend about 2 miles W of the SW part of **Pulau Cempah** (0˚09'N., 104˚19'E.).

Leda Rock (0˚11'30"N., 104˚09'45"E.), with very little water over it, and steep-to, lies about l.2 miles NW of **Lobam** (0˚10'N., 104˚11'E.); another rock, awash, is located between them. Near these reefs there are reports of strong tide rips.

A rock, with a depth of less than 1.8m, was reported (1972) to lie about 1 mile S of the S end of **Ompak** (0˚15'N., 104˚19'E.).

A dangerous wreck, with its mast showing, lies about 2.2 miles S of **Pulau Pompong** (0˚22'N., 104˚15'E.).

8.65 **Batu Belayar** (0˚25'N., 104˚16'E.) lies 2.5 miles NNE of the N end of Pulau Pompong, and consists of two rocks several feet high, a rock awash lies 0.25 mile to the W.

A dangerous wreck is reported to lie about 2.5 miles ENE of Batu Belayar.

A small reef, with a depth of 2.7m, lies about 1 mile SSE of the **South Dua** (0˚24'N., 104˚22'E.) nearly in the middle of Selat Temiang. This reef is probably not marked by breakers or discoloration and was struck by a vessel many years ago.

A 10.1m patch is reported to lie about 0.6 mile NW of North Dua Island. A reef of stones and coral having an islet at its S end and an above-water rock at its N end, is located about l.2 miles NW of North Dua Island. There are often heavy tide rips in the channel between them. A rock awash lies close NE of the reef.

Close N of this reef is another similar reef on which **Boom Rock** (0˚25'45"N., 104˚20'15"E.) is located. This rock is 4.3m high, bare, and prominent.

A coral patch, with a depth of 5.5m, and from 20.1 to 25.6m around, lies 1 mile NW of Boom Rock, and on the E side of Selat Pengelap. Other shoals are reported in this area. Caution is necessary when navigating in the vicinity.

Daleh Islet (0˚25'30"N., 104˚24'30"E.), surrounded by a reef, lies 1 mile S of Senimpan on the N side of Selat Merodong. Drying reefs, usually marked by tide rips or surf, lie 0.3 mile SE and 0.6 mile SW, respectively of Daleh Islet.

A rock, above-water, lies on the reef 0.2 mile N of the N **Selanga Islet** (0˚30'N., 104˚21'E.). A large white rock, above-water, on a reef which dries at LW, lies between the S Selanga Islet and **Tokong** (0˚29'N., 104˚23'E.), which is 68m high.

A patch of 6.9m is charted off the E coast of **Pulau Pengelap** (0˚37'N., 104˚15'E.); an above-water rock lies 0.2 mile off the S end of the island.

About midway between the Selanga Islets and the center of Pulau Pengelap is **Midden Rock** (0˚30'N., 104˚20'E.), a rock awash at LW, with depths of 14.6 to 20.1m around, lies 2.5 miles ENE of the S end of Pengelap, not always marked by tide rips.

Two shoal spots of 10.1 to 11m lie 3.5 and 4.5 miles, respectively, SSW of Pengelap.

Midway between Midden Rock and the **Alor Islands** (0˚28'N., 104˚18'E.) to the S is a patch with a depth of 4.9m.

Three rocks above-water are located on the reef extending 0.5 mile SE of **Dedap Island** (0˚30'N., 104˚16'E.). Detached rocks, dry at LW, lie about 0.6 mile SE of the reefs; these rocks are generally marked by tide rips.

Passages Leading from Outer Route and Selat Riau into Selat Durian and Selat Berhala

8.66 The navigation of these channels should present no difficulties. The flood current runs W and the ebb E in the directions of the channels, and is somewhat affected when passing wide openings.

Selat Temiang (Tamiang Strait) (0˚22'N., 104˚23'E.), the southernmost of the four wide and deep channels leading from the outer route to Selat Durian and other straits adjacent, is about 14 miles in length, NW and SE, and 2 miles in breadth at its narrowest part; on its S side are the islets off the NW end of Pulau Sebangka. In the strait, the flood current sets NW and the ebb current sets SE.

Selat Merodong (Merodong Strait) (0˚26'N., 104˚27'E.), between Pulau Mesanak and the Merodong group of islands on the S and the Titampan group on the N, is also navigable. It has a general depth of 22m over a fairway, with a minimum breadth of about 2 miles abreast **Daleh Islet** (0˚25'30"N., 104˚24'30"E.).

Selat Merodong is continued NW between Tiampan group of islands, and the **Dua Islands** (0˚24'N., 104˚22'E.), and **Boom Rock** (0˚25'45"N., 104˚20'15"E.) abreast that group, joining Selat Pengelap. Selat Merodong connects Selat Temiang between the Dua Islands and the Medang Islands. Both channels are deep in their fairways.

Batu Belayar (0˚29'N., 104˚16'E.), well open S of the islet lying NW of the N Dua island, bearing 270˚, leads in the fairway of Selat Merodong.

In Selat Merodong, the flood current sets W and the ebb current sets E.

Selat Pengelap (Pengelap Strait) (0˚29'N., 104˚20'E.) is bordered on the E by the Tiampan group and **Selanga Islets** (0˚30'N., 104˚21'E.), and on the W by the Alor Islands and the sunken dangers E of Pulau Pengelap. It is not less than 1.5 miles in width in the main fairway, with depths of 22 to 55m.

In Selat Pengelap, owing to the uneven nature of the bottom, the currents, near springs, cause eddies and overfalls which are somewhat alarming to strangers, but no dangers, other than those charted, are known to exist.

The flood current runs S and meets the currents from Selat Teminang and Selat Merodong near **Kebat Island** (0˚23'N., 104˚18'E.).

Selat Abang (Abang Strait) (0˚32'N., 104˚16'E.) is reduced by the rocks extending from **Sepintu Islet** (0˚31'22"N., 104˚14'21"E.) and Sawang Islets to a breadth of about 0.7 mile, with a fairway depth of 22m. In the strait, the flood current sets W and the ebb current sets E.

Pulau Abang-Kecil (Abang-Ketjil) (0˚33'N., 104˚14'E.), forming the N side of Selat Abang, is hilly and about 1.3 miles in extent.

8.67 The **Nijur Islets** (0˚32'N., 104˚15'E.), four in number and surrounded by reefs, lie nearly 1 mile from the E side of Pulau Abang-kecil.

The **Sepintu Islets** (0˚31'23"N., 104˚14'15"E.), on the N side of Selat Abang are two wooded rocks on the same reef.

The **Sawang Islets** (0˚30'30"N., 104˚14'45"E.), on the S side of Selat Abang and located about 0.5 mile NW of Dedap, are two wooded islets lying NE and SW from each other and connected by a reef.

Pulau Abang-Besar (0˚35'N., 104˚12'E.), 90m in height, 4 miles long, N and S, and 2.5 miles wide, is hilly, thickly wooded, and located NW of Pulau Abang-Kecil. The channel between is contracted near the center to 183m or less by a low island near Pulau Abang-Besar; it is used only by native canoes.

Pulau Tortel (0˚35'N., 104˚11'E.), steep-to, lies about 0.3 mile off the W side of Pulau Abang-Besar.

Batu Hipomenes (Hipomenes Rock) (0˚35'N., 104˚09'E.), with 1.5m, lies about 1.3 miles W of Pulau Tortel.

Karang Kameleon (0˚31'N., 104˚08'E.), a small rock, awash, lies about 5 miles SW of Pulau Abang-Besar. A bank, with a least depth of 7m, extends about 0.5 mile N of this rock.

The summit of Pulau Petong bearing 348˚ or greater leads well to the W of Karang Kameleon.

8.68 Pulau Petong (0˚38'N., 104˚05'E.), lying 6 miles WNW of Pulau Abang-Besar, has several hills, one of which, the summit, at the S end, is 154m high.

Several islets and rocks extend about 0.75 mile from the SE side of Pulau Petong; the outer rock is **Observation Rock** (0˚36'N., 104˚06'E.). A 5.5m shoal was reported to lie about 0.8 mile SSE of the SW end of Pulau Petong. Above and below-water rocks also extend 1 mile W of Pulau Petong.

Pulau Anakpetong (0˚38'N., 104˚02'E.), two islets on a reef nearly 1 mile in extent, lies 2.5 miles W of Pulau Petong; the E of these islets is 57m high, the W islet is lower.

Cucupetong (0˚39'N., 104˚01'E.), about 19m high, lies nearly 1.5 miles WNW of Pulau Anakpetong.

Caution.—In Selat Abang, there is no safe passage between the Sawang Islets and Dedap.

8.69 Selat Dempo (0˚38'N., 104˚13'E.), about 7 miles long, NW and SE, and 3 miles wide, lies between the Abang islands and **Pulau Galang Baru** (0˚40'N., 104˚16'E.) to the NE, and affords easy navigation.

The channel between Pulau Abang-Besar and Pulau Petong is the best route for vessels proceeding W to Selat Durian, well S of **East Bank** (0˚41'N., 103˚52'E.) or if bound S to Selat Berhala.

Selat Durian (0˚45'N., 103˚37'E.), entered from the S between **Great Durian** (0˚43'N., 103˚43'E.) and **Pulau Sanglang Besar** (Sanglang-besar) (0˚37'N., 103˚41'E.), is nearly 4 miles wide, and bounded on either side by a number of islands of various sizes. It has a NW direction in the S part, then turns toward the N and E between **Pulau Buru** (0˚53'N., 103˚30'E.) and **Mantaras-Besar** (0˚52'N., 103˚38'E.); Kepulauan Rukan lies in its S approach and may be passed on either side.

The strait, which is deep and well-lighted, is available at all times for all classes of vessels.

The main channel of Selat Durian has been wire-dragged to a depth of 14m. The channel S and W of Rukan Selatan has been wire-dragged to a depth of 14m. The channel SE of Rukan Selatan has been wire-dragged to a depth of 11.9m.

Caution.—A dangerous wreck, best seen on chart, has been reported approximately 2.2 miles SW of Mantaras-Besar.

8.70 Kepulauan Rukan (0˚35'N., 103˚47'E.), consisting of three islands named Rukan Selatan, Rukan Tengah, and Rukan Utara, extends over a distance of 5 miles, N and S.

Rukan Selatan (South Brother) (0˚33'N., 103˚46'E.), 43m high, the largest and highest of the Kepulauan Rukan, is located in the S approach to Selat Durian; it is 1 mile long, N and S, about 0.3 mile wide, and may be seen from a distance of 17 to 18 miles in clear weather.

Rukan Tengah (Middle Brother) (0˚35'N., 103˚46'E.), 47m high, lies about 1.3 miles N of Rukan Selatan.

Rukan Utara (North Brother) (0˚37'N., 103˚46'E.), 24m high, is a wooded rock, lying about 3 miles N of Rukan Tengah. A light is shown from a 22m high tower on the S hill of Rukan Selatan; a wide cliff on the NE side makes the island conspicuous at times. A light is also shown from Rukan Utara.

Caution.—Many dangerous wrecks, best seen on the chart, lie in the vicinity of Kepulauan Rukan.

8.71 East Bank (0˚41'N., 103˚52'E.), ridges of hard sand, with depths of 2.3 to 9.1m, lies E of Kepulauan Rukan; they are not marked by surf or discoloration. The shallowest part of the W ridge, with a depth of 4.1m, lies about 5 miles ENE of Rukan Utara. The ridges are best seen on the chart.

The Durai Islands, several low mangrove islands, lie with their S extremity about 4 miles NE of Pulau Burung, near the coast of Sumatera.

8.72 Pulau Sandam Laut (0˚28'N., 103˚40'E.), the southeasternmost of the group, is small, 32m high, and surrounded by rocks.

Pulau Durai (Doerai) (0˚31'N., 103˚36'E.), the largest of the group, lies 3 miles NW of Pulau Sandam Laut; it is 4.5 miles long and rises to a height of 71m near its N end.

Numerous other islands, which can best be seen on the chart, lie E of Pulau Durai and form the W side of Southeast Channel.

Pulau Segal Besar (Segal-besar) (0˚34'N., 103˚40'E.), on the E side of Southeast Channel, is 1.5 miles long and 36m

high; numerous islands, which can best be seen on the chart, lie NW of Pulau Segal-besar.

Southeast Channel (Alur Pelayaran Tenggara) (0˚34'N., 103˚39'E.), which lies between the Durai group of islands and Pulau Segal-besar, can best be seen on the chart; these passages should only be used by vessels with local knowledge during daylight.

Pulau Sanglang Besar (Sanglang-besar) (False Doerian) (0˚37'N., 103˚41'E.), an irregularly-shaped island with a peak 159m high, is thickly wooded and about 3 miles in extent, and with adjacent islands forms the SW limit of Selat Durian.

Pulau Sanglang-kecil (Sanglang-Ketjil) (0˚36'N., 103˚43'E.), nearly 1 mile long, E and W, is 65m high, and separated from the SE side of Pulau Sanglang Besar (Sanglang-besar) by a narrow channel.

Richardson Reef (0˚37'N., 103˚43'E.), a small reef with a depth of 5m, lies about 1 mile N of the SE end of Pulau Sanglang-kecil.

8.73 **Pulau Timun** (0˚38'23"N., 103˚37'45"E.), the northernmost of four islands lying W of Pulau Sanglang Besar, is 46m high; the W peak of **Pulau Kas** (0˚37'N., 103˚39'E.) is 49m high.

Pulau Peropos (0˚40'N., 103˚35'E.), 124m high, and **Pulau Ngal** (0˚41'N., 103˚35'E.) lie about 6 miles WNW of Pulau Sanglang Besar (Sanglang-besar).

A number of islets extend S of Pulau Peropos, nearly to the Durai group, and form the W side of the N approach to Southeast Channel.

Pulau Durian Besar (Great Durian) (0˚43'N., 103˚43'E.), on the N side of the fairway of Selat Durian, is a triangular-shaped island, nearly 4 miles in extent; it is mountainous, and Djora Peak, near its center, is 309m high. The SW side of the island is fairly steep-to.

Tiga (0˚41'N., 103˚44'E.), comprised of three rocky islets surrounded by reefs, lies about 0.5 mile S of the S end of Pulau Durian Besar. Carnbee Reef, a drying steep-to coral reef, lies about 0.5 mile SW of Tiga.

Pulau Durian Kecil (Little Durian) (Little Doerian) (0˚44'N., 103˚40'E.), 171m high, and 2 miles long, is separated from Pulau Durian Besar by a narrow channel in which there are three islets.

South Passage Island (Pulau Perasi Besar) (0˚43'N., 103˚39'E.), lying about 0.5 mile SW of Pulau Durian Kecil, is bare and 66m high. It can be passed fairly close.

Perasi Island (Pulau Perasi Kecil) (North Passage Island) (0˚46'N., 103˚38'E.), 46m high, lies about 3 miles NNW of South Passage Island; both of these islands lie on the E side of the fairway of Selat Durian.

Pulau Pelangkat (0˚45'N., 103˚35'E.) lies about 3 miles WSW of Perasi Island, on the W side of the fairway, and is marked by a light. It is low, partly inundated at HW, of coral formation, covered with trees, the tops of which are about 30m above HW, and has a round and conspicuous appearance.

8.74 **Selat Sanglang** (0˚44'N., 103˚42'E.), the strait lying N of Pulau Durian Besar and Pulau Durian Kecil, may be considered as one of the S entrances to Selat Durian.

It does not offer any advantages to vessels to proceed through it, but, on the contrary, is inferior to and less direct than the main strait. Three islands, with **Moro Laut** (0˚46'N., 103˚40'E.) being the westernmost, form the N side of the W end of Selat Sanglang.

Pulau Sugibawah (Soegi Bawah) (0˚47'N., 103˚48'E.) lies N of Selat Sanglang and Pulau Durian Besar; it is about 6 miles long, NW and SE, and about 2 miles wide at the S part, narrowing to 0.5 mile near the N end.

There is a range of hills on the N portion of the island which attain an elevation of 145m. The W coast is low and consists in a great part of morass on which are mangrove bushes. A low islet lies close SW of the N end of the island.

Pulau Belukar (Beloekar) (0˚50'30"N., 103˚39'30"E.) lies about 0.4 mile from the N end of Pulau Sugibawah; it is about 0.7 mile long. A steep-to drying reef lies about 1.2 miles W of the S end of the island.

Pulau Pandjang (Pulau Panjang) (0˚51'N., 103˚41'E.), about 2 miles E of Pulau Belukar, is hilly, about 4 miles in length, and 0.5 mile in breadth. The hills at the N end rise to a height of 104m; the hills at the S end rise to a height of 135m.

Pulau Itik (0˚53'N., 103˚39'E.) consists of two small, round, overgrown islets, 50m high, lying about 1 mile NW of Pulau Pandjang. Itik Reef, which dries, lies about 1 mile NW of Pulau Itik. A dangerous wreck lies 0.7 mile WNW of the reef, while a 5m coral patch lies about 3.7 miles NNE of the reef.

The summit of Perasi Island, in range with the E side of Mantaras-Besar, bearing 179˚, leads W of Itik Reef.

Mantaras-Besar (0˚52'N., 103˚38'E.), lying 1.5 miles SW of Pulau Itik, is about 0.4 mile in diameter, covered with trees, and 75m high; it should be visible from a distance of 15 miles in clear weather, and is conspicuous on account of its reddish-colored rocks rising almost perpendicularly from the sea.

Mantaras-Kecil (0˚52'38"N., 103˚37'22"E.), nearly 0.3 mile NNW of Mantaras-Besar, is a rocky islet with trees and is fringed by a drying reef.

8.75 **Melvill Reef** (0˚52'N., 103˚37'E.), a drying reef marked on its W side by a light, lies about 0.5 mile WSW of the W end of Mantaras-Besar. Middelburg Reef, a drying coral reef also marked by a light, lies about 3 miles W of Melvill Reef.

The summit of Pulau Sanglang Besar (Sanglang-besar), in range with the summit of Perasi Island, bearing 159˚, leads in the fairway of Selat Durian between Melvill Reef and Middelburg Reef.

The N group of the Karimun Islands has been described beginning in paragraph 5.19. These islands are located on the W side of Selat Durian, and separated from each other by narrow channels with varying depths. Some of these islets are hilly and others are low. Most of these islands are inhabited; a representative of the native self-government resides on the SW side of Pulau Buru.

Pulau Kundur (Koendoer) (0˚45'N., 103˚26'E.), the largest of these islands, is about 16 miles long, N and S, and 10 miles wide; its coasts are low and marshy.

Gading, 141m high, is located on the S end of the island; Salah, which is 101m high, is located on the N end of the island.

Pulau Ungar (Onggoet) (0˚40'N., 103˚30'E.), separated from Pulau Kundur by a channel about 0.5 mile wide, is 5.5 miles long, N and S, and 1.75 miles wide.

Pulau Degong (0˚47'N., 103˚32'E.), 4 miles N of Pulau Ungar and 1.3 miles E of the E end of Pulau Kundur, is about 3 miles long, N and S, and 1.5 miles wide.

Pulau Bilat (Belat) (0˚49'N., 103˚30'E.) lies close W of Pulau Degong and separated by a narrow channel. The coast of Pulau Bilat, from Pulau Degong, is fronted by several islands.

Pulau Buru (Boeroe) (0˚53'N., 103˚30'E.) is a low island about 4 miles long, N and S, crowned with high trees and having a few inhabitants. The E shore of the island is fronted by a shallow bank to distances of 0.5 to 1 mile.

Pulau Papan (0˚53'N., 103˚27'E.) lies W of Pulau Buru. Papan, 199m high, is located near the W side of Pulau Papan.

Pulau Parit (0˚57'N., 103˚27'E.) lies close N of Pulau Buru and forms the S side of Selat Gelam.

Pulau Pandan-besar (0˚57'N., 103˚29'E.), the S of two small islands lying about 1 mile N of Pulau Buru, is low and covered with trees about 30m high; Pulau Pandan-Ketjil lies close NE. A wreck lies 2.25 miles E of Pulau Pandan-Ketjil.

8.76 The **Bulan Archipelago** (1˚04'N., 103˚48'E.), of which **Pulau Kapaladjernih** (1˚00'N., 103˚47'E.) is the westernmost and largest, forms the E side of the N approach to Selat Durian and more particularly of **Selat Tjombol** (0˚49'N., 103˚53'E.).

Pulau Djangkat (0˚58'N., 103˚43'E.) lies about 5 miles W of the S end of Pulau Kapaladjernih, with numerous islets and reefs between and in the direction of **Tanjung Djernih** (1˚02'N., 103˚45'E.); numerous islets and reefs also lie between Pulau Djangkat and **Pulau Tjombol** (0˚50'N., 103˚52'E.). Some of these islands are inhabited.

Only the outermost islands and dangers which concern the ordinary navigator will be described.

Selat Sugi (Soegi Strait) (0˚48'N., 103˚44'E.) lies between Pulau Durian Besar, Pulau Sugibawah, and Pulau Pandjang on the W and Pulau Sugi on the E.

The W side of the strait is more encumbered by reefs and small islets than the E side, which during daylight is fairly easy of navigation. It is used by local steamers and by small craft plying between Singapore and the Indragiri River.

In Selat Sugi, the flood current runs S and the ebb current runs N; the current attains a velocity of 3 knots about 2 days after springs.

Pulau Sugi (Soegi) (0˚50'N., 103˚47'E.) is 10 miles long, NW and SE, and has an average width of about 3 miles. A range of hills extends through the island, the highest point being a saddle-shaped peak near its center, named **Bekaka** (0˚49'42"N., 103˚47'30"E.), which is 306m high. There are hills 137 to 183m high N and S.

The peak named **Sugi** (Soegi)(0˚48'36"N., 103˚48'12"E.), about 1.2 miles SE of Bekaka, is 190m high, and the hill within the S end of the island is 160m high.

On the W coast near **Tanjung Malang Tiang** (0˚48'N., 103˚46'E.) is a precipitous hill, 170m high. The E shore of the strait is formed by the W coast of Pulau Sugi; the S half is free of known dangers.

8.77 **Tanjung Riouw** (0˚45'N., 103˚49'E.), the S end of Pulau Sugi forms the E side of the S entrance of the strait, it is a bold point, the land rising within it to a height of 160m. Banks, with depths of 1.8 to 5.5m, extend 5.5 miles E of Tanjung Riouw, nearly connecting with East Bank and obstructing the S fairway of Selat Sulit.

Pulau Telumas (0˚47'N., 103˚46'E.), on the E side of Selat Sugi, lies about 3.2 miles WNW of Tanjung Riouw. It is about 0.5 mile long with a 79m high steep hill at its N end; the S end is low.

Pulau Tjonding-besar (0˚47'N., 103˚45'E.), 31m high, and Pulau Tjonding-kebil, two wooded islets, each surrounded by a drying reef, lie about 1 mile W of Pulau Telumas.

Tanjung Tello (0˚51'N., 103˚43'E.), located about 5 miles NW of Tanjung Malang Tiang, is rendered prominent by some trees on the coastal reef.

Pulau Djangka, a narrow islet, surrounded by a reef, lies about 0.2 mile N of **Tanjung Djangka** (0˚52'24"N., 103˚42'54"E.). Pulau Manis, also surrounded by a reef, lies about 0.7 mile W of Pulau Djangka.

On the W shore of Selat Sugi is **Pulau Pau** (Paoe) (0˚47'30"N., 103˚42'30"E.); to the S and E are **Pulau Sugi Darat** (0˚47'18"N., 103˚43'15"E.), 47m high; **Selerang** (0˚47'30"N., 103˚43'03"E.), and **Pulau Sugi Laut** (0˚48'03"N., 103˚43'18"E.).

Farther N are **Kelontjing** (0˚49'18"N., 103˚42'30"E.) and **Murei** (0˚49'30"N., 103˚41'48"E.), with **Pulau Jaga** (Djaga) (0˚51'N., 103˚42'E.) and **Pulau Pandjang** (0˚51'N., 103˚41'E.).

8.78 **Selat Sulit** (Soelit Strait) (0˚50'N., 103˚50'E.), between Pulau Sugi and **Pulau Tjombol** (0˚50'N., 103˚52'E.), is of little importance for navigation, as its S entrance is almost closed by sand banks.

Pulau Passai (0˚54'N., 103˚45'E.), about 1.7 miles long, NW and SE, is separated from the N end of Pulau Sugi by a narrow channel.

Pulau Sepatu (0˚55'N., 103˚46'E.) lies about 1.2 miles NE of Pulau Passai.

Selat Tjombol (0˚54'N., 103˚52'E.) lies between Pulau Tjombol, Pulau Tjitlim, and Pulau Serandjau on the SW, and the S end of Pulau Bulan and the Luing islands on the NE. Its S approach, which is common to Selat Bulan, is obstructed by sandbanks; its N approach is obstructed by numerous reefs.

Though there is ample water, none of these dangers are buoyed, and the strait is not available for navigation except to vessels with local knowledge.

Pulau Tjombol (0˚50'N., 103˚52'E.) is 7.5 miles long, NW and SE, with its greatest breadth being a little over 3 miles. A range of hills, the highest point of which is 212m high, trends through the center of the island; it is also hilly near the coast, but the land between is flat. The island is thinly populated.

Pulau Tjitlim (0˚47'N., 103˚55'E.), SE of Pulau Tjombol and separated from it by a narrow channel, the shores of which are marshy on each side, is also hilly, reaching a height of 159 and 162m on its S and E sides, respectively.

The Serandjau group of islands consists of Pulau Serandjau, the largest, rising to a height of 108m, and Katip, Kelawa, Sebai, Resam, and Pandan.

8.79 **Pulau Pisang** (0˚52'N., 103˚54'E.) with above-water rocks close SE, lies about 0.7 mile off the NE side of Pulau Tjombol, and is the most prominent islet in the strait. It is spherical in shape, with two smaller islets lying off its E side.

Pulau Semangka (0˚54'N., 103˚50'E.) lies 1 mile off the N coast of Pulau Tjombol and 1.5 miles E of **Tanjung Kakong** (0˚54'N., 103˚48'E.), the N end of Pulau Tjombol.

Pulau Badas (0˚55'N., 103˚48'E.), 37m high, lies about 2 miles W of Pulau Semangka.

Pulau Duku (0˚54'N., 103˚48'E.), 48m high, lies about 0.5 mile W of Tanjung Kakong, with Terang lying between Pulau Duku and Pulau Badas.

Pulau Sepatu (0˚55'N., 103˚46'E.), a small islet located near the E end of a drying reef, lies about 1 mile W of Pulau Duku.

Paloi (0˚55'N., 103˚49'E.) lies about 1 mile NE of Pulau Badas. Northwest of Paloi are Telan, **Pulau Telukbakau** (Telok Bakau) (0˚57'N., 103˚46'E.), Terong, and other islets forming the W side of Selat Tjombol. There are many reefs between them and Pulau Sepatu.

Pulau Bulan (Boelan) (0˚59'N., 103˚53'E.), forming the greater portion of the E side of Selat Tjombol, is generally low, except the SE part, which is hilly.

Bulan (0˚58'30"N., 103˚55'42"E.), a 224m high hill, is conspicuous.

Luing (Loeing) (0˚52'N., 103˚58'E.) a group of islands, on the SE side of the entrance to Selat Tjombol, consists of a number of very low islets, on the N of which there are some trees. Luing Laut is the southernmost of the islets.

Pulau Tepekong (0˚53'N., 103˚56'E.),18m high, lies W of the Luing group, about 2 miles NE of Pulau Pisang. The fairway of Selat Tjombol lies between them, and has depths of 27m.

8.80 Pulau Djangkat (0˚58'N., 103˚42'E.), 32m high, lies WSW of Pulau Kapaladjernih, in the N entrance to Selat Durian; the island is steep-to.

Selat Bulan (Boelan Strait) (1˚01'N., 103˚56'E.), about 15 miles in length and separating the Bulan Archipelago from Pulau Batam, is the shortest route to Singapore from ports in Berhala or from Selat Dempo, W side of approach to Selat Riau. It is available for light-draft vessels but from its intricate nature it seems improbable that it will come into general use, and therefore will not be described.

Selat Durian is slightly longer and is quite safe at all times, there being no risk of going aground. Springs rise at 3m, while neaps are reported to rise at 1.8 to 2.1m.

A submarine water pipeline water crosses Selat Bulan between Pulau Sambu and Sekupang. This pipeline passes close NE of Palau Mariam and close SW of two lighted shoal patches lying to the SE.

Tides—Currents.—In Selat Durian, Selat Tjombol, and the other minor straits, the flood usually sets to the S and the ebb to the N, but this can not be relied upon, for frequently the currents run for 24 hours in the same direction.

The ripplings met with in the straits in certain places might be alarming to a stranger; they appear to be caused by the uneven bottom and the resistance the currents meet with from the steep reefs and numerous small islands.

The flood current, setting NW through Selat Dempo runs through Selat Abang in a W direction, a portion being deflected to the S between **Pulau Pengelap** (0˚30'N., 104˚17'E.) and Pulau Dedap.

West of Selat Abang, the flood runs to the S between the islands near **Pulau Buaya** (0˚11'N., 104˚13'E.); farther along the coast of Pulau Lingga the flood runs in a S direction.

At the N entrance to **Selat Cempah** (0˚09'N., 104˚20'E.), NW of Karoti, the flood current setting to the W turns to the SSE in the strait.

The ebb current sets in an opposite direction in all the straits except where currents meet or separate; in the fairways the currents do not attain a velocity of more than 2 to 2.5 knots, but can run from 3 to 4 knots in the narrower channels.

The tidal currents in Selat Durian usually have a velocity of 2.5 knots at springs, but sometimes may have a velocity of 3 to 4 knots at springs. This irregularity appears to be produced by the prevailing winds in the N or S entrance of the straits, forcing the currents through in one direction for 12 or 18 hours at a time, although the rise and fall on the shore was regular.

Directions.—In Selat Merodong, according to the chart, **Kebat** (0˚23'N., 104˚18'E.) in range with the N extremity of **Dua Island** (0˚24'N., 104˚22'E.), bearing 258˚, leads between the reefs off Daleh and those off the N end of Merodong.

In Selat Pengelap, navigation from either direction is easy. From the E steer in with **Batu Belayar** (0˚25'N., 104˚16'E.) well open S of the Alor Islands, bearing 222˚, which leads about 0.5 mile W of **Selanga Islets** (0˚30'N., 104˚21'E.); pass about 0.5 mile E of the Alor Islands, and the same distance or more N of Batu Belayar.

In Selat Abang, the N end of Pulau Pengelap bearing 075˚ and with **Udiep** (Oediep) (0˚31'45"N., 104˚18'30"E.) just shut in, leads in the fairway.

Pulau Karsogu (0˚43'N., 103˚39'E.), well open E of Pulau Sanglang-kecil bearing W of 329˚, or **Djoria Peak** (0˚43'N., 103˚43'E.), on Pulau Durian Besar, W of 355˚, leads E of the patches S of Pulau Sanglang Besar (Sanglang-besar); it is advisable for vessels not to steer W of that bearing, for uncharted shoal depths may exist in that area.

Djora Peak, bearing 000˚, leads W of Tiga and **Carnbee Reef** (0˚41'N., 103˚44'E.), the peak on Pulau Sanglang Besar (Sanglang-besar), bearing W of 230˚, leads SE of Tiga and Carnbee Reef.

8.81 Directions for Selat Bangka through Selat Berhala and Selat Durian to Singapore.—A vessel can proceed nearly direct from light to light from abreast and S of **Pulau Berhala** (0˚52'S., 104˚24'E.), passing about 3 miles W of the light on **Pulau Muci** (0˚32'S., 104˚02'E.); then steer about 353˚, to pass the same distance E of the light on **Rukan Selatan** (0˚33'N., 103˚46'E.), from where a course may be shaped to pass about 1 mile N of **Rukan Utara Light** (0˚37'N., 103˚46'E.).

Vessels may also pass W of Kepulauan Rukan. From N of Rukan Utara, steer to pass W of South Passage Island and Perasi Island, between them and **Pulau Pelangkat Light** (0˚45'N., 103˚35'E.); from then N between the lights on Melvill Reef and **Middelburg Reef** (0˚51'N., 103˚34'E.), and into Singapore Strait between Pulau Karimun and **Pulau Nipa Light** (1˚09'N., 103˚40'E.).

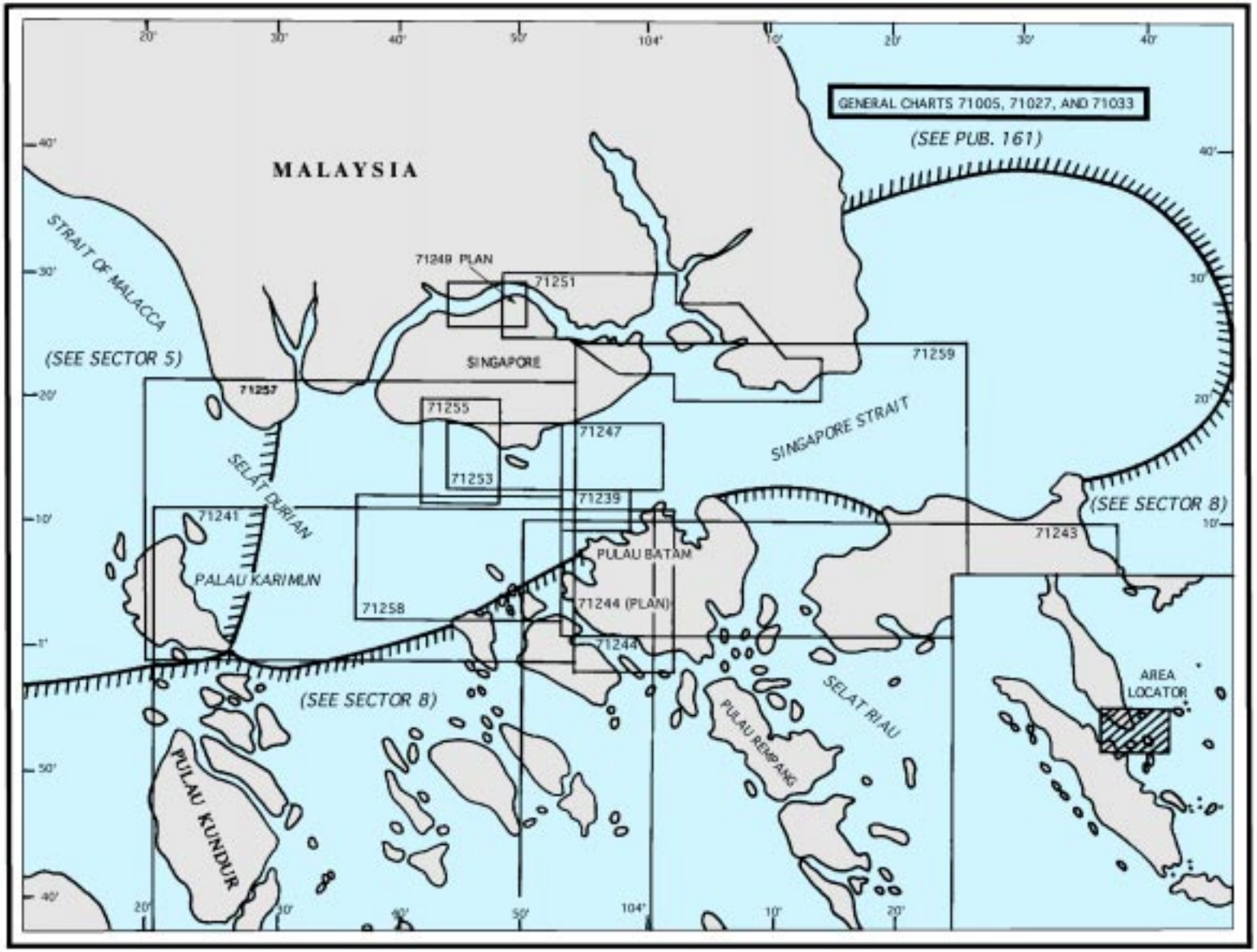
In Selat Sugi, **Pulau Telumas** (0˚47'N., 103˚46'E.) can be passed on either side, avoiding the reefs off its extremities; then keep along the Pulau Sugi side, giving a berth to the shoals N and S of Tanjung Tello, then passing between **Pulau Jaga** (0˚51'N., 103˚42'E.) and Pulau Manis or between Pulau Manis and **Djangka** (0˚53'N., 103˚43'E.).

In either of these fairways keep in mid-channel in order to avoid the reefs extending from the islands.

The channel W of **Tjonding Islets** (0˚47'N., 103˚45'E.) may be taken, if advisable, instead of passing E of Pulau Telumas.

The summit of Rukan Selatan in range with **Tanjung Batubelobang** (0˚44'N., 103˚45'E.), the E end of Pulau Durian Besar, bearing 173˚, leads in the fairway and E of the reef E of **Sugi Laut** (0˚48'N., 103˚43'E.).

When abreast this reef steer along the Pulau Sugi coast, as described above.



Additional chart coverage may be found in CATP, Catalog of Nautical Charts.

SECTOR **9** — CHART INFORMATION

SECTOR 9

SINGAPORE STRAIT AND APPROACHES, INCLUDING SINGAPORE ISLAND, SINGAPORE ROAD, KEPPEL HARBOR, AND JOHOR STRAIT

Plan.—This sector describes Singapore Strait, West Johor Strait, Keppel Harbor, and East Johor Strait. The sector is generally described from W to E, with the exception of East Johor Strait, which is described from E to W.

General Remarks

9.1 This strait is bounded on the N by the Malay Peninsula and Singapore Island, and on the S by **Kepulauan Riau** (Riouw Archipelago) (1˚00'N., 105˚00'E.), S of which is the **Kepulauan Lingga** (Lingga Archipelago) (3˚05'N., 105˚00'E.). The entire length of Singapore Strait is about 60 miles; its breadth, at the W entrance, is about 10 miles.

The E entrance is about 20 miles wide, but S of Singapore, between Pulau Sakijang Bendera and Batu Berhanti, it is only about 2.5 miles wide; however, but the fairway is deep throughout.

Because adequate aids to navigation exist, passage through Singapore Strait by day or night is comparatively simple for a prudent navigator.

Heavy rain squalls, during which visibility is moderate or poor, occur frequently in the strait.

The IALA Maritime Buoyage System “A” is used for buoys and beacons within the waters under the control of the Port of Singapore Authority.

Radar reflectors are not normally fitted to buoys in waters within the control of the Port of Singapore Authority.

An IMO-adopted routing system has been created for the Strait of Malacca and Singapore. This system is comprised of Traffic Separation Schemes (TSS) and a Deep-Water Route, as well as rules for its use.

It has been reported that numerous small boats loiter in the TSS; these vessels do not exhibit proper lights. Numerous small vessels and tugs cross the TSS at other than a right angle.

Maritime and Port Authority of Singapore

http://www.mpa.gov.sg/index.html

The Maritime and Port Authority of Singapore (MPA) has advised of the need to put measures in place to combat piracy and armed robbery against ships. Owners and operators are advised to provide guidance and supervision to masters to draw up anti-piracy plans for their vessels. The plan, among other things, should cover:

1. The need to enhance surveillance and the use of lighting and surveillance or detection equipment.
2. Crew responses if a potential attack is detected or an attack is underway.
3. Radio and alarm procedures to be followed.
4. Reports to be made after an attack or attempted attack.

Vessels navigating close to port limits are advised to exercise extra vigilance. In the event of an attack, masters are advised to report to the Singapore Authorities, as follows:

1. Singapore Police Coast Guard:
   a. VHF radio: VHF channel 7 or 16
   b. Telephone: 6377-5540/6377-5539
   c. Telefax: 276-1627
2. The MPA Port Operations Control Center:
   a. VHF radio: VHF channel 5, 12, 18, 21, 22, or 68
   b. Telephone: 6325-2493/6325-2494
   c. Telefax: 224-5776

Masters are also advised to report any suspicious-looking craft to the above authorities.

Pilotage

9.2 Requests for pilotage service should be placed directly with the pilot service provider, giving a minimum of 12 hours notice; the vessel’s ETA at its pilot boarding area should be confirmed 2 to 3 hours in advance on VHF channel 20 (3 hours in advance if boarding at the East Johor Strait Boarding Ground). The following information should be stated:

1. Vessel’s name and call sign.
2. ETA and pilot boarding location.
3. Direction of approach—“arriving from the East” or “arriving from the West.”

The Pilotage District, within the limits of the port of Singapore, is divided into four areas, named A, B, C, and D, in which differing rules apply for compulsory pilotage. These areas are reported to lie within the port limits, as follows:

1. **Area A.—**West of a line joining the following positions:
   a. 1˚16.3'N, 103˚51.4'E.
   b. 1˚15.0'N, 103˚51.9'E.
   c. 1˚14.7'N, 103˚52.3'E.
   d. 1˚14.7'N, 103˚52.8'E.
   e. 1˚13.3'N, 103˚51.9'E.
   f. 1˚12.7'N, 103˚52.1'E.
   g. then extending to the N in the W part of Johor Strait to the Causeway (1˚27.0'N., 103˚46.0'E.).

   Pilotage in Area A is compulsory for all vessels of 300 grt or more.
2. **Area B.—**East of the E limit of Area A and the S limit of the Area D, excluding Area C. Pilotage in Area B is compulsory for all vessels of 5,000 grt or more.
3. **Area C.—**The approach to and within Kallang Basin (1˚18'N., 103˚52'E.). Pilotage in Area C is compulsory for all vessels of 300 grt or more and for all vessels of 45m in length or greater.
4. **Area D.—East Johor Strait.—**North of the N limit of Area B and N of a line joining the following positions:
   a. 1˚20.5'N, 104˚00.7'E.
   b. 1˚20.0'N, 104˚02.7'E.

c. 1˚20.0'N, 104˚03.1'E.
d. 1˚18.8'N, 104˚04.3'E.
e. 1˚17.5'N, 104˚05.2'E.
f. 1˚17.8'N, 104˚07.3'E.
g. 1˚20.8'N, 104˚05.1'E.
h. 1˚21.5'N, 104˚04.8'E.
i. then to the Causeway (1˚27.0'N., 103˚46.0'E.).

Pilotage in Area D is compulsory for all vessels of 300 grt or more and for all vessels with a height above the waterline of 30m or more.

Vessels are required to use certain pilot boarding grounds, as follows:

1. Southern Boarding Ground—For vessels from E or W proceeding directly to Singapore Cruise Center with advanced Health and Immigration clearance or with Immigration boarding at the pilot boarding ground. This boarding ground is to be used only through prior arrangement with the Port Operations Center.
2. Eastern Boarding Ground A—For vessels from W proceeding directly to anchorages in the E sector, with advanced Health and Immigration clearance.
3. Eastern Boarding Ground A, Western Boarding Ground A, or Western Boarding Ground B—For vessels from W proceeding directly to berths and anchorages, with advanced Health and Immigration clearance.
4. Eastern Boarding Ground A or B, as arranged with the Pilotage Section—For vessels from E proceeding directly to berths and anchorages, with advanced Health and Immigration clearance.
5. Eastern Boarding Ground A—For vessels from E or W requiring Health and Immigration clearance.

In all areas for all liquefied gas or chemical carriers which are loaded or which have not been certified as gas free, pilotage is required.

The pilot boarding grounds are best seen on the chart.

Pilot Boarding Grounds	
Eastern Boarding Ground A	1˚13.52'N, 103˚53.45'E.
Eastern Boarding Ground B	1˚15.65'N, 103˚57.40'E.
Western Boarding Ground A	1˚12.92'N, 103˚36.08'E.
Western Boarding Ground B	1˚12.03'N, 103˚39.48'E.
Southern Boarding Ground	1˚11.70'N, 103˚49.67'E.
Gusong Boarding Ground	1˚10.48'N, 103˚46.90'E.
East Johor Boarding Ground	1˚17.65'N, 104˚06.40'E.

It is reported that pilots board between the positions of Eastern Boarding Ground A and Eastern Boarding Ground B.

Anchoring is prohibited in Eastern Boarding Ground B due to the presence of submarine cables.

Vessel Traffic Information Service

9.3 The Vessel Traffic Information Service (VTIS) will assist vessels within the Singapore Strait TSS, bounded by 103˚25'E, and 104˚23'E.

The VTIS is divided into VTIS East, VTIS Central, and VTIS West. The boundary between VTIS East and VTIS Central is longitude 104˚02.2'E. The boundary between VTIS Central and VTIS West is longitude 103˚44.6'E. The calling and working frequency of each VTIS sector is, as follows:

1. VTIS East—VHF channel 10.
2. VTIS Central—VHF channel 14.
3. VTIS West—VHF channel 73.

All vessels transiting Singapore Strait must maintain a continuous listening watch on VHF channel 12.

The following vessels are required to report to the VTIS:

1. Vessels of 300 grt and over.
2. Tugs engaged in towing or pushing if combined grt of tug and tow or vessel being pushed is 300 grt or over.
3. Passenger vessels carrying more than 12 passengers intending to call at Singapore.

Vessels transiting Singapore Strait but not calling at Singapore are requested to report to the VTIS.

Vessels arriving at the port of Singapore must report their name, call sign, and position to VTIS East on VHF channel 10 when entering the VTIS operational area and at the following positions:

1. If approaching from the E via the South China Sea, report when abeam of **Horsburgh Light** (1˚19.8'N., 104˚24.4'E.).
2. If approaching from the S via Selat Riau, report when abeam of **Karang Galang Light** (1˚10.0'N., 104˚11.5'E.).
3. If approaching from East Johor Strait, report when abeam of **Eastern Lighted Buoy** (1˚17.9'N., 104˚06.0'E.).

Vessels arriving at the port of Singapore must report their name, call sign, and position to VTIS West on VHF channel 73 when entering the VTIS operational area and at the following positions:

1. If approaching from the S via Selat Duran, report when abeam of **Pulau Jangkat** (0˚57.9'N., 103˚42.7'E.).
2. If approaching from the W via the Strait of Malacca, report when abeam of **Pulau Iyu Kechil** (1˚11.5'N., 103˚21.2'E.).

A VLCC (greater than 150,000 dwt) or a deep-draft vessel (draft greater than 15m) intending to cross traffic lanes should also report its approximate crossing location and the estimated time of crossing.

A Confirmation of Arrival Report should be made when the vessel is at any of the above reporting points and should include the following information:

1. Vessel name.
2. Call sign.
3. Present location, with reference to any of the above-designated reporting points.
4. Number of passengers and crew (passenger vessels only).
5. ETA at first destination in the port or name of the pilot boarding ground for vessels using the services of a pilot.
6. For vessels requiring a pilot on arrival:
   a. Name of the pilot boarding ground.
   b. ETA at the pilot boarding ground.
7. Height of vessel above waterline, if different from that provided in the Notification of Arrival Report.

Vessels approaching from a location not mentioned above must contact VTIS East or VTIS West, as appropriate, and

provide the vessel's position by bearing and distance from one of the following reference points:

Pulau Iyu Kechil	1˚11.5'N, 103˚21.2'E.
Sultan Shoal Light	1˚14.4'N, 103˚39.0'E.
Raffles Light	1˚09.6'N, 103˚44.6'E.
Sakijang Lighted Beacon	1˚13.3'N, 103˚51.4'E.
Bedok Light	1˚18.6'N, 103˚56.1'E.
Tanjung Setapa Light	1˚20.6'N, 104˚08.2'E.
Horsburgh Light	1˚19.8'N, 104˚24.4'E.

Vessels departing the port of Singapore must report to Port Operations on VHF channel 18.

Reporting requirements.—Vessels required to participate in the VTIS are also required to submit the following reports:

1. Notification of Arrival Report.
2. Clearance Report.
3. Arrival Report.
4. Underway Report.

Notification of Arrival Report.—Vessels of 500 grt and over should send this report to the Singapore Portmaster 12 hours before arrival, stating:

1. Vessel name.
2. Call sign.
3. Draft (in meters).
4. Height of highest point above waterline (in meters).
5. ETA (date, month, year, and time).
6. Direction from which vessel is approaching (E, W, or S).
7. Track-Chem Indicator (Y or N).
8. Slop/Sludge Indicator (Y or N).
9. Remarks (leave blank if not applicable).

Clearance Report.—This report is made by vessels arriving from sea before entering the port, by vessels maneuvering from a berth or anchorage to another location within the port, or by departing vessels. Vessels shall seek clearance from the appropriate Sector Control Station before entering the port or commencing the movement. The report will contain the following information:

1. Vessel name.
2. Call sign.
3. Present location.
4. Destination (location in port or bound for sea).
5. Draft.
6. Height.
7. Remarks, if any.

Arrival Report.—When a vessel has arrived at a berth or an anchorage either from sea or from another location in the port, the vessel shall report on VHF, as soon as practicable, to the appropriate Sector Control Station, as follows:

1. Vessels berthing alongside—the report contains the following information:
   a. Vessel name.
   b. Call sign.
   c. Arrival date and time.
   d. Name of the berth or location.

2. Vessels at anchor—the report contains the following information:
   a. Vessel name.
   b. Call sign.
   c. Arrival date and time.
   d. Name of the anchorage.
   e. Bearing and distance of vessel from one of the listed Position Reference Points, as follows:

Sector	Position Reference Point
Timor	Amber Lighted Beacon
Jurong	Rimau Lighted Beacon Sultan Shoal Light
Sembawang Control	Eastern Lighted Buoy

The clearance and arrival reports shall be made by VHF radiotelephone to the appropriate control station. For these reports the port has been divided into six sectors. Each sector has a Sector Control Station, which operates on a designated VHF channel.

All vessels at anchor should maintain a continuous listening watch on the VHF channel for the appropriate Sector Control Station, as follows:

Sector	Sector Control Station	VHF channel
Timor	Timor Control	12
Keppel	Keppel Control	18
Cruise Bay	Keppel Control	5
West Jurong	Jurong Control West	22
East Jurong	Jurong Control East	22
East Johor Strait	Sembawang Control	21

Underway Report.—After clearance has been granted under the Clearance Report, vessels shall report to Port Operations East or Port Operations West, as appropriate, when underway and entering the fairway. The report shall be made when abeam of any of the Reporting Points listed below, and shall contain the vessel's name, call sign, and present location.

Vessels make the report to Port Operations East on VHF channel 12 (back up channel is VHF channel 18) when E of longitude 103˚51.2'E, or to Port Operations West on VHF channel 68 (back up channel is VHF channel 18) when W of longitude 103˚51.2'E.

All underway vessels must maintain a continuous listening watch on VHF channel 12 or 68, as appropriate.

Reporting Points E of Longitude 103˚ 51.1'E	
Reference Point	**Position**
Airway Lighted Buoy	1˚17.7'N, 104˚01.2'E.
Lagoon Beacon	1˚16.6'N, 103˚57.5'E.
Forward Lighted Buoy	1˚16.1'N, 103˚56.0'E.

Reporting Points E of Longitude 103˚ 51.1'E	
Reference Point	**Position**
Rear Beacon	1˚17.4'N, 103˚55.1'E
Approach Lighted Buoy	1˚17.0'N, 103˚54.0'E.
Timor Beacon	1˚16.1'N, 103˚54.9'E
NE Corridor Lighted Buoy	1˚15.4'N, 103˚53.8'E.
Sirdhana Lighted Buoy	1˚14.7'N, 103˚52.7'E.
Outer Shoal Beacon	1˚15.0'N, 103˚51.9'E.
Ro Ro Lighted Buoy	1˚15.9'N, 103˚51.5'E
Buran Buoy	1˚15.1'N, 103˚51.0'E
Tembakul Lighted Beacon	1˚13.3'N, 103˚51.8'E.

Reporting Points W of Longitude 103˚ 51.1'E	
Reference Point	**Position**
Rimau Lighted Beacon	1˚15.6'N, 103˚48.5'E.
West Panjong Approach Buoy	1˚16.2'N, 103˚47.2'E.
Selegi Lighted Beacon	1˚13.6'N, 103˚49.7'E.
Sisters Lighted Buoy	1˚13.0'N, 103˚48.3'E.
Sebarok Lighted Buoy	1˚11.8'N, 103˚48.4'E.
East Cyrene Lighted Buoy	1˚15.6'N, 103˚45.9'E.
Pusing Lighted Buoy	1˚17.2'N, 103˚44.3'E.
Sawa Lighted Buoy	1˚15.1 N, 103˚44.0'E.
Serebut Lighted Beacon	1˚14.8'N, 103˚42.2'E.
Ajax Shoal Buoy	1˚13.7 N, 103˚39.8'E.
Salu Lighted Buoy	1˚12.5'N, 103˚40.6'E.
Esso No. 3 Buoy	1˚16.3 N, 103˚41.1'E.
Triton Lighted Beacon	1˚16.4'N, 103˚39.4'E.

In the event that the VTIS radar system is inoperable, vessels will also report, as appropriate, at the following reporting points:

Eastbound Vessels		
Reporting Point	**Station**	**VHF channel**
Racon D	VTIS West	73
Sakijiang Light	VTIS Central	14
Tanjung Setapa Light	VTIS East	10
Horsburgh Light	VTIS East	10

Westbound Vessels		
Reporting Point	**Station**	**VHF channel**
Tanjung Setapa Light	VTIS East	10
Sakijiang Light	VTIS Central	14

Westbound Vessels		
Reporting Point	**Station**	**VHF channel**
Raffles Light	VTIS West	73
Pulau Iyu Kechil	VTIS West	73

Caution

Several hovercraft are operating along the Singapore coast and in Johor Strait.

The Director of Marine, Singapore, advises that ships in Singapore Strait between the area W of **Sultan Shoal** (1˚14'N., 103˚39'E.) and **Horsburgh Light** (1˚20'N., 104˚24'E.) proceed at slow speed consistent with safe navigation standards in view of the traffic likely to be encountered. Engines should be ready to maneuver instantly.

Singapore Strait—West Part of South Shore

9.4 The **Karimun Islands** (1˚06'N., 103˚27'E.), on the S side of the W approach to Singapore Strait, have been previously described begining in paragraph 5.19. Little Karimun's N point lies about 9 miles SW of **Tanjong Piai** (1˚16'N., 103˚30'E.). Great Karimun extends about 33 miles Southward. Eastward of these islands is the N entrance to Elat Durian.

Pulau Nipa (Tree Island) (1˚09'N., 103˚40'E.) is the NW of a chain of islands extending about 5 miles in a NW and SE direction and forming the S side of Singapore Main Strait. The islet is 0.9m high and lies near the SE end of a coral reef which dries from 0.3 to 2.4m. A sand bank extends from the N side of the islet along the NE edge of the reef. There are a few trees on the reef. A light is shown from the NE side of the reef.

To keep in the fairway N of this shoal and S of the shoals lying SW of **Pulau Pawai** (1˚11'N., 103˚44'E.) keep Raffles Light on **Pulau Satumu** (1˚10'N., 103˚45'E.) between the bearings of 100˚ and 104˚.

About 8 miles NW of the NW extremity of Pulau Nipa is an area where the tidal currents from the various straits and channels in the vicinity converge. It is impossible to give the exact limits of the area; therefore, it must be treated with caution. The W entrance to Singapore Strait must be approached very carefully as a relatively small difference in position may mean a great difference in the direction and strength of the tidal current.

Kent Rocks (1˚09'N., 103˚41'E.), about 1.2 miles ESE of the light on Pulau Nipa, lie in a NW-SE direction from each other, about 0.5 mile apart. They are steep-to and their positions are usually marked by tidal rips. From the S rock, which is the larger of the two and has a depth of 2.3m, the center of Pulau Pelamburg is in range with the E extremity of Pulau Takong Besar, bearing 125˚, the former island distant 1 mile. The N rock has a depth of 1.2m.

Pulau Pelamburg (Red Islet) (1˚07'N., 103˚42'E.), a sandy 12.5m high islet located about 3 miles SE of Pulau Nipa, is about 119m long and 64m wide; it is a peculiar red color, with a few trees. The reef surrounding Pulau Pelamburg extends about 0.5 mile NW, with a breadth of about 0.2 mile.

Five small reefs, which uncover 0.6 to 0.9m, lie from 0.5 to 1.5 miles SW of Pulau Pelamburg. A wreck, with a depth of

21.5m, lies in Singapore Main Strait 1.3 miles NE of Pulau Pelamburg.

Pulau Takong Besar (1˚07'N., 103˚43'E.) is 26m high to the tops of the trees. The rock off the N end is 1.2m high, and a small detached reef lies about 183m SW of the SW edge of the surrounding reef.

Between Pulau Pelamburg and Pulau Takong Besar is a channel used by local vessels.

Pulau Takong Kecil (1˚06'N., 103˚43'E.), 25m high to the tops of the trees, is small, thickly overgrown, and lies about 0.5 mile SSE of Pulau Takong Besar. There is a red cliff, about 12m high, that rises at its S extremity. A light is shown from Pulau Takong Kecil.

The reef surrounding this islet is narrow on the E side, but is about 0.2 mile wide on the W and S sides.

A small detached reef is located about 183m from the shore reef on the S side; a lighted beacon stands on the reef. Two detached reefs lie N and NE from the islet at 0.2 mile distant; the E of these reefs is about 0.2 mile in extent.

9.5 Phillip Channel (1˚05'N., 103˚45'E.) lies between Pulau Takong Besar and Pulau Takong Kecil to the NW, and the numerous islands fronting Pulau Batam and Pulau Bulan to the SE. The channel is about 3 miles wide and lies within the deep water and general E traffic lane of the Singapore Strait Traffic Separation Scheme.

Tanjung Jernih (Steep Cape) (Tanjong Djernih) (1˚02'N., 103˚45'E.), the NW point of Pulau Kapalajernih, is 64m high, precipitous, and conspicuous; it forms the SE side of Phillip Channel.

Islets and rocks extend SW of Tanjung Jernih to **Pulau Jangkat** (Djangkat) (0˚58'N., 103˚43'E.), encumbering the N entrance to **Selat Combol** (0˚54'N., 103˚52'E.).

Pulau Cula (Tjupla) (1˚02'N., 103˚43'E.), in the S approach to Phillip Channel, about 3 miles WNW of Tanjung Jernih, is a bare rock of yellowish color, 11m high, with a flat top and perpendicular sides; it is surrounded by a reef to a distance of about 0.2 mile, with depths of 7.3 to 9.1m lying 0.3 mile off the islet. Vessels should not pass between it and Tanjung Jernih. A dangerous wreck lies about 0.5 mile E of the above islet. The islet is marked by a light.

Karang Tangah (1˚02'N., 103˚44'E.), located in the fairway between Pulau Cula and Tanjung Jernih, is 0.6 mile long in a N and S direction, about 0.1 mile wide, and dries.

The channel between Karang Tangah and Pulau Cula is deep but is not recommended; a dangerous wreck lies 0.5 mile E of Pulau Cula. A drying reef lies between Karang Tangah and Tanjung Jernih. An obstruction lies about 2 miles NE of Karang Tangah.

Pulau Pemping Besar (1˚06'N., 103˚48'E.), the largest of the NW islands of the **Bulan Archipelago** (1˚04'N., 103˚48'E.), and forming the E side of Phillip Channel, is about 2 miles long and fully 1 mile wide. It is composed of a number of moderately-elevated hills, with the greatest elevation being 60m high.

Several above-water rocks lie on the reef which encircles the island to a distance of 0.2 to 0.3 mile; a wooded rock lies close to its N extremity.

Pulau Labon (1˚06'N., 103˚47'E.), two small islets lying about 0.5 mile W of Pulau Pemping Besar, are connected to it by reefs; a detached reef about 0.5 mile long lies W of the islets. The larger N islet is fringed with mangroves, above which is a bare conical hill, 29m high.

A dangerous wreck is reported to lie about 0.7 mile W of the N islet.

A reef, about 0.2 mile in extent and which dries, lies almost 1.5 miles S of Pulau Labon, with another reef midway between; another reef lies about 0.5 mile off the NE extremity of Pulau Kapalajernih.

East of these reefs lies **Pulau Ampar** (1˚03'N., 103˚49'E.), 27m high, with **Pulau Kera** (1˚04'N., 103˚48'E.) on the W extremity of the former island's reef. A rock, which dries, lies about 0.5 mile farther W. A great number of islets and rocks lie NE of the above, and can best be seen on the chart.

9.6 Helen Mar Reef (1˚07'N., 103˚46'E.), marked by a light, is the outer and NW of the dangers which lie off the NW end of Pulau Batam and the turning point from Phillip Channel into Singapore Main Strait for eastbound vessels. The reef consists of two drying patches; both are steep-to and lie within the 20m curve. A wreck, the hull or superstructure of which is visible, was reported at Helen Mar Reef in 2003.

A coral patch with a depth of 1.3m lies about 0.3 mile SSE of Helen Mar Reef; drying reefs lie between the 1.3m coral patch and Pulau Pemping Besar to the SE. A rock, with a depth of 0.9m, lies about 1.2 miles E of Helen Mar Reef.

Djantan (Jantan) (1˚06'N., 103˚22'E.), the 437m high S peak on Pulau Karimunbesar, in range with Pulau Pelamburg bearing 266˚, leads about 0.4 mile N of Helen Mar Reef; Tanjong Jernih, bearing 190˚, leads the same distance W.

Pulau Nirup (1˚08'N., 103˚50'E.), with a flat hill 47m high, lies about 2 miles NE of Pulau Pemping Besar.

Kapal Islets (1˚08'N., 103˚50'E.), from 13.1 to 36m high, lie about 0.7 mile NE of Pulau Nirup; farther NE is Pulau Belakangpadang.

A flat with depths of less than 5.5m extends about 0.7 mile W of Pulau Nirup. The drying reef N of Pulau Nirup extends to a distance of about 0.2 mile.

Pulau Subar (1˚09'N., 103˚50'E.), a rock 18.3m high, lies just N of the Kapal Islets, within the 20m curve fronting the above islands.

Buffalo Rock (1˚09'N., 103˚49'E.), marked by a lighted beacon, 1.5m high, with a patch which dries 0.6m about 91m S of it, lies about 1.3 miles NW of Pulau Subar, well out toward the fairway of Singapore Main Strait. There is a depth of 17m about 2 miles NW of Buffalo Rock.

Pulau Tolop (Pulau Telup) (1˚10'N., 103˚52'E.) and Pulau Senang, encircled by the same common reef, lie about 0.5 mile off the W coast of Pulau Belakangpadang.

Caution.—Submerged dangers lie up to 0.5 mile NW of the islands. A dangerous reef, extending about 0.2 mile in a NE and SW direction, lies about 0.5 mile W of Pulau Telup.

Depths of 10.5m lie close to the reef on its W and SE sides, but near the N and S ends of the reef are depths of 0.7 to 4.1m.

9.7 Pulau Belakangpadang (1˚09'N., 103˚53'E.), 30m high and about 2 miles in diameter, is the largest of the islands on the S side of Singapore Main Strait and fronts the entrance of **Selat Bulan** (1˚09'N., 103˚55'E.).

The island is generally low, covered with jungle, and encircled by a reef which projects nearly 0.5 mile in places.

It is separated from **Pulau Sambu** (1˚10'N., 103˚54'E.) to the E by Sambu Road, a channel about 0.5 mile wide, which has depths of 13.7 to 29m and is described in paragraph 9.8.

The N entrance of Selat Bulan lies between Pulau Miriam and Tanjung Pinggir. The fairway lies on the W side of the entrance and is clear of the dangers off Tanjung Pinggir.

There is a pier on the E side of Pulau Belakangpadang, about 183m long, with a T-head about 33m long.

A detached reef, marked at its N end by a light, lies close N of the encircling reef that contains Pulau Belakangpadang. A depth of 11.4m lies about 0.2 mile NE of the detached reef.

Indonesian quarantine and immigration stations are located on Pulau Belakangpadang. Vessels requiring inspection for entry into Indonesian ports in the area may receive such inspection here.

Tanjong Pinggir (1˚08'N., 103˚55'E.), the NW extremity of Pulau Batam, is the E side of the N entrance of Selat Bulan. The point is easily identified by a 47m high bare conical hill.

Detached drying reefs and foul ground extend up to 0.6 mile NW of Tanjung Pinggir and encumbers the E side of the N entrance of Selat Bulan.

A small reef, with a least depth of 1.8m, lies about 0.5 mile N of Tanjung Pinggir.

9.8 **Sambu Road** (1˚10'N., 103˚53'E.) lies between the islands of Anaksambu, Sambu and Mariam on the NE and Pulau Belakangpadang and Pulau Lengkana on the SW.

The road has a least width of about 0.2 mile between Pulau Sambu and Pulau Belakangpadang, and extends in a NW and SE direction for about 2 miles.

Anchorage.—Vessels arriving at night should anchor off the NE side of Pulau Sambu, in 20 to 35m. Large vessels awaiting a berth should anchor about 0.8 mile WSW of the light on Batu Berhanti, in a depth of about 42m.

Except for Government and small local vessels, all navigation and fishing within the limits of the roadstead is prohibited at night between 2100 and 0600.

A prohibited anchorage area, best seen on the chart, lies S of Batu Berhanti.

Vessels should not enter or leave at night, as the current is strong and full of eddies.

Batu Berhanti (1˚11'N., 103˚53'E.) are two rocky ledges about 0.2 mile apart, the centers of which are above-water. A light, shown from a conspicuous structure, stands on the W rocky ledge of Batu Berhanti.

A depth of 2.5m lies about 0.2 mile NE of the W rock of Batu Berhanti. Within about 0.2 mile NW and SE of the same rock are depths of 5.5 to 8.8m.

A bank, about 4 miles long, lies E of Batu Berhanti, with depths varying from 8.2 to 18.3m.

A shoal bank, as defined by the 30m curve, extends about 1 mile NNW of Batu Berhanti. Least depths of 13.7 to 14.9m are found on the outer part of the shoal.

9.9 **Pulau Anaksambu** (1˚10'N., 103˚54'E.), about 0.3 mile long, lies about 0.7 mile SSE of Batu Berhanti. Karang Sambu extends about 0.5 mile NW of Pulau Anaksambu; about 0.2 mile further NW is a 6.5m shoal with a dangerous wreck at its SE end.

Pulau Sambu (1˚10'N., 103˚54'E.), about 0.3 mile SE of Pulau Anaksambu, is fringed by a reef, except on its SW side. The port of Sambu is described in paragraph 9.10.

Pulau Mariam (1˚09'N., 103˚54'E.), an islet marked by a light, lies about 0.2 mile S of Pulau Sambu.

Foul ground and three drying patches lie in the fairway between Pulau Mariam and Tanjung Pinggir. A reef extends from the N and NE sides of Pulau Mariam. A depth of 6.5m lies close S of the island.

Depths of 3.2 to 7.5m lie 0.8 mile SW and 0.6 mile SSW, respectively, of the island.

Caution.—Owing to the strong tidal currents which prevail in this part of the strait, and the rocky and uneven nature of the bottom, violent eddies and overfalls are usually encountered, it is therefore advisable to keep on the N side of the strait.

Sambu (1˚10'N., 103˚54'E.)

World Port Index No. 50060

9.10 The terminal and its facilities are situated on the SW side of Pulau Sambu. Vessel movements are limited to daylight hours. The terminal usually takes one tanker at a time and therefore it is unlikely tankers will meet outbound vessels with this arrangement.

Winds—Weather.—The terminal may be affected by sudden heavy squalls, usually occurring during the night.

Tides—Currents.—Tidal currents generally parallel the wharves. The flood current sets NW while the ebb current sets SE; velocities may reach 2 to 3 knots.

An eddy extends along the SW side of Pulau Sambu, occasionally being felt as far as the SE extremity of the island.

Depths—Limitations.—Pier facilities, which are described below, are situated on the SW side of Pulau Sambu.

The Dolce Berth has a depth alongside of 40m. It is used for oil and can accommodate vessels up to 120,000 dwt, with a maximum vessel length of 175m.

Berth No. 1 has a depth alongside of 10.5m. It is used for oil and can accommodate vessels up to 29,000 dwt, with a maximum vessel length of 270m.

Berth No. 2 has a depth alongside of 11.3m. It is used for fresh water and can accommodate vessels up to 400 dwt, with a maximum vessel length of 56m.

Berth No. 3 has a depth alongside of 10.6m. It is used for oil and can accommodate vessels up to 6,500 dwt, with a maximum vessel length of 125m.

Berth No. 4 has a depth alongside of 5.6m. It is used for oil and can accommodate vessels up to 400 dwt, with a maximum vessel length of 270m.

Berth No. 5 has a depth alongside of 3m. It is used for general cargo and fresh water. It can accommodate vessels up to 200 dwt, with a maximum vessel length of 31m.

Aspect.—Numerous petroleum storage tanks are conspicuous from various directions. A flagstaff stands on a hill about 0.2 mile from the SE end of Pulau Sambu. A beacon stands on a reef at the SE end of the island.

Radar ranges obtained from Pulau Sambu and surrounding islands should be regarded with caution since all the islands are surrounded by drying reefs.

Pilotage.—Pilotage is compulsory. Pilots require 6 hours notice of arrival and 3 hours notice of departure.

The pilot vessel flies a blue flag with a white star and meets vessels about 0.8 mile WSW of Batu Berhanti.

Pilots are forbidden to proceed during thick or foggy weather or when navigational marks are not visible. Berthing and unberthing are permitted during daylight hours only.

Signals.—The following signals are shown for vessels requiring a pilot.

1. By day—Flags "UC," International Code, pilot jack, or the vessel's national flag at the fore.
2. By night—A blue light every 15 minutes or a white light shown over the stern at short frequent intervals for about 1 minute at a time.

The above signal should be made only until the pilot is onboard.

Anchorage.—For information, see Sambu Road in paragraph 9.8.

Directions.—When approaching from the W, steer for the middle of the entrance to Sambu Road bearing 141˚. If approaching from the E, steer to pass N of Batu Berhanti, and then for the entrance as directed for a vessel approaching from the W.

The channel between Pulau Anaksambu and Pulau Sambu is suitable only for small craft.

Caution.—Due to the reclamation of land, Temasek Fairway must be traversed to access West Jurong Channel. The fairway lies between Sultan Shoal Light on the W and Jurong Island on the E.

West Jurong Channel

9.11 Tanjong Gul (1˚17.7'N., 103˚39.9'E.) is a fairly high bluff, steep-to from seaward, and generally sloping gradually toward the interior. It is covered with timber, though there has been some attempt at clearing on the E slope. Two radio towers stand about 4 miles N of the point.

Long Shoal (1˚17'N., 103˚39'E.) lies on the N side of West Jurong Fairway about 0.4 mile SW of Tanjong Gul. A least depth of 1m lies over an obstruction situated on the shoal. The shoal is marked close NE by a lighted buoy.

From Tanjong Gul, the coast extending E to **Sungi Pandan** (1˚18'N., 103˚45'E.), a distance of about 6 miles, consists of mangrove swamps, backed by hills 30 to 61m high and fronted by reefs, on which lies Pulau Samulun and Pulau Damar Laut, both of which are described later.

Gul Channel (1˚18'N., 103˚40'E.), a basin with general depths of 4.3 to 6m, lies close ENE of Tanjung Gul. Repair berths, with alongside depths of 7 to 10m, occupy the NE side of the basin. There are also two dry docks, the largest of which can accommodate vessels up to 300,000 dwt. The controlling depth of the fairway approaching the berths is 5.8m

Benoi Basin (1˚18'N., 103˚41'E.), whose depths are best seen on the chart, lies close E of Gul Channel.

The **Exxon/Mobil Asia Pacific** (1˚17.9'N., 103˚41.3'E.) oil depot is close E of Benoi Basin. The tidal rise at the oil depot is 3.4m at springs and 0.6m at neaps. The currents parallel the pier faces with the ebb flowing E and the flood flowing W.

Depths—Limitations.—The T-head pier provides four berths, while an L-head pier provides two berths, the locations of which can best be seen on the chart, as follows:

1. Berth No. 1 is 360m long, with an alongside depth of 13.1m. It can accommodate vessels up to 120,000 dwt.
2. Berth No. 2 is 270m long, with an alongside depth of about 12.8m. It can accommodate vessels up to 50,000 dwt.
3. Berth No. 3 is 270m long, with an alongside depth of 11.9m. It can accommodate vessels of 50,000 to 30,000 dwt.
4. Berth No. 4 is 145m long, with an alongside depth of 9.4m, although caution is necessary as an obstruction, with a charted depth of 7.4m, lies close N of the berth. The berth can accommodate vessels up to 5,000 dwt.
5. Berth No. 5 is situated on the NE extremity of Pulau Pesak, on the S side of Selat Jurong. The berth is 300m long; it has an alongside depth of 14.8m and can accommodate vessels up to 50,000 dwt.
6. Berth No. 6 is 130m long, with an alongside depth of 7.7m.
7. Berth No. 7 situated about 0.4 mile W of Berth No. 6 is 286m long, with an alongside depth of 14.7m.
8. Berth No.8 is 132m long, with an alongside depth of 14.0m.
9. Berth No. 9 is 132m long, with an alongside depth of 12.5m.

9.12 Pulau Samulun (1˚18'N., 103˚42'E.), 21m high, lies E of the Exxon/Mobil Asia Pacific oil depot. The Jurong Shipyard is situated at the S end of Pulau Samulun. The facilities include a dry dock, 270m long and 40m wide, that will accommodate vessels up to 90,000 dwt, and a newer dry dock, 350m long and 56m wide, that will accommodate vessels up to 300,000 dwt. There is also a floating dry dock of 2,000 tons lifting capacity.

Jurong Shipyard Pte Limited

http://www.jspl.com.sg/index.htm

East Jurong Channel

9.13 Pulau Damar Laut (1˚18'N., 103˚43'E.), 17m high, lies about 1 mile E of Pulau Samulun. A causeway joins Pulau Damar Laut with Jurong Island separating West Jurong Channel from East Jurong Channel. A prominent chimney, which sometimes shows a flare, stands about 2 miles WNW of Pulau Damar Laut; another chimney, marked by obstruction lights, stands 0.8 mile NNW of the same island.

The S side of Pulau Damar Laut is composed of a continuous quay, consisting of six berths, each with a depth of 18m alongside. A directional light stands close to the E of the easternmost berth.

Port Jurong (1˚18'N., 103˚44'E.), abreast the NE side of Pulau Damar Laut, has a total berthing length of 1,517m, with alongside depths of 6.4 to 13m. The Pulau Damar Laut Basin,

which lies adjacent to Port Jurong, has a dredged depth of 13.3m (2002).

Port Jurong Home Page

http://www.jp.com.sg

The **Sungai Jurong** (1˚18'N., 103˚44'E.), entered close E of Port Jurong, is the designated fishing harbor, and has a least depth of about 3.4m in the fairway. Many oil pipelines, best seen on the chart, lie in Selat Jurong.

The **GATX Terminal** (1˚17.8'N., 103˚43.8'E.), a T-head wharf, lies SE of the entrance to the Sungai Jurong. Berth 1 and Berth 2, with alongside depths of 14m, can accommodate vessels up to 85,000 dwt, with a maximum length of 180m. Berth 3, with an alongside depth of 13.7m, can accommodate a vessel up to 5,000 dwt, with a maximum length of 116m.

The **Caltex Singapore Terminal** (1˚17.7'N., 103˚44.3'E.), which consists of five sets of breasting dolphins, with a total of seven berths, is close SE of the GATX Terminal. Berth 1, with an alongside depth of 13.6m, can accommodate vessels up to 100,000 dwt, with a maximum length of 335m. Berth 2, with an alongside depth of 15.3m can accommodate vessels up to 132,000 dwt, with a maximum length of 300m. The remaining berths are best seen on the chart. The controlling depth of the fairway approaching the berths is 12.8m.

Caltex Singapore has installed a real-time current meter to give indication of tidal strength at the time of berthing activities.

The **Sungai Pandan** (1˚18'N., 103˚45'E.) is entered close E of Tanjung Penura. The coast for 2 miles S and E of the Sungai Pandan is fronted by drying sand banks, and sometimes marked by pile beacons, extending up to 1 mile offshore.

East of these sand banks, the coast trends 2 miles SE to **Tanjong Berlayar** (1˚16'N., 103˚48'E.).

A tower stands about 0.2 mile NW of Tanjong Berlayar.

9.14 Pasir Panjang Terminal (1˚16.6'N., 103˚46.8'E.) has 2,000m of berthing space, with alongside depths of 6.9 to 11m, between Berth P1 through Berth P8. The controlling depth of the fairway approaching the berths is 11.5m.

Pasir Panjang Terminal

http://www.psa.com.sg/container/5-4.html

Jurong Island

9.15 Jurong Island is formed by reclaimed land. At one time it consisted of six islands (Pulau Pesek, Pulau Ayer Chawan, Pulau Merlimau, Pulau Seraya, Pulau Ayer Merbau, and Pulau Sakra). A causeway now bisects Selat Jurong, connecting Jurong Island with Singapore, forming West Jurong Channel and East Jurong Channel.

Regulations.—A prohibited area encircles Jurong Island. All vessels are restricted and prohibited from entering, anchoring, mooring, transiting or being in the area for any other purposes unless specific approval had been obtained from the Port Master. In granting approval, the Port Master may impose further time or location specific restrictions and conditions.

The oil wharf situated on the N side of Jurong Island W of Pesek Basin is part of the Exxon/Mobil Asia Pacific complex and has been previously described in Benoi Basin in paragraph 9.11. Another T-headed pier, with an alongside depth of 14.7m, extends NW close W of the Exxon/Mobil piers.

Three T-headed jetties are situated on the NE corner of Pesek Basin, with 10 to 15m alongside.

The **Esso Refinery** (1˚16.8'N., 103˚41.5'E.), a bunkering terminal, is situated on the S side of Pesek Basin. The tidal range at the terminal is 2.1m at springs and 0.9m at neaps.

A jetty provides six berths, five of which are T-head projections. Each berth is capable of stern loading to conventional service.

The berths are numbered from S to N; limiting dimensions are given below:

1. Berth No. 1, with a length of 110m and a depth alongside of 9.0m, accommodates vessels up to 35,000 dwt.
2. Berth No. 2, with a length of 198m and a depth alongside of 12.5m, accommodates vessels up to 25,000 dwt.
3. Berth No. 3, with a length of 244m and a depth alongside of 12.6m, and accommodates vessels up to 48,000 dwt.
4. Berth No. 4, with a length of 305m and a depth alongside of 15.7m, accommodates vessels up to 80,000 dwt.
5. Berth No. 5, with a length of 305m and a depth alongside of 15.4m, accommodates vessels up to 90,000 dwt.
6. Berth No. 6, with a length of 210m and a depth alongside of 13.6m.

The **Singapore Refining Company** (1˚17.6'N., 103˚43.0'E.), situated at the head of East Jurong Channel, and the N side of Jurong Island, has a T-headed pier extending about 0.3 mile N.

Singapore Refining Company—Berthing Limitations (2004)

Berth	Length of berth	Depth alongside	Controlling depth in approaches
1	290m	15.7m	-
2	290m	15.4m	-
3	160m	10.7m	9.8m
4	50m	8.8m	-
5	115m	10.9m	7.3m
6	110m	11.4m	-
7	228m	12.4m	-

Power Seraya Pier (1˚17.1'N., 103˚43.5'E.), a T-headed oil pier, extends about 0.2 mile NE, from the NE side of the island. The controlling depth in the approach is 12.8m. **Oil Tanking Limited Pier** (1˚16.8'N., 103˚44.1'E.) lies close SE of the power company pier. **Seraya Chemical Pier** (1˚16.2'N., 103˚44.1'E.) is situated on the SE side of the easternmost point

of Jurong Island. Berthing information is given in the accompanying table.

Oil Tanking Limited Home Page

http://www.oiltanking.com/singapor.htm

Berthing Facilities (2004)			
Berth	**Length**	**Depth**	**Remarks**
Power Seraya Pier			
1	260m	14.8m	Maximum vessel length of 250m
2	200m	12.6m	Maximum vessel length of 250m
Oil Tanking Limited Pier			
MJ1	140m	15.2m	E side Jurong Island
MJ2	384m	15.5m	
MJ3	124m	13.7m	
MJ4	312m	14.6m	
MJ5	140m	12.8m	
MJ6	180m	12.4m	
11	235m	14.4m	SE side Jurong Island
12	226m	13.4m	SE side Jurong Island
Seraya Chemical Pier			
1	171m	15.1m	Maximum vessel length of 162m
2	220m	15.7m	Maximum vessel length of 216m
Sempec Terminal			
1		13.6m	WSW of Van Ommeran Terminal; has a T-head pier.

9.16 Sakra Basin (1˚16'N., 103˚43'E.), has been established on the S coast of the island; berthing facilities are described below:

1. Berth No. 1 has a depth alongside of 2.5m and is used by barges.
2. Berth No. 2, with an alongside depth of 9.5m, can accommodate vessels up to 165m long.
3. Berth No. 3, used by tankers, has an alongside depth of 8.6m and can accommodate vessels up to 130m long.
4. Berth No. 4 and Berth No. 5 are used by tankers. They each have a depth alongside of 11.8m and can accommodate vessels up to 140m long.

Selat Sinki

9.17 Selat Sinki (1˚15'N., 103˚44'E.) is the deep channel by which **Keppel Harbor** (1˚16'N., 103˚51'E.) is approached from the Strait of Malacca; it is bounded on either side by islands and reefs.

Between Sultan Shoal and Cryene Reef, the channel is about 7 miles long, at its E and narrowest part, it is about 0.5 mile wide, with irregular depths of 12.8 to 29.3m.

Vessels going both to and from Europe now use Selat Sinki as the direct route. The channel is available at all times, but night navigation requires local knowledge.

The maximum velocity of the current is 3 knots; the flood current sets W and the ebb current sets E.

Pilotage is compulsory; see paragraph 9.2 for further information.

Sultan Shoal (1˚14'N., 103˚39'E.), circular and about 0.7 mile in diameter, lies on the N side of the W entrance to Selat Sinki; a short pier extends NE from the lighthouse that stands on the shoal. Close W of the shoal are depths of 5.5 to 7.3m, but the E side of the shoal is steep-to.

A light, which is equipped with a racon, is shown from a tower rising from a small dwelling. A wreck, with a depth of 9.3m, lies about 0.3 mile SE of Sultan Shoal.

The N shore of Selat Sinki is formed by Jurong Island.

Terumbu Serebut (1˚15'N., 103˚42'E.), a drying reef, lies about 0.6 mile S of the S side of Jurong Island. The S side of the reef is marked by a lighted beacon.

Cyrene Reefs (1˚15'30"N., 103˚45'00"E.) lie 0.9 miles SE of Jurong Island. The reefs are about 1 mile in extent, consisting of four patches partly drying at LW, with deep water around them. Shoal depths within and in the vicinity of the reef may best be seen on the chart.

Esso/Mobil SBM(1˚14'N., 103˚41'E.), a spherical lighted buoy, 12m in diameter, is connected to the SW side of Jurong Island by a pipeline extending about 3.2 miles SSW from the island. The controlling depth in the approach is 21m. Vessels up to 285,000 dwt can be accommodated. The mooring has a 457m swing radius.

PSA SPM (1˚13'N., 103˚40'E.) lies about 2 miles SW of Esso/Mobil SBM. The controlling depth in the approach is 22.8m. Vessels up to 320,000 dwt can be accommodated.

Mariners are advised to give a wide berth when passing this area at slow speed consistent with safe navigation.

Directions.—Raffles Light, standing on Pulau Satumu, both of which are described in paragraph 9.21, bearing 248˚, leads S of all dangers off the N shore of Singapore Main Strait situated E of Raffles Light.

Raffles Light bearing 101˚ leads in the best water W of the light, between the 8.5m and 10.5m patches on either side.

Caution.—The narrowest part of Singapore Main Strait is S of Raffles Light, where it is 1 mile wide. Vessels with a draft of up to about 19.8m can navigate in this area.

9.18 Pulau Salu (1˚13'00"N., 103˚42'30"E.), a small islet on a reef about 0.5 mile in extent, forms the SW side of the W entrance, and is steep-to.

Pulau Busing (1˚14'N., 103˚45'E.), about 10.4m high, lies nearly 2.5 miles NE of Pulau Salu; it is a small islet covered with mangroves and surrounded by a reef. The oil piers on the N side of the island(P.B. Tankers Limited), consists of five berths, with depths of 12.5 to 17.0m alongside, that can accommodate a vessel up to 360m long.

Drying reefs lie up to about 0.1 mile NW and about 0.2 mile WSW of the island.

Pulau Hantu (1˚13'30"N., 103˚45'03"E.), 19m high, lies about 0.5 mile SSE of Pulau Busing. Drying reefs extend up to 1.8 miles WNW of the island.

9.19 Pulau Bukom (Bukum) (1˚14'N., 103˚46'E.) (World Port Index No. 50010) bounds the S side of the E entrance to Selat Singkeh; its N extremity, which borders the channel, lies about 1 mile ENE of Pulau Busing. The island, about 1.2 miles long, is 40m high near its S end and fringed by a reef.

Tides—Currents.—During the E current in Selat Sinki, an eddy forms along the NE side of Pulau Bukom. The inshore current sets NE for most of the time, and sets SE only from 1 hour after the main current in Selat Sinki turns E until about the time of maximum E current. Tidal ranges are 2.4m at springs and 1m at neaps.

Depths—Limitations.—The NE side of the island is almost entirely fronted by deep water oil berths. Berthing information for the Shell Refinery is given in the accompanying table.

The berths are easy to approach at slack water, but currents are often experienced at other times and care is necessary when berthing.

Pulau Bukom—Berthing Limitations

Berth	Maximum vessel length	Depth alongside	Vessel size
1	90m	12.3m	33,000 dwt
2	150m	11.3m	33,000 dwt
3	170m	11.6m	33,000 dwt
4	170m	11.8m	43,000 dwt
5	170m	12.8m	45,000 dwt
6	245m	15.7m	135,000 dwt
7	200m	13.3m	65,000 dwt
8	240m	13.8m	84,000 dwt
9	170m	13.1m	33,000 dwt
10	245m	16.0m	84.000 dwt
10A	Ferries/tugs	3.9m	—
10B	60m	6.1m	—
10C	90m	6.0m	—
11	100m	5.5m	—
12	110m	13.0m	—

Aspect.—A water tower stands about 0.5 mile NW of the SE end of the island. Range lights stand on the NW end of the island.

A conspicuous house, with a cupola and a red roof, stands on the SE peak of the island. A conspicuous flare stands close S of Berth No. 7. A prominent 83m high chimney stands near the center of the island. A number of conspicuous tanks stand on the N part of the island.

Drying rocks and reefs, best seen on the chart, lie NE of the berths. Drying rocks and reefs also lie from 0.2 mile SE to 0.2 mile SSW of the SE point of Pulau Bukom.

Regulations.—A restricted area encircles Pulau Bukom, Pulau Bukom Kechil, Pulau Ular and Pulau Busing. All vessels are restricted and prohibited from entering, anchoring, mooring, transiting or being in the area for any other purposes unless specific approval had been obtained from the Port Master. In granting approval the Port Master may impose further time or location specific restrictions and conditions.

Caution.—Heavy cross traffic may be encountered NE of Pulau Bukom, at the intersection of Selat Sinki, Jong Fairway, and West Keppel Fairway.

9.20 Pulau Ular (1˚13'04"N., 103˚45'27"E.) and **Pulau Bukom Kechil** (1˚13'45"N., 103˚46'00"E.) lie between Pulau Bukom and Pulau Busing to the W, but are of no importance to navigation.

A group of islands, described below, lies to the S of Selat Sinki; those bordering the strait have been described with it.

They are separated by deep water, but so encumbered with reefs as to render them unavailable for anything but small craft.

Pulau Sudong (1˚12'24"N., 103˚43'48"E.), with a treetop height of about 32m, lies about 2 miles ESE of Pulau Salu, on the E end of an extensive drying reef.

A wreck, with a depth of 1.1m and marked by a buoy, lies about 0.6 mile N of the E end of the island. A drying reef, marked at its W end by a buoy, lies 0.3 mile SE of the wreck.

Monggok Gerita, a rock with 1.8m and marked by a lighted beacon, lies about 0.5 mile NW of the wreck.

Caution.—A military maneuver area is situated in the W part of Selat Pauh, close NNE of Pulau Sudong. The area is closed to vessel traffic during military maneuvers.

A mooring buoy, best seen on the chart, has been inserted in Pauh Strait.

9.21 Pulau Pawai (1˚11'18"N., 103˚43'36"E.), 0.8 mile in extent and fringed by reefs, lies about 1 mile S of Pulau Sudong. The summit is conspicuous, being bare, except for a clump of trees, the tops of which are about 62m high on the W side of the islet.

Several detached reefs lie in the channels around the islet, the largest being a drying reef midway between Pulau Sudong and Pulau Pawai.

Pulau Senang (1˚10'18"N., 103˚44'18"E.), about 0.5 mile SE of Pulau Pawai, is about 1 mile in extent, 48m high at its S extremity, and covered with trees. A 6.4m shoal lies about 0.4 mile WNW of the W end of the islet.

Pulau Biola (1˚09'54"N., 103˚44'37"E.) lies about 0.2 mile SE of the SE end of Pulau Senang and is fringed by a reef extending as much as 0.2 mile to the NE. It is about 137m long in a general N to S direction and about 21m high.

Pulau Satumu (1˚09'36"N., 103˚44'33"E.) is the S islet of the group and borders Singapore Main Strait; it lies about 0.2 mile SSW of Pulau Biola. There is a small pier for the use of the lighthouse staff on its E side.

Raffles Light is shown from a lighthouse on Pulau Satumu; prominent clumps of trees cover the island, but the lighthouse is visible above the trees.

Regulations.—A restricted area, 300m in radius centered on Raffles Light, encircles Pulau Satuma. All vessels are prohibited from entering, anchoring, mooring, transiting, or being in the area unless specific written approval had been ob-tained from the Port Master. In granting approval, the Port Master may impose further time or location specific restrictions and conditions.

Caution.—A steep-to reef, with a sunken rock close off its S end, extends about 183m offshore from the lighthouse.

9.22 Pulau Semakau (1˚12'30"N., 103˚45'45"E.), 27m high to the tops of the trees and about 1 mile in extent, lies near the center of the islands.

The island is separated from the adjacent islands by narrow channels of deep water, encumbered with shoals. The vegetation is mangroves and coconut palms. A village, which is the best landing place, is on the SW point of the island.

Other houses stand on the W shore of the island. The SE extremity of the island is marked by a lighted beacon.

Pulau Semankau is surrounded by drying reefs. Three drying reefs, each marked by a lighted beacon, lie 0.5 mile SE, about 0.7 mile S, and about 0.6 mile SSW of the SE point of the island. Other drying reefs and submerged dangers lying N of a line joining Pulau Biola and Pulau Sebarok can best be seen on the chart.

Pulau Sakeng (1˚12'30"N., 103˚46'42"E.), 32m high to the tops of the trees, lies between Pulau Semakau and Pulau Sebarok to the E and is surrounded by reefs. The island is almost completely surrounded by mangroves and covered with jungle. The land generally is very low. There are a few coconut palms close to the N end of the island.

Shell SBM (1˚11'N., 103˚47'E.) lies about 1.2 miles SE of Pulau Sakeng. A submarine pipeline extends to Pulau Bukom Kechil. The SBM, which has a controlling depth of 23m, can accommodate tankers up to 350,000 dwt.

9.23 Pulau Sebarok (1˚12'24"N., 103˚47'45"E.), the easternmost island of the group, is about 0.4 mile long and about 17m high.

The island is fringed by a reef which extends about 0.3 mile from its SE extremity; fish stakes stand on the SE edge of the reef. An obstruction, with 17.8m, lies about 0.5 mile SE of the SE end of the island. A detached reef about 0.2 mile long and drying in places lies parallel to the SE side of Pulau Sebarok and 0.1 mile offshore.

Tides—Currents.—The tidal current off Pulau Sebarok sets NW and SE, with a maximum velocity of 2.5 knots at springs.

Van Ommeren Terminal (1˚12.3'N., 103˚47.8'E.), an oil facility on the NE side of Pulau Sebarok, has five piers. Vessels are berthed during daylight hours only. Berthing limitations are, as follows:

1. Berth No. 3 has a depth of 16.9m alongside and can accommodate vessels with a maximum length of 320m.
2. Berth No. 4 has a depth of 12.9m alongside and can accommodate vessels with a maximum length of 220m.
3. Berth No. 5 has a depth of 17.6m alongside and can accommodate vessels with a maximum length of 260m.
4. Berth No. 6 has a depth of 10.3m alongside and can accommodate vessels with a maximum length of 110m.
5. Berth No. 7 has a depth of 10.1m alongside and can accommodate vessels with a maximum length of 110m.

Pulau Sebarok Slop Reception Center (1˚12.5'N., 103˚47.7'E.) is a concrete pier situated off the NE side of Pulau Sebarok; from its head arms extend NW and SE to form three dolphin berths. Pier 1, with a controlling depth of 12.8m, can accommodate vessels up to 65,000 dwt, with a maximum length of 174m. Pier 2, with a controlling depth of 11.7m, can accommodate vessels up to 26,000 dwt, with a maximum length of 264m. The barge pier has a controlling depth of 5.2m and a length of 72m.

These berths are used for tank cleaning and the admission of slops from oil tankers; no other facilities are available. Ships are berthed during daylight hours only.

Pulau Jong, about 23m high to the tops of the trees, lies about 0.5 mile NW of Pulau Sebarok. A reef, marked at its SE extend by a lighted beacon, extends about 0.4 mile SE from the island.

The Sisters (1˚13'N., 103˚50'E.), lying about 2.2 miles ENE of Pulau Sebarok, is composed of Pulau Subar Darat, the N island, and Pulau Subar Laut, the S island. The islands are surrounded by reefs to a distance of about 183m; close to the edges are irregular depths of 9.1 to 16.5m.

Pulau Subar Darat, about 27m high to the tops of the trees, is steep-to, cliffy, and covered with rock and small jungle; Pulau Subar Laut is about 21m high to the tops of the trees.

The channel between The Sisters and the islands to the E is deep and free of known dangers. Mariners are warned of frequent ferry crossings in the approaches to Sisters Fairway.

The use of this channel is not recommended during the flood current and should never be used by low-powered vessels.

A shoal area, with depths under 18.3m, extends about 1.7 miles W of The Sisters; on the S edge is a shoal nearly 1 mile long with a least depth of 3m charted in several places. A shoal, with a depth of 10.7m, lies about 1 mile SE of Pulau Subar Laut.

9.24 Terumbu Selegi (1˚13'36"N., 103˚49'36"E.), a coral reef which dries 0.6m, and is about 183m in extent, lies about 0.7 mile NW of Pulau Subar Darat.

Depths of 5.5 to 11m lie within about 0.1 mile N and SE of the reef. A light stands on the E side of the reef.

Selat Pauh (1˚13'N., 103˚44'E.), an anchorage, is situated N of Pulau Sudong. Within the anchorage are several dangers best observed on the chart.

Regulations.—A Traffic Separation Scheme has been established by the local authorities for Sinki Fairway, which leads through Selat Sinki, and may best be seen on the chart.

Vessels should take note that a Precautionary Area encompasses almost the entire S lane of the scheme.

The regulations governing traffic within the scheme are, as follows:

1. All vessels intending to proceed W to Sultan Shoal area via Sinki Fairway shall as far as practicable, join the outward lane which commences at the E extremity of Selat Pandan.
2. Vessels when using the Precautionary Area are to navigate with caution as there may be vessels berthing or unberthing at Pulau Busing Terminal or deep draft vessels navigating against the recommended direction of traffic flow.

3. Deep draft vessels proceeding W and unable to proceed via the outward lane (Selat Pandan) due to insufficient depth of water may proceed via the Precaution-ary Area.

In addition, such vessels should inform Jurong Control on VHF channel 22 of their intention before entering the Precautionary Area or immediately before unberthing from the Esso SBM as the case may be. This information would be conveyed to other vessels using the Sinki Fairway.

4. Vessels navigating in the Sinki Fairway are advised to establish communications with Jurong Control and report their intended movements so that other users of the fairway may be kept informed. They are also advised to navigate with caution and avoid impeding the safe passage of a deep draft vessel in the Sinki Fairway.

Selat Sinki is available for all classes of vessels.

Danger bearings on **Raffles Light** (1˚09'36"N., 103˚44'33"E.) are useful in avoiding dangers when approaching Selat Sinki from W.

Pulau Jong (1˚12'54"N., 103˚47'18"E.), bearing 304˚ and open well NE of Pulau Sebarok, leads NE of the small detached reef lying about 0.6 mile SE of Pulau Sebarok, and SW of the 13.5m shoal lying about 0.4 mile NE of the reef.

Vessels are warned not to anchor in the vicinity of the cable area in Selat Sinki, which extends about 12 miles E from a position about 3 miles W of **Sultan Shoal Light** (1˚14'23"N., 103˚38'59"E.).

The boundaries of the prohibited anchorage areas in the vicinity of Singapore are charted.

Signals.—When vessels are going against the recommended direction of traffic flow, they are to display the following signals:

1. By day—A black cylinder as prescribed in the International Regulations for Preventing Collisions at Sea.

2. By night—Three red lights in a vertical line as prescribed in the International Regulations for Preventing Collisions at Sea.

Traffic signals are occasionally displayed from a steel framework tower, 36m high, standing 91m N of **Raffles Light** (1˚10'N., 103˚45'E.). The signals are intended to warn vessels that a VLCC is crossing Singapore Main Strait bound for Shell SBM, situated about 4 miles NE of Raffles Light.

The VLCC may approach either through West Raffles Fairway or through Phillip Channel.

The day signal is a black cone point up over a black cylinder. The night signal is a white isophase light shown in the shape of an X.

Vessels should keep a good lookout for these signals and should avoid impeding the passage of a VLCC by reducing speed or stopping if necessary and should in no circumstances cross ahead of such a vessel.

Caution.—In order to avoid damage to vessels berthed at Pulau Bukom vessels passing N of that island must not exceed a speed of 8 knots in Selat Singkeh between the E extremity of **Cyrene Reefs** (1˚15'30"N., 103˚45'00"E.) and the entrance to Keppel Harbor.

Mariners are warned to keep outside of the shoal area that extends about 1.7 miles W of **The Sisters** (1˚13'N., 103˚50'E.) because depths of 4.6 to 11m lie along the 20m curve between positions 1˚13'05"N, 103˚48'15"E, and 1˚12'45"N, 103˚49'35"E.

Singapore Road

9.25 Singapore Road (1˚16'N., 103˚53'E.), lying E of Keppel Harbor, is approached between **Pulau Sakijang Bendera** (1˚13'N., 103˚51'E.) and **Tanjong Katong** (1˚17'36"N., 103˚53'38"E.), about 5 miles NE.

At the head of the bay is the town and river of Singapore, with the Gelang River, within **Tanjong Rhu** (1˚17'39"N., 103˚52'09"E.), to the E.

Malay Point and **Malay Spit** (1˚16'10"N., 103˚51'07"E.), located N of **Tanjong Pagar** (1˚15'45"N., 103˚50'48"E.), are mostly absorbed by the reclamation of the land on which there is a container and ro-ro terminal.

Heavy squalls during the Southwest Monsoon occasionally impede cargo operations in Singapore Road.

Telok Ayer (1˚16'30"N., 103˚51'09"E.) used mainly by small craft, lying with its S end about 0.7 mile NNE of Tanjong Pagar. The basin is protected from E winds by a large land reclamation to the E. Telok Ayer basin is used by small craft.

Tanjong Rhu (1˚17'39"N., 103˚52'09"E.) is the W end of a peninsula. The peninsula, about 1 mile long together with **Tanjong Katong** (1˚17'36"N., 103˚53'38"E.), forms the N shore of Singapore Road; it is separated from the W shore of the bay by a channel about 0.2 mile wide.

Reclamation has been carried out along the coast E of Tanjong Rhu. Shoals with depths of less than 5m extend over 0.5 mile S of the reclaimed area, between Tanjong Rhu and Tanjong Katong.

Depths—Limitations.—The depths in Singapore Road are only from 3.7 to 7m for over 1 mile seaward of the river and from about 0.2 to 0.7 mile seaward of the reclaimed areas.

Southwest, S, and SE of Tanjong Katong, and within the 10m curve, are several detached depths of 0.9 to 5.8m.

Seaward of the 10m curve and within **Outer Shoal** (1˚15'N., 103˚52'E.) there are depths of 11 to 22m, mud and sand bottom, from 1.3 to 2 miles SE of the town and river of Singapore, available for all classes of vessels.

The water shoals somewhat abruptly within the 10m curve in most places, as will be seen on the chart requiring caution in vessels of deep draft when selecting an anchorage.

9.26 Outer Shoal (1˚15'N., 103˚52'E.), the SW end of which lies about 1.2 miles SSE of the S end of the land reclamation project above, is, within the 10m curve, about 2.2 miles long NE and SW, and from about 0.5 to 1 mile wide. A least depth of about 5.7m is reported to lie on the SW end of the shoal.

Obstructions, with a least charted depth of 4.6m and marked by a light, also lie on the SW end of the shoal. Less water than charted was reported on Outer Shoal.

A shoal, with depths of 9.4 to 10m, lies between the SW end of Outer Shoal and the reef extending NE from **Pulau Seringat** (1˚13'42"N., 103˚51'09"E.).

A tall lattice radio mast, about 79m in elevation, stands on Fort Canning, about 1.7 miles N of **Tanjong Pagar** (1˚15'45"N., 103˚50'48"E.). Close NE there is a disused lighthouse, a white iron tower, about 66m high.

Close SW of **Telok Ayer** (1˚16'30"N., 103˚51'09"E.) is the Singapore Polytechnic, surrounded by a lattice radio mast, and

near the N end is the Asia Insurance Building, 77m high and prominent.

Katong Lighted Beacon stands about 1 mile E of **Tanjong Rhu** (1˚17'39"N., 103˚52'09"E.). A light is shown at Bedok, a little over 4 miles ENE of Tanjong Rhu.

Considerable reclamation work has been carried out along the coast E of Tanjong Rhu. Shoals, with depths of less than 5.5m, extend more than 0.5 mile S from the reclaimed area, between Tanjong Rhu and a position about 2.2 miles E.

Signals.—The following signals should be made, when necessary, by vessels lying in the Inner Harbor or Outer Road:

1. When in need of customs, use Flag "C" of the International Code of Signals when requiring clearance, or a green light above a red light at night.
2. When in need of police assistance use Flags "CB3" of the International Code of Signals, or two red lights above a white light, vertically disposed at night, when requiring immediate police assistance; at the same time a ship should sound three long blasts on the siren, repeated at intervals of one minute.
3. For fresh water needs, use Flags "CDZero" of the International Code of Signals, or a green light above a white light at night.

Fullerton Signal Station (1˚17'10"N., 103˚51'16"E.) maintains constant visual watch, but can accept day signals only. It can receive signals at night, but can not reply. It does not repeat traffic or berthing signals for Keppel Harbor. Local signal codes may be obtained from the Director of Marine's office, near the mouth of the Singapore River.

Moored dredges will display, by day, a black ball at the masthead and a similar ball at the yardarm on the side on which it is safe to pass. A red, flag will be displayed on the side on which it is dangerous to pass. At night, white lights will be displayed in place of the black balls, and a red light in place of the red flag.

Anchorage.—Within the Singapore Port Limits, no vessel shall, except in an emergency, anchor in an area outside its appropriate designated anchorage.

The following special purpose anchorages are situated W and SW of Singapore:

1. Western Anchorage—General purpose. For general purposes such as receiving stores, water, bunkers, or awaiting a berth. Depths range from 13 to 34m. A wreck with a depth of 25m lies in the SE part close to the E boundary.
2. Western Petroleum Anchorage A—For vessels of 10,000 gross tons or less loaded with petroleum and non gas-free vessels. Depths range from 15 to 33m.
3. Western Petroleum Anchorage B—For vessels of over 10,000 gross tons loaded with petroleum and non gas-free vessels. Depths range from 14 to 22m. A wreck with a depth of 19.4m lies close to the SE boundary. Tankers exceeding 50,000 gross tons shall use Eastern Petroleum Anchorage A.
4. Western Quarantine and Immigration Anchorage—For vessels seeking quarantine and immigration clearance. Depths range from 10 to 32m.
5. Pasir Panjang Holding Anchorage—For vessels as directed by the Port Master. Depths range from 13 to 22m.
6. Selat Pauh Anchorage—For vessels under arrest, laid-up vessels, and other vessels with permission of the Port Master. Depths range from 10 to 26m.
7. Raffles Reserved Anchorage—For LASH vessel operations, damaged vessels, vessels requiring emergency repairs, or as directed by the Port Master. Depths range from 10 to 23m.
8. Tuas Petroleum Holding Anchorage—For tankers waiting to service vessels at anchorages in the Jurong Sector, waiting for berthing facilities in the West Jurong Fairway and Pesek Basin, or as directed by the Port Master. Depths range from 12 to 22m.
9. West Jurong Anchorage—For vessels awaiting a berth, vessels under repair, special vessels, or for immigration and quarantine clearance. Depths range from 6 to 25m.
10. LPG/LNG/Chemical Gas Carriers Anchorage—For non gas-free LPG, LNG, and chemical carriers. Depths range from 10 to 23m. A wreck with a depth of 10.7m lies near the E limit.
11. Very Large Crude Carrier Anchorage—Temporary anchorage for loaded VLCCs. Depths range from 23 to 32m.
12. Sudong Holding Anchorage—Temporary holding anchorage used with prior permission of the Port Master. The depth is 23m. A wreck, least known depth 21m, was reported (2003) in the vicinity of Sudong Holding Anchorage and can be best seen on the chart.
13. Sudong Special Purposes Anchorage—Temporary holding anchorage for VLCCs over 75,000 grt requiring immigration clearance or with prior permission of the Port Master. Depths range from 22 to 23m.
14. Sudong Explosive Anchorage—Replaces the Tuas Explosive Anchorage and the Tuas Explosive Lighter Anchorage. This anchorage is used for vessels and small craft loading or discharging explosives and Group 1 dangerous goods or vessels in transit with such cargo on board. Depths range from 19 to 41m.The maximum height of vessels permitted at this anchorage is 47m.

The following special purpose anchorages are situated SE of Singapore:

1. Changi General Purpose Anchorage—For vessels over 20,000 grt wishing to remain in port for not more than 8 hours for the purpose of exchanging crew or loading ship's stores, under the special anchorage scheme, upon prior permission of the Port Master. Depths range from 13 to 23m.
2. Changi Holding Anchorage—For vessels over 20,000 grt wishing to remain in port for not more than 8 hours for the purpose of exchanging crew or loading ship's stores, under the special anchorage scheme, upon prior permission of the Port Master. Depths range from 18 to 20m.
3. Eastern Special Purposes Anchorage C—For vessels over 20,000 grt other than LPG/LNG vessels, oil rigs, and drill ships, for the purpose of taking on bunkers, under the special anchorage scheme, upon prior permission of the Port Master. Depths range from 29 to 40m.
4. Eastern Special Purposes Anchorage D—Is centered on 1˚17.9'N, 104˚59.5'E. For vessels under arrest, damaged or requiring repairs, or upon prior permission of the Port Master. Depths range from 19 to 35m.

5. Changi Special Purposes Anchorage—For vessels over 20,000 grt other than LPG/LNG vessels, oil rigs, and drill ships, for the purpose of taking on bunkers under the special anchorage scheme and upon prior permission of the Port Master. Depths range from 17 to 32m.

6. Eastern Special Purposes Anchorage B—For vessels under arrest, damaged vessels or vessels requiring repair, and other vessels, under the special anchorage scheme, upon prior permission of the Port Master. Depths range from 11 to 27m.

7. Eastern Petroleum Anchorage B—For non gas-free vessels and vessels loaded with petroleum. Depths range from 16 to 31m.

8. Eastern Special Purposes Anchorage A—For vessels under arrest, damaged vessels, deep draft vessels, vessels requiring repairs, and other vessels, upon prior permission of the Port Master. Depths range from 24 to 38m.

9. Laid-up Vessels Anchorage—For vessels laid-up in port. Depths range from 16 to 30m.

10. Small Craft Anchorage—For harbor tugs, pontoons, barges, and other small craft, including fishing vessels. Depths range from 15 to 22m. A wreck with a depth of 19.2m lies SE of the center of the anchorage.

11. Man-of-War Anchorage—For visiting warships. Permission from Changi Port Control is required to anchor in this area. Depths range from 6 to 9m.

12. Eastern Explosives Lightering Anchorage—For small craft loaded with explosives. A wreck with a depth of 7.3m lies in the W part.

13. Eastern Anchorage—General purpose. Depths range from 5 to 24m. Charted wrecks and fouls are best seen on the chart.

14. Eastern Petroleum Anchorage A—For non gas-free vessels and vessels loaded with petroleum. Depths range from 21 to 56m. A wreck with a depth of 31m lies in the center of the anchorage.

15. Eastern Holding Anchorage A—For waiting vessels or as directed by the Port Master. Depths range from 34 to 53m. A wreck, marked by a lighted buoy on its N side, lies in the middle of the anchorage. A wreck with a depth of 42m over it lies on the SE boundary.

16. Eastern Holding Anchorage B—For vessels as directed by the Port Master. Depths range from 19 to 41m.

17. Eastern Holding Anchorage C—For tankers waiting to service vessels in Keppel Harbor. The depth is 5m.

18. Changi Barge Temporary Holding Anchorage—For barges loaded with sand/granite for discharge and proceeding to an approved aggregate terminal. Depths range from 13 to 23m.

Certain anchorage areas in the eastern sector qualify as special anchorage schemes for bunkering, storing, and crew changes. The maximum stay in these anchorages is 24 hours for bunkering or 8 hours for storing and crew changes. The schemes are only applicable to vessels over 20,000 grt and do not apply to LPG and LNG vessels. Vessels proceeding to the designated anchorages are exempt from compulsory pilotage. Anchorages will be designated by the VTIS.

Anchoring is prohibited within the area of the submarine cables that are laid SE from a position about 2 miles E of Tanjong Rhu.

Vessels over 15m high are not permitted to enter, transit, or anchor in the area S and SE of Changi International Airport and on the W side of Kuala Johor. This area includes Eastern Special Purposes Anchorage B.

No vessel whose height, measured vertically from the waterline of the vessel to the highest point of the vessel, including its cargo, structure, or equipment on board, exceeds 49m shall enter, transit, or anchor in the height restricted area in the Eastern Special Purposes Anchorage A, Eastern Petroleum Anchorage B, or Eastern Special Purposes Anchorage C. This height restricted area is bounded, as follows:

a. 1˚18'18"N, 103˚56'37"E.
b. 1˚18'18"N, 103˚56'45"E.
c. 1˚17'30"N, 103˚59'05"E.
d. 1˚17'39"N, 104˚01'12"E.
e. 1˚16'38"N, 104˚01'46"E.
f. 1˚16'38"N, 103˚59'05"E.
g. 1˚16'38"N, 103˚56'37"E.

Directions.—The lattice radio mast that is on Fort Canning, bearing 345˚, leads over the W part of the shoal lying between Outer Shoal and Pulau Renget, but W of Outer Shoal.

The greater and shallowest part of this shoal, and the SW part of Outer Shoal, are covered by the fixed red sector of Tanjong Pagar Light. The whole of Fort Canning radio mast, bearing about 298˚ and open NE of **Superior Court Dome** (1˚17'22"N., 103˚51'10"E.), leads NE of Outer Shoal.

Caution.—It was reported that less water exists over Outer Shoal than charted.

Numerous dangerous wrecks, some of a shifting nature, lie in Singapore Road. Information as to positions and markings can best be obtained from the chart.

It is suspected that the wreck buoys are used as moorings by native craft and their positions must therefore be considered unreliable. Vessels should navigate with caution in this area.

Deviation from recommended tracks within harbor limits requires cognizance of and careful regard for charted dangers.

9.27 Pulau Sakijang Bendera (St. John Island) (1˚13'N., 103˚51'E.), a coral island lying about 0.7 mile E of The Sisters, is about 30m high. Hospital buildings and fumigating sheds of the quarantine station stand on the island.

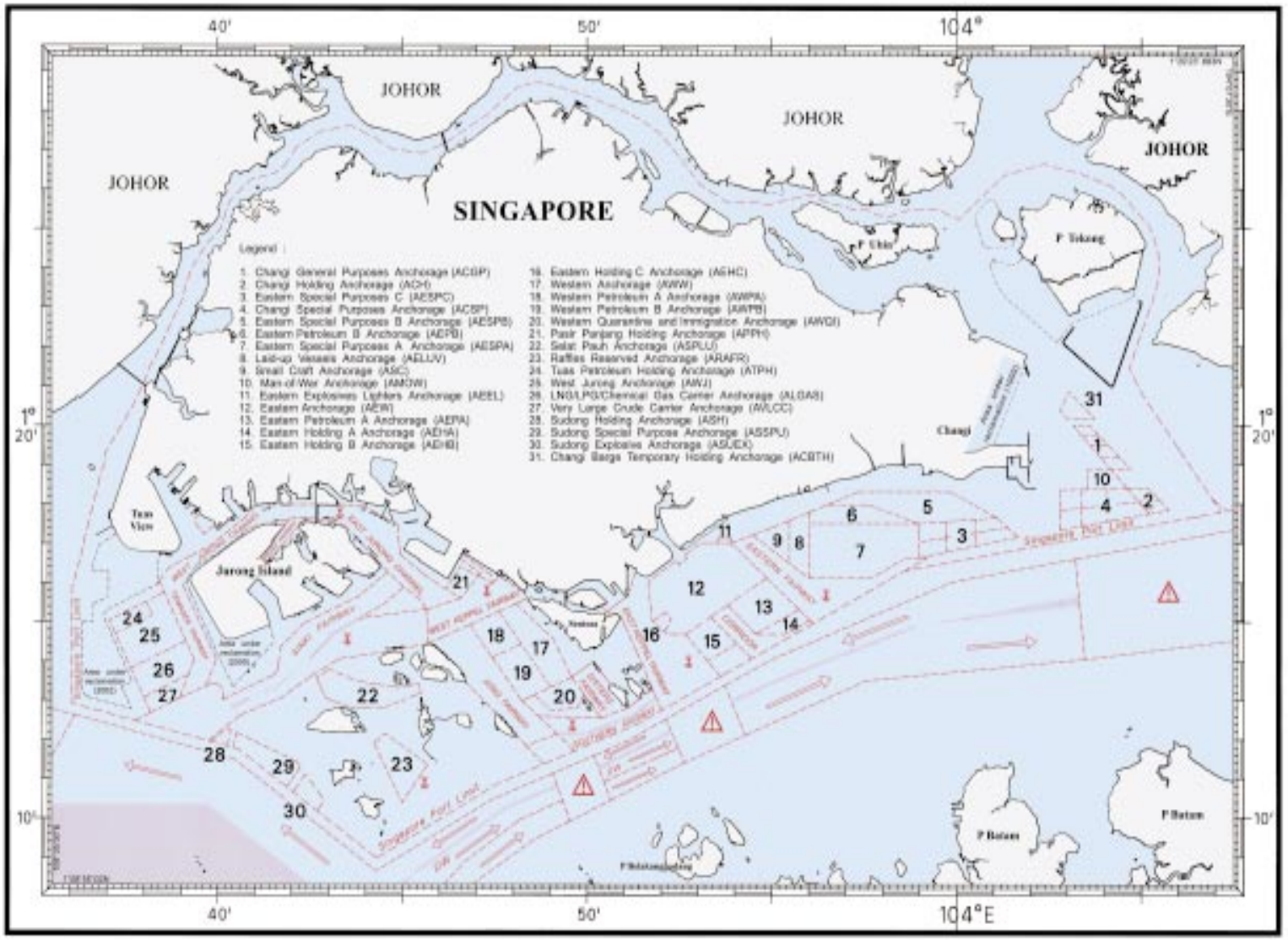
Tanjong Lokos is the SE extremity of the island; two lattice radio masts stand about 183m N and about 0.1 mile NW, respectively, of Tanjong Lokos.

A conspicuous chimney stands 206m W of the pier situated on the E side of the island.

Pulau Sakijang Pelepah (Lazarus Island) lies E of Pulau Sakijang Bendara. The islands are separated by Cooper Channel, with a least width of 183m and a least charted depth of 15.5m. The island is 53m high and is uninhabited. Cooper Channel is closed to through traffic by a low bridge joining the two islands. The summit of the island is marked by a light; an aviation light stands close W of the summit.

Both islands are about 0.7 mile long and are surrounded by drying reefs. A 10.7m shoal lies about 0.7 mile SSW of Tanjong Lokos.

Pulau Tembakul (Peak Island) (1˚13'N., 103˚52'E.), lying E of Pulau Sakijang Pelepah, is wooded, 33m high to the tops of the trees, and surrounded by a reef which extends about 0.2 mile from its NW extremity and about 0.1 mile from its S ex-



Anchorages and Fairways for the Port of Singapore

tremity. A small village, with a temple on a rock close W of it, stands on the NW end of the island. A white stone obelisk stands near the SE end of the island.

Pulau Renget Kechil, a small islet, lies close N of Pulau Sakijang Bendera on the S side of a reef about 0.7 mile long and about 0.2 mile wide.

Pulau Tekukor (1˚13'51"N., 103˚50'21"E.), a narrow island about 0.3 mile long and 23m high, lies between Pulau Sakijang Bendera and the S extremity of Sentosa.

An unused explosives magazine complex is situated on Pulau Tekukor. There is a concrete jetty, with a depth of 4.3m alongside, on the SW side of the island.

Sentosa (Blakang Mati Island) (1˚15'N., 103˚50'E.) lies S of the S part of Singapore Island, from which it is separated by Keppel Harbor. The island is about 2 miles long in an ESE and WNW direction, and its W end terminates in Tanjong Rimau, the S point of the W entrance to Keppel Harbor. The point is formed of cliffs and patches of shelving rock projecting from their bases. A light is shown close NW of Tanjong Rimau.

Mount Siloso, 47m high, lies about 0.1 mile ESE of Tanjong Rimau. A summit is covered by a clump of high fir trees.

9.28 Mount Imbiah (15˚23'N., 103˚49'E.), 68m high to the tops of the trees, is 0.5 mile ESE of Tanjong Rimau. Other small hills, covered with scrub and small trees, are in the vicinity.

Terembu Palawan (1˚15'N., 103˚49'E.) is an approximately 0.1 mile long steep-to drying reef lying about 183m off the coast of Sentosa, about 0.8 mile SE of Tanjong Rimau. The reef is marked by a light. Shoal depths, best seen on the chart, lie close WNW and ENE of the reef.

Tanjong China (1˚14'N., 103˚50'E.) is the S extremity of Sentosa.

Mount Serapong (1˚15'N., 103˚50'E.), rising to a height of 83m, is about 0.6 mile to the N of Tanjong China. It is wooded on its N side but barren on its S side; a number of buildings stand on its summit. It is a prominent mark from the E. A conspicuous radio mast stands about 0.2 mile SE of the summit.

Drying reefs extend up to about 0.1 mile off the SW and SE sides of Sentosa.

Berhala Spit (1˚15'N., 103˚50'E.) is the NE extremity of Sentosa. Tanjong Berhala, a wooded peninsula, 23m high, to the tops of the trees, lies about 0.2 mile W of Berhala Spit.

Tanjong Berhala is connected to the 12m high cliffs of Sentosa by a narrow concrete causeway.

9.29 Buran Darat (1˚15'N., 103˚51'E.), off the E side of Sentosa, is a coral reef, with occasional patches of sand, about 1 mile long, and 0.3 mile wide at its N end, tapering to a point at its S end; rocky heads dry in places 1.2 and 1.5m. A shoal, with a depth of 1.8m, lies close N of the NW end of the reef.

A disused spoiling ground extends about 183m NE from the NE end of Buran Darat. A number of reefs, some of which dry at LW, lie between the S end of Buran Durat and Pulau Dakijang Bendera and may best be seen on the chart.

Tides—Currents.—Tidal currents in the W approaches to Singapore, within a line joining the W end of **Selat Jurong** (1˚18'N., 103˚43'E.), **Raffles Light** (1˚09.6'N., 103˚44.5'E.), **Pulau Tembakul** (1˚13.4'N., 103˚51.7'E.), and the E end of **Keppel Harbor** (1˚15.5'N., 103˚50.5'E.) are described below.

In this area the current is mainly diurnal; that is to say, the portion which varies with the declination of the moon and sun, and which is slack twice only in each lunar day, runs at a greater rate than the portion which varies with the moon's phases and which is slack four times in each lunar day.

The current usually follows the direction of the channels, with the flood running to the W, NW, or SW and the ebb running to the E, NE, or SE; the rate at any moment is approximately the same over the whole area, and the current turns everywhere at approximately the same moment.

The strength of the current may be increased off salient points and slack water may be found, or eddies occur, on the lee side of these; when the current is strong, overfalls and swirls may be formed, due to inequalities of the bottom.

In **Selat Sinki** (1˚15'N., 103˚44'E.) the W approach to Singapore, there is a confused sea during W winds when the current is running to the W.

Noticeable eddies and swirls occur between **The Sisters** (1˚13'N., 103˚50'E.) and **Pulau Sakijang Bendera** (1˚13'N., 103˚51'E.); a vessel at anchor in this channel, obtaining tidal current observations, was frequently swung rapidly through an arc of 60˚, and as rapidly back again, during the strength of the current.

There are also eddies and swirls between Pulau Sakijang Bendera and **Pulau Tekukor** (1˚13'51"N., 103˚50'21"E.) and between Pulau Tekukor and **Sentosa** (1˚15'N., 103˚50'E.).

The E current is not strong N of **Pulau Sakijang Pelepah** (1˚13'N., 103˚51'E.) and Pulau Tembakul where there may be eddies during the strength of this current.

In Selat Sinki (Keppel Harbor), there are swirls and eddies at the E entrance and on the spit extending from the military pier.

In Keppel Harbor, the E current runs strongly and causes somewhat dangerous swirls and eddies.

There are eddies close to the telegraph company's wharves in **Selat Chermin** (1˚16'N., 103˚49'E.) and at both ends of the P. and O. Company's wharf.

Tidal currents S of Tanjong Piai

Hours before HHW	Direction	Rate (knots)	Hours after HHW	Direction	Rate (knots)
12	093˚	1.1	0	100˚	0.3
11	098˚	1.0	1	093˚	0.5
10	103˚	0.7	2	104˚	0.4
9	115˚	0.3	3	114˚	0.3

Tidal currents S of Tanjong Piai					
Hours before HHW	Direction	Rate (knots)	Hours after HHW	Direction	Rate (knots)
8	230˚	0.2	4	163˚	0.1
7	264˚	0.5	5	249˚	0.2
6	280˚	1.0	6	254˚	0.4
5	280˚	1.3	7	278˚	0.4
4	282˚	1.3	8	279˚	0.5
3	284˚	1.0	9	282˚	0.3
2	295˚	0.3	10	283˚	0.2
1	106˚	0.2	11	086˚	0.7
0	100˚	0.3	12	093˚	1.0

It was reported that the E current sets on the oil wharf immediately E of King's Dock and the W current causes an offset.

The W current runs with great strength between the W entrance points, where the rate may reach 4 knots. It is weak along the Port of Singapore Authority wharves from the dry dock as far as W wharf, but increases then toward the W entrance, and is hardly felt along the wharf at **Pulau Brani** (1˚15'30"N., 103˚50'00"E.). There is, during this current, slack water on the W side of **Tanjong Pagar** (1˚15'45"N., 103˚50'48"E.); this should be remembered when approaching the docks, for with the bow in slack water and a strong current on the quarter, an awkward sheer might be experienced.

The average directions and rates of the tidal currents in a position about l.3 miles S of **Tanjong Piai** (1˚16'N., 103˚31'E.) at each hour before and after HHW at Singapore are given in the table below.

The rates are increased, without material change in direction, at springs and when the moon is in high declination; the increase may be as much as 75 per cent when the moon is in maximum declination at springs. The rates are reduced and directions become less regular at neaps and when the moon is in low declination; when the moon is on the Equator at neaps, the current is weak and irregular.

The currents off Tanjong Piai differ materially both in character and time from those in **Singapore Main Strait** (1˚09'N., 103˚45'E.).

The average conditions for a strong E current is 10 hours after to 9 hours before HHW. For a strong W current, it is 8 hours before to 2 hours before HHW.

The average conditions for a weak E current is 1 hour before to 4 hours after HHW. For a weak W current, it is 5 hours after to 9 hours after HHW.

Within the Singapore Main Strait, the weak W current is 10 hours after to 10 hours before HHW. For the strong W current, it is 9 hours before to 2 hours before HHW. For the strong E current, it is 1 hour before to 7 hours after HHW and for the weak E current, it is 8 hours after to 9 hours after HHW.

Caution is therefore required in navigating the W approach to Singapore Main Strait, for a comparatively small change in position may cause a great change in the direction and rate of the currents.

It should be noted that, as the current in Singapore Main Strait is mainly diurnal, average conditions occur only when the moon is in average declination 3 or 4 days after springs and neaps; at all other times conditions may differ widely from the average.

Off Tanjong Piai the current, being mainly semidiurnal, is more constant.

Directions.—In proceeding E through the W part of Singapore Strait, from a mid-channel position between **Karimun-Kecil** (1˚09'N., 103˚24'E.) and **Tanjong Piai** (1˚16'N., 103˚31'E.), where there are depths of about 35m, no directions are necessary for a vessel beyond keeping in the fairway other than observing that **Raffles Light** (1˚09'36"N., 103˚44'33"E.), bearing 101˚, midway between the 8.7m and 10.5m shoals on either side of the fairway.

Having passed **Pulau Nipa Light** (1˚09'N., 103˚40'E.), steer to round Raffles Light from 0.5 mile to 1 mile distant; or if the wind and tidal current be adverse, or from other circumstances it may be desirable to anchor to the W of **Pulau Senang** (1˚10'18"N., 103˚44'18"E.), out of the strength of the current.

Having rounded Raffles Light, steer to pass Pulau Sakijang Bendera about 0.5 mile distant, passing about 1 mile S of **Lighted Beacon No. 45** (1˚11'51"N., 103˚48'27"E.), so as to avoid the rocks SW of **Pulau Sebarok** (1˚12'24"N., 103˚47'45"E.).

After passing **Pulau Sakijang Bendera** (1˚13'N., 103˚51'E.), if a vessel is bound for Singapore Road, round Pulau Tembakul at a distance of about 0.2 mile and steer NNW to pass between **Outer Shoal** (1˚15'N., 103˚52'E.) and the shoals SE of **Sentosa** (1˚15'N., 103˚50'E.).

A least depth of 9.1m can be carried through this channel, but caution is necessary if the tide is setting strongly across the track. When Tanjong China, the S end of Sentosa, bears 235˚, course may be changed NE for the anchorage.

If bound through the E part of Singapore Strait, set a course to pass N of **Horsburgh Light** (1˚20'N., 104˚24'E.), and then into the South China Sea.

Caution.—Numerous dangerous wrecks, some of a shifting nature, lie in Singapore Road, and may best be seen on the chart.

9.30 **Singapore** (1˚17'N., 103˚51'E.) is built on each side of the Singapore River, which is a small stream only navigable by small craft. The river is barred by a flat, with about 0.3 to 0.9m at LW, which fronts the shore to a distance of about 0.2 mile. Several bridges span the river. The lower one at the mouth is Anderson Bridge and the next above it is Cavanagh Bridge.

The river is always crowded with cargo boats, the central part being kept dredged and clear for those under way.

Marina Bay, formerly Inner Roads, lies SE of the mouth of the Singapore River. Reclamation continues between Marina wharf and the entrance to Marina Bay.

Another reclaimed area fronts the shore between the entrances to the Singapore River and Kallang Basin. Further improvements are being made E of Tanjong Rhu, the E entrance point to Kallang Basin, for about 2 miles and up to 0.8 mile from the shore. A large part of the area is enclosed by sea walls and prohibited areas surround them.

The commercial area of the town is situated on the S side of the river. The banks on either side are lined with quays and go downs for the landing and receiving of goods. Singapore is a free port.

Several conspicuous buildings stand on the reclaimed ground.

Among the most conspicuous objects in the vicinity, when seen from seaward, is the **Victoria Memorial Hall** (1˚16'50"N., 103˚51'08"E.) a yellow stone building, surmounted by a dome and clock tower, the clock being illuminated at night; the crown surmounting this building is 57.3m above HW, and conspicuous when the sun is shining on the clock tower.

From the open square in front of the Victoria Memorial Hall a fine esplanade extends for 0.3 mile along the sea front; behind this esplanade is situated the Recreation Ground fronting **St. Andrews Cathedral,** (1˚17'32"N., 103˚51'13"E.) which is reported to have a tower surmounted by a spire about 65m high.

The Ocean Building is very tall, with a conspicuous green roof.

The **Fullerton Building** (1˚17'10"N., 103˚51'16"E.) has a red roof and is one of the more conspicuous buildings on the water front.

There are numerous tall buildings which are constantly being added to on the S side of the entrance to Singapore river.

The War Memorial stands on the shore opposite the Recreation Grounds, a lattice radio mast and a disused lighthouse are situated on **Fort Canning Hill,** (1˚17'33"N., 103˚50'56"E.), which rises gradually above the center of the town to a height of about 47m.

The Director of Marine's Pier is situated close eastward of Fullerton Building.

Keppel Harbor (1˚16'N., 103˚50'E.)

World Port Index No. 50000

9.31 Keppel Harbor, between Singapore and Sentosa, is about 3 miles long in an E and W direction, but the main channel takes a somewhat serpentine course; its width is about 0.2 mile, but in several places is not more than about 0.1 mile wide. Situated as it is, Keppel Harbor is of considerable importance and possesses extensive dock and wharf accommodation.

Pasir Panjang Terminal

http://www.psa.com.sg/container/5-4.html

Keppel Terminal

http://www.psa.com.sg/container/5-2.html

Tides—Currents

Tidal currents in **Selat Sengkir** (1˚15'21"N., 103˚50'00"E.) have considerable strength, the flood flowing to the W and the ebb to the E.

With no slack water; there are swirls and eddies at the E entrance. Tidal ranges are about 2.3m at springs and 1.1m at neaps.

In the E approach to Keppel Harbor, the tidal currents are very irregular in the passages among these islands, running sometimes 4 knots.

In Keppel Harbor the currents run strongest at the W entrance points off the N end of **Pulau Brani** (1˚15'30"N., 103˚50'00"E.), at the rate of 3 knots, but in the W entrance, at times it reaches 4 knots.

The E current commences about 1 hour before HHW, and runs until about 2 hours after LLW.

The W current is reported to commence about 2 hours after LLW, and runs until about 1 hour before HHW at varying strength.

The ebb or E current at springs running through Keppel Harbor causes somewhat dangerous swirls and eddies; the flood or W current is more uniform, with eddies only occurring between the points of the W entrance.

In **Selat Chermin** (1˚16'N., 103˚49'E.), the currents sweep around **Pulau Hantu** (1˚15'51"N., 103˚48'49"E.) with considerable force, but close to the wharves at the head of that bay is an eddy current on both sides.

There is also a slight eddy at each end of the Port of Singapore Authority wharves.

Alongside the wharf at Pulau Brani, it is quite slack water on the flood, but the ebb runs strongly.

The flood current sweeps W along the harbor board's wharves from the dry docks as far as West Wharf, with very little strength, but then it runs strongly. On the flood, on the W side of Tanjong Pagar, the projecting line of wharves causes slack water on that side.

Approaching Tanjong Pagar, if unaware of this fact, the bow being in slack water with a strong current on the quarter, an awkward sheer might be experienced.

Depths—Limitations

Keppel Harbor, and both entrances to it, have sufficient water for all classes of vessels; there are depths of 5.2 to 11.3m or more alongside the wharves at LW.

The W entrance, with a least depth of 11.6m in the fairway, is a little more than 183m wide and lies between **Tanjong**

Courtesy of Lloyd's List

Brani Causeway from W with Keppel Terminal in background

Rimau (1˚15'35"N., 103˚48'30"E.) and Tanjong Berlayar, about 0.1 mile NW.

The E entrance between **Tanjong Pagar** (1˚15'45"N., 103˚50'48"E.) and the E extremity of Pulau Brani to the SW is about 0.4 mile wide.

Keppel Harbor is divided into two parts by a causeway linking **West Wharf** (1˚15.8'N., 103˚49.5'E.) with Tanjong Risim, the W extremity of Pulau Brani.

Vessels are prohibited from transiting through Keppel Harbor.

Tanjong Pagar Terminal, which handles container and ro-ro vessels, has a total berthing length of 3,600m, with alongside depths of 8.9 to 14.8m.

Keppel Terminal, situated W of Tanjong Pagar Terminal, has 15 berths, with depths of 9.8 to 14.6m alongside.

There are three berths for cruise ships situated on the N side of Keppel Harbor close W of the causeway. Berth CC1, Berth CC2, and Berth CC3 have depths alongside of 12m, 11m, and 9m, respectively. Berth B1, Berth B2, and Berth B3 have reported depths (2002) alongside of 11.0m, 11.4m, and 11.5m, respectively.

Pilotage

Pilotage information is found in paragraph 9.2.

Regulations

Cruise Bay (1˚16'N., 103˚49'E.) is the W part of Keppel Harbor. Vessels with a length of over 30m or whose height exceeds 30m should obtain permission from Cruise Bay Control on VHF channel 5 before entering, leaving, or maneuvering in Cruise Bay.

All vessels maneuvering within Cruise Bay should maintain a listening watch on VHF channel 5.

Entry into Cruise Bay is prohibited to vessels over 52m high. Vessels between 48 and 52m high must obtain written permission from the Port Master to enter or remain in the area.

Anchorage

Anchorage is prohibited in the whole of Keppel Harbor, in Selat Sengkir, and in the E entrance.

Caution

Both sides of Keppel Harbor are reported to be fringed with drying reefs.

Reclamation work is being done in the Keppel Harbor area and mariners are advised to use caution.

9.32 Tanjong Berlayar (1˚15'48"N., 103˚48'24"E.), the NW entrance point to Keppel Harbor, is formed of cliffs about 18.3m high. Tanjong Rimau, about 0.1 mile SE of Tanjong Berlayer, is the SE entrance point to Keppel Harbor. A white obelisk stands 46m NW of Tanjong Berlayer.

A T-headed oil terminal, flanked by concrete dolphins, is 0.1 mile ENE of Tanjong Berlayar. A military pier, with 7.6m at its extremity, is 119m NE of Tanjong Berlayar; mooring buoys are situated E of the pier head.

BP Dock—Tanjong Berlayar

Berlayar Rock (Blayer Rock), lying about 91m WSW of Tanjong Berlayar, has a least depth of 1.8m and is steep-to on its S side.

A depth of 5.2m lies about 0.3 mile W of Tanjong Berlayar; it is the shallowest part of a ridge with depths of 5.5 to 14.6m.

There are depths of 9.1 to 11m between the ridge and **Pasir Panjang** (1˚16'N., 103˚48'E.).

A reef, with 2.7 to 4.9m, extends almost 91m W from **Tanjong Rimau** (1˚15'35"N., 103˚48'30"E.). A fishtrap is situated about 165m SSW of the same point. A military pier, with 8.8m at its extremity, stands 0.2 mile E of Tanjong Rimau.

Caution.—Due to the existence of submarine cables, vessels should not anchor within 1 mile of Tanjong Berlayar or N of a line joining that point and the lighted beacon on **Cyrene Reefs** (1˚15.5'N., 103˚45.0'E.).

A submarine cable extends from Tanjung Rimau NNW to the military pier standing NE of Tanjong Berlayar.

To the E, between Tanjong Berlayar and **Bukit Chermin** (1˚15'58"N., 103˚48'39"E.), there is an impassable mangrove swamp, into which **Berlayar Canal** (Blayer Canal) (1˚16'00"N., 103˚48'28"E.) discharges, off the mouth of which a reef extends up to about 200m seaward.

9.33 Pulau Hantu (1˚15'51"N., 103˚48'49"E.), the small round densely-wooded island lying in front of Selat Chermin, is about 0.1 mile in diameter and 45m high to the tops of the trees. A reef fringes the E and N sides of the island.

The channel between the island and the coast is about 91m wide and has charted depths of 6.8 to 13.6m. Berthing facilities in the vicinity of Pulau Hantu can best be seen on the chart.

Pulau Renggis (1˚15'37"N., 103˚48'59"E.) is the central portion of a coral reef, covered with mangroves, the tops of which are 5.5m above HW; it lies about 0.5 mile E of Tanjong Rimau and 91m from the S shore. The reef, which dries, extends about 119m W and about 64m N and E from the islet, with shallow water extending 91m beyond the E part.

Pulau Brani (1˚15'30"N., 103˚50'00"E.), on the S side of Keppel Harbor, forms the N side of Selat Sengkir; it is nearly 0.6 mile in length, in an E and W direction, with an extreme width of 0.4 mile. On its NE side are three hills; the middle one, which is the highest, is 48m high and covered with trees.

Tanjong Risim (1˚15'34"N., 103˚49'40"E.), from which a fringing reef extends W about 0.2 mile, is the W end of Pulau Brani. The NW coast of Pulau Brani is fronted by a reef which ends about 0.2 mile NE of Tanjong Risim. A pier is situated close NE of Tanjong Risim. A submerged pipeline extending to Singapore is laid in the vicinity. Mooring buoys are laid close off the NW coast of Pulau Brani.

Brani Terminal (1˚15.7'N., 103˚50.2'E.) is situated on the S side of Keppel Harbor, along the N shore of Pulau Brani; it has nine berths that are best seen on the chart.

Brani Terminal

http://www.psa.com.sg/container/5-3.html

Brani Terminal (PSA Corporation Ltd.)

Berth	Length of berth	Depth alongside
B1	205m	11.0m (2001)
B2	258m	11.4m (2001)
B3	258m	11.4m (2003)
B4	314m	15.1m (2001)
B5	320m	15.2m (2001)
B6	320m	14.7m (2003)
B7	320m	15.0m (2000)
B8	330m	14.4m (2003)
B9	249m	12.2m (1999)

A concrete wharf, 15m long, with 2.7 to 4.6m alongside, is situated on the S side of Pulau Brani close ESE of Tanjong Risim.

Caution.—An aerial tramway, with a vertical clearance of 56m, crosses the channel between Sentosa and Singapore about 0.4 mile W of Tanjong Risim. The tramway, which is about 1 mile long, has a conspicuous tower and two conspicuous cable car stations on Singapore and a conspicuous tower and cable car station on Sentosa.

Submarine cables, the locations of which can best be seen on the chart, lie in the W part of Selat Sengkir.

9.34 Tanjong Tereh (1˚15'49"N., 103˚49'57"E.), the N end of Pulau Brani, is a bold red point rising within to a height of 29m, with many buildings on its grassy slopes, and is conspicuous from either entrance to Keppel Harbor.

Selat Singkir (1˚15'21"N., 103˚50'00"E.), the channel between Pulau Brani and Sentosa, with a least depth of 3m in mid-channel but greater depths elsewhere, is navigable for vessels of light draft.

Directions.—Vessels proceeding into Keppel Harbor through the W entrance, which is little more than 183m wide, should keep in mid-channel.

Inbound from Singapore Main Strait toward Keppel Harbor W entrance, the channel that is between **Pulau Sebarok** (1˚12'24"N., 103˚47'45"E.) and **The Sisters** (1˚13'N., 103˚50'E.) is very recommended.

Between the shoals W of The Sisters and the sunken rock, lying about 0.6 mile SE of the SE end of Pulau Sebarok, the channel is about 0.7 mile wide.

When approaching this channel from SE, **Pulau Jong** (1˚12'54"N., 103˚47'18"E.), bearing 304˚ and kept well open of Pulau Sebarok, leads E of the rock.

9.35 Terembu Selegi (1˚13.6'N., 103˚49.6'E.), marked by a beacon, about 0.7 mile NW of The Sisters, should be given a wide berth.

Terumbu Palawan (1˚15'N., 103˚49'E.), marked by a beacon and near the coast of Sentosa, should be given a berth of 183m; then to the W entrance to Keppel Harbor there are no dangers beyond 0.3 mile offshore.

Deep-draft vessels should avoid the ridge with 7.8m extending W of the 5.5m depth W of The Sisters, and the ridge with the same depths E of **Pulau Bukom** (1˚14'N., 103˚46'E.).

East of The Sisters, and between them and **Pulau Sakijang Bendera** (1˚13'N., 103˚51'E.), is a good and deep channel about 0.5 mile wide, for which the chart is sufficient guide.

9.36 East Keppel Fairway (1˚14'N., 103˚52'E.) is the relatively wide fairway leading NE of the islands and reefs forming the E part of Port Singapore for 3 miles to the E entrance to Keppel Harbor.

East Keppel Fairway has been dredged (1996) to a depth of 15m; the dredged limits are best seen on the chart.

Caution.—Anchorage in the vicinity of the port of Singapore and areas which anchorage is prohibited are charted.

Vessels may not anchor in Keppel Harbor except in an emergency or when berthing or unberthing.

A prohibited area exists at the E entrance to the Selat Sengkir, the limits of which are best shown on the chart.

No vessel of any description, except vessels authorized by the Port Captain or the Commander, Republic of Singapore Navy, shall enter the area for anchorage, passage, or any other purpose.

9.37 The E part of Singapore Strait, E of **Pulau Sambu** (1˚10'N., 103˚54'E.), is formed by Pulau Batam, on the W side of the N entrance to **Selat Riau** (1˚10'N., 104˚13'E.), and by Pulau Bintan on the E side of the strait.

Teluk Jodoh (1˚10'N., 103˚58'E.), lying close E of Pulau Sambu, is 6.5 miles wide between it and **Tanjung Sengkuang** (1˚11'N., 104˚02'E.) to the E. The depths in the outer part of the bay vary from 18.3 to 47.5m but close to the shore reefs, there are depths of 10.9 to 12.8m; caution is necessary when working toward them.

Pulau Dongas (Pulau Dangas) (1˚09'N., 103˚57'E.) lies close off the shore of Teluk Jodoh. A wreck lies about 2 miles NNE of the island.

Caution.—A floating storage tanker is reported to be moored about 2 miles N of Pulau Dongas.

The bight between Pulau Dongas and Pulau Bakor (Pulau Bokur) affords anchorage, in depths of 6.1 to 7.3m.

Vessels may anchor, in about 7.3m, with Pulau Bokor bearing 135˚, distant 0.5 mile. The depths decrease sharply to 5.5m toward the island, but decrease more regularly towards the reefs on the E side of Teluk Jodoh.

Pelabuhan Batuampar (Pelabuhan Batu Ampar) (1˚10'N., 104˚00'E.), on the E shore of Teluk Jodoh, consists of a square-shaped basin about 0.2 mile wide. The center of the channel leading into the basin is marked by a range light. The basin, which has a controlling depth of 4.9m, has a total berthing length of 1,000m. A ferry terminal is situated in the SE corner.

McDermott Basin, with a controlling depth of 3.4m, lies about 0.3 mile N of the main basin.

9.38 Tanjung Sengkuang (1˚11'N., 104˚02'E.) is the NE extremity of a peninsula that separates Teluk Jodoh from Teluk Tering to the E.

Teluk Tering (1˚11'N., 104˚04'E.) is about 3 miles wide between Tanjung Sengkuang and **Tanjung Kapur** (1˚11'N., 104˚05'E.) and is about 4 miles in length.

Pulau Nongsa (1˚12'15"N., 104˚04'54"E.) is about 0.2 mile in extent and surrounded by a reef. It is rocky, wooded, and 26m high to the tree tops and lies about 0.5 mile off **Tanjong Batubelah** (1˚11'36"N., 105˚05'09"E.) shore reef.

On the S edge of the islet is a sand cay, overgrown with low trees. A wreck is charted about 0.5 mile E of the islet. The islet is reported to be marked by a light.

Rosa Rock (1˚12'23"N., 104˚05'53"E.), which uncovers, lies nearly 1 mile E of Pulau Nongsa. Vessels should not stand S of the line of Pulau Nongsa bearing 262˚.

The best anchorage in Teluk Tering is on the E side of its approach, in 11m, about 1 mile WSW of Pulau Nongsa; small vessels may go further in.

The N entrance to Selat Riau lies between **Tanjung Babi** (1˚11'51"N., 104˚06'04"E.), the N point of Pulau Batam, and Tanjong Sebong about 9.7 miles ESE.

East of Tarjong Babi the shore reef, to the N entrance of Selat Riau, projects about 0.7 mile in places.

Pulau Bintan (1˚14'N., 104˚34'E.), of which Tanjong Berakit is the NE end, is the largest island on the S side of Singapore Strait.

Like most of the other land forming Singapore Strait, it is covered with trees, and, except for the hills inland, is not much elevated.

Vessels should not venture in by the curve, as the depths are very irregular, with shallow patches which are difficult to approach by the lead, though they may frequently be distinguished by tide rips.

9.39 Gunung Bintan-besar (1˚04'N., 104˚27'E.), located about 7 miles within the N coast of Pulau Bintan, is 348m high;

it may be seen in clear weather from a distance of about 40 miles and is a good mark in approaching Singapore Strait from the N.

When viewed from the N it shows up as a saddle-shaped summit. Lying 3 miles N and appearing to be joined to Gunung Bintan-besar is Gunung Bintan-ketjil, a 195m high conical hill.

Tanjong Tondang (1˚11'N., 104˚19'E.) lies about 7 miles NE of Tanjong Sebong; Tanjong Pergam lies about 1.6 miles farther E. Teluk Sebong indents the coast E of Tanjong Sebong.

Lagoi Reef (1˚12'N., 104˚21'E.), consisting of several rocky heads with depths of less than 1.8m, lies between 0.9 mile and about 1.8 miles NE of Tanjong Pergam.

Karang Manjang (1˚12'N., 104˚22'E.), a narrow ridge about 0.5 mile in length, lies between Lagoi Reef and the shore, along with other shoals.

Diana Reef (1˚14'N., 104˚27'E.), consisting of several ridges of sand, with depths of 4.9 to 5.5m, lies from 4 to 5.5 miles ENE of Lagoi Reef. Vessels should keep outside the 20m curve.

Between Lagoi Reef and Diana Shoal are several patches, on which lie depths of as little as 6.2m. More isolated rocks are found between Diana Shoal and the shore.

9.40 **Tanjong Sambang** (1˚11'52"N., 104˚22'48"E.), a prominent point on the N coast of Pulau Bintan having a hill, lies about 3 miles E of Tanjong Pergam.

Between Tanjong Sambang and **Tanjong Sading** (1˚12'15"N., 104˚23'37"E.), a bluff, is a bight about 1 mile in extent.

Small vessels can obtain temporary anchorage, in 7.3m, in the middle of a bight between Tanjong Said and Tanjong Sambang, about 1.6 miles E, being careful to avoid Lagoi Reef and Karang Manjang.

Teluk Sumpat (Sumpat Bay) (1˚12'N., 104˚29'E.) lies between Tanjong Sading and the W end of Tanjong Berakit, 9.5 miles distant. The head of the bay and its E shore are fronted by coral reefs to distances of from 0.5 to 1 mile offshore. Anchorage can be taken in the bay, in depths of 12.8 to 18.3m.

Pulau Sumpat (1˚11'45"N., 104˚31'40"E.), a rocky wooded islet, 70m high, and located on the E side of Teluk Sumpat, may be readily identified by its saddle shape. Sumpat Village is situated on the coast S of the islet.

A rock of small extent, with a depth of 4.9m, lies near the center of the bay, about 2.7 miles NW of the summit of Pulau Sumpat; a wreck lies close SE of the rock.

9.41 **Tanjong Berakit** (1˚14'N., 104˚34'E.), the NE end of Pulau Bintan, is marked by a light. Some hills, with elevations of up to 39m, lie on the E side of the island about 2 miles S of the point. Some trees grow on the point. Reefs and foul ground extend up to 1.8 miles off the point. Dangerous wrecks may best be seen on the chart.

Pulau Berakit (1˚14'N., 104˚35'E.), about 12m high to the tops of the trees, small, and wooded stands on the shore reef, at about 0.5 mile N of Tanjong Berakit; the reef is covered with large stones, several of which uncover at half tide. Black Rock lies about 0.3 mile W of the island above.

Pulau Koko (1˚13'N., 104˚35'E.), 12m high, is narrow and about 0.5 mile long; it lies close-to and appears to form the E side of Tanjong Berakit.

Tanjong Lokan (1˚13'N., 104˚35'E.), the E point of the peninsula, lies about 1 mile S of Pulau Koko and is fronted by a reef to a short distance.

Karang Bebek (1˚15'N., 104˚33'E.), with a least depth of 3.6m, lies near the W end of a bank, with depths of less than 11m, lying about 1.7 miles NNW of the N end of Tanjong Berakit.

Karang Berakit (1˚16'N., 104˚36'E.), with a least depth of 0.9m, lies about 3 miles NE of Tanjong Berakit. A coral patch, with a depth of 5.8m, lies about 0.2 mile NW of the reef; the depths in the vicinity are irregular. A dangerous wreck lies close SW.

Directions.—The E summit of Gunung Bintan-besar in range with the NW extremity of Tanjong Berakit, bearing 211˚, leads W of Karang Berakit.

The N end of Tanjong Berakit, bearing S˚, leads N of Diana Reef.

A conspicuous double tree, on a hill 4 miles S of **Tanjong Lokan** (1˚13'N., 104˚35'E.), kept well open of Tanjong Lokan, bearing 192˚, leads E, and **Horsburgh Light** (1˚20'N., 104˚24'E.), in range with the highest coast hill on **Tanjong Penyusok** (Datok) (1˚22'N., 104˚17'E.) bearing 285˚, leads N.

The whole of the N coast of Pulau Bintan is fronted with dangers, and it is advisable that vessels should not attempt to come inside **Diana Reef** (1˚14'N., 104˚27'E.) and **Lagoi Reef** (1˚12'N., 104˚21'E.).

These will be guarded against by keeping **Pulau Sekerah** (1˚07'27"N., 104˚14'30"E.) well open of Tanjong Kalumpang, bearing 227˚, until the N extremity of Tanjong Berakit bears 097˚. Pulau Sumpat, bearing 165˚, will lead W of the shoals in the vicinity of Tanjong Berakit.

Caution.—An ammunition dumping ground, about 5 miles square, is centered about 22 miles ENE of the Horsburgh Light.

Singapore Strait—North Shore

9.42 The N shore of the E part of Singapore Strait is formed by the SE part of **Singapore Island** (1˚20'N., 103˚55'E.), **Johor Shoal** (1˚19'N., 104˚03'E.), and **Tanjong Penyusop** (1˚22'N., 104˚17'E.), the SE part of the Malay Peninsula.

The **Lima Islands** (1˚22'N., 104˚18'E.), with several rocks and dangers near them, together with **Ramunia Shoals** (1˚27'N., 104˚26'E.), **North Patch** (1˚29'N., 104˚27'E.) and **Eastern Bank** (1˚31'N., 104˚31'E.), extend E of Tanjong Penyusop nearly as far as the meridian of **Tanjong Berakit** (1˚14'N., 103˚34'E.) on the opposite shore.

From Tanjong Takong, the NE limit of Singapore Road, the coast trends NE about 5 miles to **Tanjong Bedok** (1˚20'N., 103˚58'E.); about midway between is the village of Siglap.

Tanjong Changi (1˚23'N., 104˚00'E.), the E end of Singapore Island, is low land with a white sandy beach and is the S point of the E entrance of Johore Strait.

The airport is situated at the NE end of Singapore Island. Its runway extends about 2 miles SSW from a position within 0.5 mile W of the reclamation of Tanjong Changi. The flight path of aircraft taking off and landing passes over Kuala Johor.

Regulations.—The Civil Aviation Authority of Singapore (CAAS) has requested that shipyard operations and masters,

owners, or agents of vessels with heights exceeding 100m intending to conduct intra-port movements (within port limits) which require to transit, leave, or move between longitudes 103˚54'E, and 104˚05'E, S and E of Changi Airport, to notify CAAS at least 3 working days in advance of such movements. This is to allow CAAS to issue a NOTAM (Notice to Airmen) in order to keep aircraft pilots informed of such tall ship movements.

Masters of vessels with heights exceeding 100m above the waterline intending to enter, transit, or leave the area described above are also required to report to Sembawang Control on VHF channel 21 when passing either longitudes, or if entering or leaving the Traffic Information Area of Serangoon Harbor.

An extensive sea area in the vicinity of the airport, best seen on the chart, is prohibited to vessels whose height measured from the waterline to the highest point of the ship's structure, including its cargo and equipment on board, exceeds 15m.

In addition to the above reporting procedures, shipyard operators, masters, owners, or agents are reminded that every vessel 2,000 grt or more or with a height of more than 30m above its waterline are to comply with the Traffic Information System for vessels navigating in Serangoon Harbor.

Tanah Merah Ferry Terminal (TMFT) (1˚19'N., 103˚59'E.) is situated E of Singapore Changi Airport and S of Tanjong Changi. All vessels should obtain permission from the TMFT before entering, leaving, or maneuvering within the TMFT and its approaches. Vessels maneuvering within the TMFT and its approaches should maintain a continuous listening watch on VHF channel 5.

9.43 Changi Naval Base (1˚19'N., 104˚01'E.) is situated on the SE corner of Singapore Island, 2 miles E of Tanah Merah Ferry Terminal, adjacent to Johor Shoal. The base lies entirely on reclaimed land. The newly-constructed basin is large enough to accommodate an entire carrier battle group. The basin has depths ranging from 9 to 17m. The S side of the South Breakwater Pier is reserved for aircraft carriers.

A tidal range from 2.4 to 3m was reported in the basin. Currents and effects of tides inside the harbor are negligible. The ebb current from Johor Strait into Singapore Strait can be significant, with an average velocity of 2.5 knots. Land reclamation in the area may be accelerating the current in this area with a speed of 5 knots reported in 2003.

Berth No. 6 can accommodate vessels up to 183m in length with a draft of 11m.

No marked channel nor range markers exist leading to Changi Naval Base. Good water is found in all areas S of the breakwater entrance. The Changi Special Purpose Anchorage is situated directly in front of the entrance to the base. Anchored vessels can easily foul a planned approach to the base.

A large control tower situated at the S end of the East Breakwater is an excellent aid to navigation.

Singapore Port Operations can be contacted on VHF channel 10 to confirm mooring and pilot boarding times. Pilots can be contacted on VHF channel 20 to confirm pilot boarding arrangements. The fleet operations center, call sign 88, can be contacted via bridge to bridge radio to request harbor clearance.

A prohibited area surrounds the naval base. No vessels of any description except those authorized by the Commander, Republic of Singapore Navy, shall use the area for anchorage, passage, or other purposes.

9.44 Kuala Sungai Johor (Kuala Johor) (1˚20'N., 104˚05'E.) lies between the dangers extending over 1 mile S of **Tanjong Pengelih** (1˚22'N., 104˚06'E.), a bluff promontory on the E, and Johor Shoal and Red Cliff Bank on the W. It is about 3 miles wide abreast Johor Shoal, with irregular depths of 10.1 to 23.8m in the fairway, decreasing toward Tanjong Pengelih.

Between Red Cliff Bank and the bank extending S from Pulau Tekong Besar the channel 12.8 to 23.8m in the fairway.

Farther in, between **Pulau Ubin Bank** (1˚24'N., 104˚00'E.), and Pulau Sajahat and Pulau Tekong Kechil to the E, the width is about 0.7 mile with depths of 12.8 to 21.9m.

Red Cliff Shoal (1˚20'N., 104˚00'E.) and Red Cliff Bank form an extensive flat of mud and sand, with patches of rock and coral, extending from the E part of Singapore Island, between **Tanjong Bedok** (1˚20'N., 103˚58'E.) and **Tanjong Changi** (1˚23'N., 104˚00'E.).

Its apex, with a depth of 5.5m is 3 miles E of Large Red Cliffs, with a detached shoal, known as **Angler Bank** (1˚21'N., 104˚03'E.) extending from 0.2 to 0.8 mile further E; there are depths of less than 1.8m on Red Cliff Bank.

Caution.—A dangerous wreck, with a depth of 9.9m, lies about 0.5 mile ESE of Angler Lighted Buoy.

9.45 Johor Shoal (1˚19'N., 104˚03'E.), fronting Kuala Sungai Johor, the E entrance of Johor Strait, is 3 miles long and about 0.2 mile wide. It is composed of hard sand and has a least depth of 2.3m and depths of 3.7 to 5.5m elsewhere, which may best be seen on the chart. A light situated on the W end of the shoal.

The **Sungai Johor** (1˚28'N., 104˚02'E.) entered between Pulau Tekong Kechil and **Tanjong Kopok** (1˚26'N., 104˚00'E.), about 2 miles NW, is navigable for vessels with local knowledge drawing up to 6.1m as far as **Pulau Layang** (1˚36'N., 103˚59'E.), about 10 miles above Tanjong Kopok.

Pulau Tekong (1˚25'N., 104˚04'E.) and **Pulau Tekong Kechil** (1˚25'N., 104˚01'E.) are two islands lying NW of Tanjong Pengelih, at the entrance of the Sungai Johor and dividing it into two branches. Pulau Tekong, 53m high, is about 4 miles long, E and W and 2.3 miles wide, N and S.

Pulau Tekong Kechil, lying close to the W side of the larger island, is nearly round, its diameter being about 0.6 mile.

Pulau Sajahat (1˚24'N., 104˚01'E.), consisting of three conspicuous vegetation-covered rocks, lies about 0.7 mile S of Pulau Tekong Kechil. A drying rock lies 0.2 mile NW of Pulau Sajahat. A bank, steep-to in places, extends 1.5 miles S of Pulau Tekong and 2.5 miles N of Pulau Tekong Kechil.

A bank, with depths of less than 5.5m and on which there are many above and below-water rocks, extends about 2 miles SE of Pulau Sajahat.

Malang Tiga (1˚23'N., 104˚02'E.), three rocky heads, awash, lies 1.3 miles SSE of the S point of Pulau Tekong Kechil; a shoal, with depths of less than 5.5m, extends 0.6 mile further SE. A ruined masonry beacon stands on the easternmost rocky head.

A reef, on which there is a drying coral patch, lies close W of the N end of Pulau Tokong, a depth of 5.5m lies about 0.6 mile W of the same point.

Changi Naval Base

9.46 **Tanjong Pengelih** (1˚22'N., 104˚06'E.), lying about 2 miles SE of the SE side of Pulau Tekong, is the end of the W slope of **Bukit Pengerang** (1˚23'N., 104˚06'E.). This hill, which lies about 0.9 mile NE of the point and is 186m high, is of a regular oblong sloping form and has been planted with trees. It is one of the most conspicuous objects in Singapore Strait.

The tidal range at Tanjong Pengelih is 2.2m at springs and 1m at neaps.

Calder Harbor (1˚23'N., 104˚05'E.) is the space between Pulau Tekong and the coast extending N of Tanjong Pengelih. The harbor, which is about 0.7 mile wide, affords anchorage, in depths of 9.1 to 14.6m. The Sungai Santi, with a depth of 1.8m in its entrance, is on the E side of the harbor.

Merlin Rock (1˚23'N., 104˚05'E.), with a least charted depth of 5m, lies about 0.8 mile N of Tanjong Pengelih.

Malang Berdaun (1˚21'N., 104˚06'E.), a rocky islet 3m high to the tops of the trees, lies about 0.7 mile SE of Tanjong Pengelih, within the edge of the drying bank which extends about 0.7 mile from the coast; shallow water extends further from the islet. A drying reef lies 0.6 mile S of Tanjong Pengelih.

Anchorage.—Four special purpose anchorages are designated between Tanjong Pengelih and Tanjong Stapa, about 3.3 miles ESE.

9.47 There are several villages between Tanjong Pengelih and Tanjong Bulat. The whole area between the shore and the 10m curve is so crowded with fishing stakes and traps as to render navigation impossible.

Tanjong Stapa (Langkah Blak) (1˚20'N., 104˚08'E.), lying about 3 miles ESE of Tanjong Pengelih, is a somewhat prominent point. A light is shown from the point.

The coast between Tanjong Stapa and Tanjong Ayam should not be approached in a depth of less than 12.8m.

A wreck, with a depth of 26m, lies about 4 miles SSE of Tanjong Stapa.

Tanjong Ayam (1˚20'N., 104˚12'E.), the S point of this part of the Malay Peninsula, lies nearly 4 miles E of Tanjong Stapa, with **Tanjong Kapal** (1˚20'N., 104˚10'E.) between.

Tanjong Bulat (1˚21'N., 104˚14'E.) lies nearly 2 miles E of Tanjong Ayam. The 5.5m edge of the shore bank is rather more than 0.5 mile off Tanjong Bulat but from the head of the bight between it and Tanjong Penyusop, it extends 1.3 miles off Two rocks, with less than a 1.8m depth, lie 0.4 mile and 0.5 mile S of Tanjong Bulat.

Pulau Che Kamat (1˚21'N., 104˚14'E.), about 0.5 mile NE of Tanjong Bulat, is a round island, 31m high and about 0.3 mile in extent, with an islet 15.2m high off its SW part.

Telok Ramunia (1˚22'N., 104˚15'E.) is an open roadstead where there is anchorage about 2 miles offshore. Several facilities for loading bauxite into lighters are situated along the bay's shoreline. The harbormaster of Johor is responsible for Telok Ramunia.

Vessels usually anchor between the 10 and 20m curves, smooth mud bottom with good holding ground.

There is no protection during the Northeast Monsoon. Fishermen often completely enclose the anchorage with their nets.

9.48 **Tanjong Penyusop** (1˚22'N., 104˚17'E.), the SE extremity of the Malay Peninsula, and the N side of the E entrance to Singapore Strait, is level land covered with trees, with some small hills behind. Coral reefs extend 0.1 to 0.3 mile off the point, with the Lima Islands in the offing.

Bukit Pelali (1˚24'N., 104˚12'E.), 191m high and located about 5 miles WNW of Tanjung Penyusop, is a regular pyramid rising from the low land and a useful object in making Singapore Strait from the N. It is completely wooded but is conspicuous by its height. Another hill, 100m high, is located 1 mile W of Tanjong Penyusop.

Bukit Iwatow (1˚30'N., 104˚15'E.), 139m high to the tops of the trees, is located near the coast about 6 miles NNE of Bukit Pelali. It has a group of trees on its summit and is a little more elevated than the coast, which is all rather low and wooded to the N of the hills over Tanjong Penyusop.

It is discernible during hazy weather much sooner than Bukit Peloli and is a useful mark when approaching Singapore Strait from the N.

Tanjong Punggai (1˚26'N., 104˚18'E.) lies about 4 miles N of Tanjong Penyusop; the summit of the point is conspicuous, wooded, and 61m high to the tops of the trees.

Pulau Punggai, 22m high to the tops of the trees, lies about 0.1 mile S of Tanjong Punggai.

Tanjong Penawan (1˚30'N., 104˚07'E.) lies about 5 miles N of Tanjong Punggai; foul ground extends about 0.7 mile off the point. A wreck, with a mast showing, lies about 3 miles E of the point.

9.49 The S and SE coasts of Singapore Island are level and wooded. The most conspicuous objects are **Tanah Merah Kechil** (Small Red Cliffs) (1˚20'N., 103˚57'E.), SW of Tanjong Bedok, and **Tanah Merah Besar** (Large Red Cliffs) (1˚21'N., 103˚59'E.), about 3 miles NE of them.

Tanah Merah Besar is visible from a considerable distance.

A conspicuous prison tower with a flagstaff stands about 0.7 mile WNW of Tanah Merah Besar.

Directions.—In approaching **Kuala Sungai Johor** (1˚20'N., 104˚05'E.) from E, Tanjong Changi should be steered for, bearing 302˚, which leads E of Johor Shoal and Red Cliff Bank in not less than 12.8m.

When abeam of **Angler Bank Lighted Buoy** (1˚21'N., 104˚03'E.), distant about 0.2 mile, the light structure on **Tanjong Chek Jawa** (1˚25'N., 104˚00'E.), the SE end of Pulau Ubin, should be brought into range with the beacon standing about 183m SE.

When appropriate, alter course for Serangoon Harbor or the Sungai Johor. At night, a vessel should keep in the white sector of Tanjong Chek Jawa Light.

Reclamation in progress on the bank fringing the coast in the vicinity of **Tanjong Bedok** (1˚20'N., 103˚58'E.) and NE toward **Tanjong Changi** (1˚23'N., 104˚00'E.).

An area in which navigation is prohibited extends up to 3 miles SE from the coast of Singapore Island between these two points; its limits are indicated on the charts.

Caution.—Unmarked obstructions may be encountered inshore of the 20m curve between Singapore Approach Lighted Buoy and Johor Shoal Lighted Buoy.

A disused ammunition dumping ground lies about 8 miles ESE of the E extremity of Johor Shoal. Another disused dumping area lies about 4.5 miles SE of the same point.

Obstructions exist in **Kuala Sungai Johor** (1˚20'N., 104˚05'E.) in the passage between **Pulau Sajahat** (1˚24'N., 104˚01'E.) and Singapore Island.

Malang Tiga Lighted Buoy, about 1 mile WSW of **Tanjong Batu Koyok** (1˚24'N., 104˚02'E.) and marks the E side.

Paku Lighted Buoy, about 1 mile W of the same point, marks the W side of Johore Channel.

Singapore Strait—East Entrance

9.50 The E entrance to the strait lies between **Tanjong Penyusop** (1˚22'N., 104˚17'E.), off which are the Lima Islands, and Ramunia Shoals extending about 13 miles NE of the point on the N, and **Tanjong Berakit** (1˚14'N., 104˚34'E.), about 19 miles SE of Tanjong Penyusop on the S.

Near the fairway between these points is Pedra Branca, with a deep channel on either side.

The **Lima Islands** (1˚22'N., 104˚18'E.), together with many dangers around and among them, front Tanjong Penyusop; they extend nearly 3 miles in a NNE to SSW direction.

Pulau Lima (1˚22'00"N., 104˚17'42"E.), 34m high, is the westernmost and largest of the group; it lies about 0.7 mile off Tanjong Penyusop, is barely 183m in extent, and is conspicuously covered with trees.

Pulau Besar, NE of Pulau Lima, is wooded and 27m high, with the summit cleared, except for a single tree; it is about 137m in extent and located about 91m from Pulau Lima with which it is connected by a ridge of rocks, drying at LW.

Pulau Mungging (1˚21'45"N., 104˚18'00"E.), about 0.3 mile SE of Pulau Lima, is 24m high, wooded, and, being the southernmost of the group, is easily recognized. The island is marked by a light and a racon, although the light structure is difficult to see and is obscured by trees on N bearings.

Dangerous wrecks lie 3.5 miles SW and 2.3 miles E of the island. A stranded wreck lies 0.3 mile SE of the island.

Pulau Geruda (1˚22'N., 104˚18'E.), 32m high and covered with trees, lies about 0.5 mile NE of Pulau Besar.

Lima Channel (1˚21'N., 104˚17'E.), between Tanjong Penyusop and the Lima Islands, is used by coastal vessels, but as it is narrow and encumbered by shoals, it should not be used without local knowledge.

Tides—Currents.—In making Singapore Strait from the N, vessels should always be prepared to meet with a current running to the S in the Northeast Monsoon, and the N in the opposite season, the strength of which is governed by the strength of the monsoon. In fine weather its rate is usually from 1.5 to 2 knots, but the rapidity of the current is also accelerated or retarded by the tidal currents near the coast.

Between **Horsburgh Light** (1˚20'N., 104˚24'E.) and a position 40 miles to the E it has been known to set at the rate of from 3 to 4 knots.

In the neighborhood of Horsburgh Light, the main directions of the current are NE and SW, the current being of similar type to that found in the W approaches to Singapore and running at about the same velocity; the NE current near Horsburgh Light corresponds to the E current in the W approaches, but commences about 30 minutes later.

No exact information regarding the duration of the NE current, or the commencement and duration of the SW current, can be given.

The direction of the current is, for some hours before and after slack water, considerably influenced by a cross current running in a NW or SE direction; this current is of similar type to the main current and commences to run to the NW about 5 hours 30 minutes before the commencement of the NE main current, but its velocity is only about 0.3 that of the main current. It will be seen that, as the currents are of diurnal type and as the times of commencement of the NE and NW currents differ by about 5 hours 30 minutes, the cross current will be running at its greatest velocity when the main current is slack, and vice versa.

The current near Horsburgh Light runs in the direction toward which the prevailing wind is blowing; the velocity may reach 2 knots during gales or strong and long-continued monsoon winds, but during calms there may be no current.

From the above remarks it will be seen that near the summer solstice, if strong SW winds occur at about the time when the new moon is in maximum declination, a set of as much as 4 knots to the NE may be found during the period of the NE current, with no corresponding SW set; whereas near the winter solstice, if strong NE winds occur at about the time when the full moon is in maximum declination, a set to the SW of about 4 knots may be experienced during the period of the SW current, with no corresponding NE set.

It should be particularly remarked that, in Singapore Main Strait generally, as in all places where the currents are of diurnal type, the strongest currents in each month occur a day or two after the moon reaches maximum declination, not after new or full moon, and the strongest currents of the year occur near the solstices, when the moon is in maximum declination near new and full moon, and the sun is also in maximum declination, not near the equinoxes.

9.51 A rock 3.7m high lies near the S end of **Pulau Mungging** (1˚21'45"N., 104˚18'00"E.), with a reef of straggling rocks extending to the E.

A rock 0.6m high lies about 0.2 mile SW of Pulau Mungging and a rock, with a least depth of 2.7m, lies about 0.5 mile ESE of the 0.6m rock. A rock, with a least depth of 2.7m, lies about 183m SW of the above 0.6m rock.

The southernmost danger of the Lima Islands is a rock with a depth of 3.7m lying about 2 miles SSW of the summit of Pulau Lima; a buoy lies close SW. A depth of 7.6m lies about 0.5 mile N of this rock.

Peak Rock (1˚21'57"N., 104˚18'24"E.), 11.3m high, is a barren rock of reddish color and easily recognized; it lies about 0.6 mile E of Pulau Lima.

Stork Reef (1˚21'36"N., 104˚18'56"E.) is about 0.3 mile in extent; it dries 0.9m and lies about 0.6 mile SE of Peak Rock.

Falloden Hall Shoal (1˚21'04"N., 104˚18'59"E.) is about 0.2 mile in extent, with a depth of 4.3m; it lies about 0.5 mile S of Stork Reef and on the NW part of a bank about 2 miles in extent, on which there are depths of 12.8 to 16.5m.

The water over this bank becomes very disturbed and discolored when the tide is running, often giving the impression of less water than actually exists. A stranded wreck is situated on the shoal.

Congalton Skar (1˚21'56"N., 104˚19'20"E.), a rocky patch with a depth of 1.2m, and steep-to, lies about 0.7 mile E of Peak Rock. A shoal area, with a least depth of 8.5m, lies about 1.2 miles ENE of Congalton Skar.

Whale Rock (1˚22'24"N., 104˚18'54"E.), which dries 2.1m, lies about 0.7 mile NE of Peak Rock; it is a small ledge on which the sea generally breaks, and which is steep-to; the depths around are irregular.

Jones Reef (1˚22'30"N., 104˚19'12"E.), with a least charted depth of 1.2m, lies about 0.2 mile ENE of Whale Rock and nearly 1 mile NE of Peak Rock.

North Rock (1˚23'15"N., 104˚18'21"E.), small, 10m high, and with a few bushes on it, lies about 0.7 mile N of Pulau Geruda.

A small barren rock, 0.3m high, lies about 0.3 mile SSW of North Rock, with a patch of sunken rocks between them. A reef, about 0.5 mile in extent, and with rocks which dry, lies between Pulau Geruda and North Rock; there are several patches between it and Pulau Geruda.

Between Jones Reef and North Rock are two shoals of 5.9m and 6.9m; these are steep-to with depths of 12.8 to 16.5m of water.

Caution.—An aircraft bombing range lies within a 1 mile radius of North Rock.

9.52 Rumenia Shoal (Ramunia Shoals) (1˚27'N., 104˚26'E.) are a number of detached patches of coarse sand and gravel, extending NE and then N from the Lima Islands toward North Patch. They are steep-to on their E and S sides, there being depths of 21.9 to 36.6m nearby; between the patches there are depths of over 11m.

The shallowest spot, over which there is a depth of 4.6m, lies about 5 miles NNW of **Horsburgh Light** (1˚20'N., 104˚24'E.). The N extremity of the shoal lies about 11 miles NNE of Horsburgh Light.

Rumenia Shoal is connected with North Patch by a ridge on which the depths are 9.1 to 16.5m, with many isolated patches of 6.4 to 9.1m; between Rumenia Shoal and the Lima Islands are similar patches. Large vessels should pass E of this ridge and North Patch.

The S part of the shoal is ridged with sandwaves, over which the least depth may vary from time to time, and depths less than charted may be encountered. The water over the shoal becomes very disturbed and discolored when the tide is running, often giving the impression of less water than actually exists.

North Patch (1˚29'N., 104˚27'E.), lying between 6.5 and 7.5 miles NE of the shallowest part of Rumenia Shoal, is a little more than 11 miles in length, in a N-S direction, with depths of 6.4 to 8.5m. Its N end lies almost 12 miles E of **Bukit Twatow** (1˚30'N., 104˚15'E.) and about 10.7 miles NNE of Horsburgh Light.

Eastern Bank (1˚32'N., 104˚31'E.), the outermost of the known banks off Tanjong Penyusop in the approach to Singapore Strait, is nearly 2 miles in extent, with depths of 18.3m at the extremities. Depths of 7.3 and 14.6m lie within the bank. The bank itself lies about 6 miles within the range of Horsburgh Light, which from its N edge bears SSW, distant 14 miles.

Caution.—It was reported at least one oil company recommends that VLCCs ensure that there be an underkeel clearance of 4m in the area about 12 miles NE of Horsburgh Light due to the possibility of an E swell on Eastern Bank.

9.53 Pedra Branca (1˚20'N., 104˚24'E.), lying in the middle of the E entrance to Singapore Strait, 8 miles from either shore, is about 7m high. It lies on the W edge of a bank with depths of 11 to 18.3m, which extends about 0.7 mile E.

Horsburgh Light, a 22m high white round tower with black bands, stands on the islet. A conspicuous lattice mast stands close N of the light. The light is equipped with a racon; a radiobeacon transmits from the light.

A drying rock lies 0.3 mile ENE of the light. A steep-to 8.2m patch lies about 0.4 mile N of the light.

A dangerous wreck is reported to lie about 1.7 mile NW of the light.

Anchorage.—During the Southwest Monsoon, small vessels can anchor, in a depth of 18.3m, hard bottom, good holding ground, about 0.2 mile NNE of Horsburgh Light.

At this anchorage, during the E current, slack water continues; during the W current overfalls are not experienced until the lighthouse bears about 192˚.

Middle Rocks (1˚19'N., 104˚25'E.), S of Pedra Branca, are of a whitish color, from 0.5 to 1.2m high, and stand on the S edge of the surrounding bank, about 0.6 mile from the lighthouse.

9.54 South Ledge (1˚18'N., 104˚24'E.) consists of three rocks, the N of which dries 1.8m; the others do not uncover.

They are steep-to, with depths of 29 to 37m being contained within a short distance, and are almost always marked by heavy tide rips or the sea breaking over them.

The N rock lies a little over 2 miles SSW of Horsburgh Light. Rocky heads, having depths of 18.3m, lie between the lighthouse and South Ledge.

Carter Shoal (1˚16'N., 104˚22'E.) is a pinnacle rock with a depth of 3m; it is steep-to on its E side and has depths less than 18.3m extending from its W side for a distance of 91m. It is marked by heavy overfalls. This rock lies about 5 miles SSW of Horsburgh Light.

To the S of Carter Shoal, at a distance of nearly 1 mile, are several coral patches covering an area of over 0.5 mile; the least depth is 9.1m lying about 0.7 mile SSE of Carter Shoal.

A bank with depths of 16.5 to 18.3m, about 0.7 mile in extent, lies about 6 miles WSW of Horsburgh Light. It is marked by overfalls and eddies. There are overfalls and eddies between this bank and Carter Shoal.

An IMO-adopted Traffic Separation Scheme (TSS) is established in the vicinity of Horsburgh Light as part of the Routing System in the Straits of Malacca and Singapore.

Depths—Limitations.—The significant depth in the westbound lane of the TSS at Horsburgh Light is 21m.

Directions.—Tanjong Stapa (1˚20'N., 104˚08'E.), in range with **Tanjong Ayam** (1˚20'N., 104˚12'E.) bearing 274˚, leads S of all the dangers S of the Lima Islands.

The S extremity of Pulau Mungging, bearing 256˚ leads S of **Rumenia Shoal** (1˚27'N., 104˚26'E.) and Horsburgh Light, in range with the center of the W slope of **Gunung Bintan-besar** (1˚04'18"N., 104˚27'27"E.), bearing 169˚ leads E of them in a depth of about 11m, but a patch of 9.1m lies about 183m on each side of this range line.

Eddies bringing up sand and mud from the bottom make the whole shoal quite visible and is disconcerting for a mariner using this range line, or the one for **North Channel** (1˚30'N., 104˚23'E.) giving the impression that there is less water than there really is. It is recommended only for light-draft vessels.

On Pulau Bintan, the W summit of **Gunung Bintan-besar** (1˚04'18"N., 104˚27'27"E.), in range with the foot of the E slope of Gunung Bintanketjil bearing 182˚, leads E of **North Patch** (1˚29'N., 104˚27'E.) and the shoals to the S, and between **Eastern Bank** (1˚31'N., 104˚31'E.) and North Patch.

In thick weather, the land is seldom obscured for any length of time, so that a vessel is generally able to fix its position; but if not able to do so the soundings will show whether the vessel is within the 40m curve, which should be avoided, and course altered as necessary to keep in the deep channel, passing in preference over the 16.5m bank W of Horsburgh Light, and avoiding the area within the 40m curve off the Lima Islands.

If in any doubt, the vessel should haul toward the N shore, by sounding, and anchor. This shore may be approached to depths from 20.1 to 21.9m.

9.55 Middle Channel (1˚21'N., 104˚23'E.), the passage generally used by vessels passing through the straits, has an average width of 4 miles between Horsburgh Light and the 20m curve off Rumenia Shoal. There are no known dangers within this area, but a vessel should, when approaching from the E, steer so as to comply with the Traffic Separation Scheme. A submarine cable lies in Middle Channel.

The entrance may be easily recognized, if the weather is clear, by Gunung Bintan-Besar, a remarkable saddle-shaped hill on Pulau Bintan and **Bukit Pelali** (1˚24'N., 104˚12'E.), the sharp peaked hill on the opposite side of the strait. Bearings of these objects will serve to determine the vessel's position when shaping a course to sight Horsburgh Light.

Directions.—Departing from **Pulau Aur** (2˚26'N., 104˚32'E.), steer to bring it to bear 000˚ when disappearing; if the weather is clear, Gunung Bintan-Besar and Pulau Aur may be seen together, but this seldom happens. The W summit of Gunung Bintan-Besar in range with the foot of the E slope of Gunung Bintan-Ketjil, bearing 182˚, leads nearly 1 mile E of the 6.4m depth of North Patch.

In slightly hazy weather, having Pulau Aur disappearing bearing about 000˚, a course between 192˚ and 203˚ may be required if the NE current is running out of the strait.

The depths will decrease regularly in steering S, and the low land will probably be seen to the W when in depths of 32.9 to 36.6m; if so, steer along the coast at a distance of about 13 miles, until **Bukit Twatow** (1˚30'N., 104˚15'E.), a low sloping hill, is discerned, appearing like a clump of trees more elevated than the others.

When this hill bears 248˚, a depth of 27.4m is the best track; with it bearing 265˚, overfalls in 29.3 to 23.8m of water may be experienced, or probably less water, the vessel being then on about the parallel of the North Patch and Eastern Bank.

If there is any doubt about the position, the vessel should either haul off into deep water or anchor.

With Bukit Twatow bearing 265˚, if depths of 14.6 to 18.3m are obtained, and being uncertain whether these soundings are near the North Patch, or on the shallow part of Eastern Bank, haul to the SE until in 25.6 to 18.3m.

Then steer 180˚ until the hill bears 270˚, when the vessel will be to the S of Eastern Bank, and may haul in 248˚, when depths of 18.3 to 20.1m will show that these soundings are on the outer edge of Rumenia Shoal.

If less than 18.3m is obtained, haul out directly E into depths of 27.4 to 29.3m, and then steer along the SE edge of the shoals in depths of 29.3 to 31.1m.

A course should be steered to make Horsburgh Light, bearing about 205˚, distant about 6 miles. This is the start of the Traffic Separation Scheme.

At night it is necessary to keep a good outlook for **Horsburgh Light** (1˚20'N., 104˚24'E.), which should be in sight before a vessel can get near the dangers at the entrance of the strait. It is a sufficient guide for navigating Middle Chan-nel.

The light bearing about 215˚ will lead well E of the ridge between Rumenia Shoal and North Patch.

In the event of the lights in and around the Inner Harbor not being distinctly made out by the time **Bukit Pengerang** (1˚23'N., 104˚06'E.) bears 012˚, care is necessary not to sail in depths of less than 29m toward Johor Shoal; if a depth of 18.3m is obtained the course should be altered quickly to the S, for this shoal is steep-to and cannot be approached with safety under that depth.

9.56 **South Channel** (1˚16'N., 104˚25'E.) is not recommended for deep draft vessels, and there is no advantage gained by using it. Generally, South Channel is cluttered with several dangerous shoals; the bottom generally rocky and uneven. The principal dangers are **South Ledge** (1˚18'N., 104˚24'E.) and **Carter Shoal** (1˚16'N., 104˚22'E.), both previously described in paragraph 9.54.

If a vessel find itself in the South Channel, the vessel should steer to the NW along the line of **Bukit Pelali** (1˚24'N., 104˚12'E.) open W of the highest coast hill, bearing 303˚, which leads between Carter Shoal and South Ledge in not less than 18.3m; when Horsburgh Light bears between 076˚ and 084˚ a vessel may shape course within the Traffic Separation Scheme for Singapore Road.

At LW, when both South Ledge and **Middle Rocks** (1˚19'N., 104˚25'E.) are plainly visible, it is often preferable to pass between them instead of getting on to the range line just mentioned, especially when, as frequently happens, rain clouds obscure Bukit Pelali. Submarine cables lie in South Channel.

9.57 **North Channel** (1˚30'N., 104˚23'E.), lying between Rumenia Shoal and the dangers outlying the Lima Islands, has a fairway with more than 11m. The channel is encumbered at its S end with shoals, with depths from 5.2 to 10m. The lack of good aids to navigation requires great care in maintaining a position in the fairway. Vessels without local knowledge should use this passage during daylight only, and with caution.

Caution.—Mariners are warned that North Channel should not be used for navigation, as no advantage is gained by passing through it, and it is possible that more dangers exist there than are shown on the chart.

Mariners are warned that firing and bombing practices take place in the following areas:

1. Singapore (China Sea) North Range comprises all that area of the high seas within 5 miles of positions 1˚35'N, 104˚25'E, and 1˚50'N, 104˚25'E, and within 5 miles of a line joining these positions.
2. Singapore (China Sea) South Range comprises all that area within 4 miles of **Tanjong Punggai** (1˚26'N., 104˚18'E.).

Johor Strait

9.58 **Johor Strait** (1˚28'N., 103˚50'E.), the channel between Singapore Island and the Malay Peninsula, was formerly the passage by which all vessels proceeded between India and China when Singapore Main Strait presently in use was not known to be navigable. There is no passage through except for small craft on account of the railway causeway E of **Johor Baharu** (1˚28'N., 103˚46'E.).

Numerous uncharted stilt houses and boat houses protrude into Johor Strait, especially in the vicinity of Serangoon Harbor (1˚24'N., 103˚ 57'E.).

Considerable reclamation has been carried out off Tanjong Gul and along the coast for about 4 miles NW to **Tanjong Karang** (1˚20'42"N., 103˚38'18"E.).

The **Tuas Shipyard** (1˚18'N., 103˚39'E.) has two dry docks, the largest of which can accommodate a vessel of up to 330,300 dwt; this dry dock is 355m long, 60m wide, and has a sill depth of 9.4m. The shipyard has six repair berths, with a total length of 1,690m and alongside depths of 6 to 8.5m. The shipyard is approached from the SE via Tuas Channel, which has a least depth of 5.5m.

Johor Strait—West Entrance

9.59 The W approach is barred by a sandbank which stretches across from **Tanjong Piai** (1˚16'N., 103˚31'E.) to **Tanjong Gul** (1˚18'N., 103˚40'E.), with depths under 5m. A narrow channel, with a least depth of about 6.1m, is shown on the chart S and E of **Pulau Merambong** (1˚19'N., 103˚37'E.).

Vessels drawing more than 5.5m or exceeding 106m in length should not use the W entrance. From Tanjong Piai to Tanjong Kupang, about 7 miles NE, the coast on the W side of the entrance is low with no conspicuous features.

The **Sungai Pulai** (1˚20'N., 103˚33'E.) flows out between Tanjong Bin, about 4.8 miles NNE of Tanjong Piai, and Tanjong Kupang.

The N shore of the entrance to the river W of Tanjong Kupang is reported composed of mud and sand backed by mangroves.

There is a depth of 16.5m in the narrows at the entrance to the river, but there is a bar across it to the S and entrance should not be attempted without local knowledge.

Tanjong Kupang (1˚21'N., 103˚36'E.) can be identified by a red-roofed building standing close W of the point.

9.60 **Tanjung Pelepas** (1˚22'N., 103˚33'E.), a new port in the SW part of Malaysia, lies about 8 miles W of Singapore, on the W side of Johor Strait at the mouth of the Sungai Pilai. The port opened in March, 2000. The Port of Tanjung Pelepas is being developed in five phases and is expected to be completed by 2020. Dredging and reclamation work is being completed (2002) as part of Phase II development, which will bring eight more berths to the port.

Port of Tanjung Pelepas

http://www.ptp.com.my

Depths—Limitations.—The port is approached from a position in the Cross Traffic Area on the Traffic Separation Scheme S of **Tanjung Piai** (1˚15.9'N., 106˚30.6'E.) and entered through a channel dredged to a depth of 14m. The channel is marked by lighted buoys, the centerline of which is marked by range lights. The channel can handle two-way traffic.

There are a total of six of berths available, with depths of 15m alongside. Each berth has a length of 360m.

Pilotage.—Pilotage is compulsory within port limits and is available 24 hours. The pilot boards about 2 miles SE of Tanjung Piai. Vessels awaiting pilotage may anchor 1 mile E of the pilot station. Port Control monitors VHF channel 83.

Anchorage.—There are two designated anchorage areas, best seen on the chart, as follows:

1. General Purposes Anchorage—3.5 miles E of Tanjung Piai.
2. Explosives and Hazardous Cargo Anchorage—4.5 miles E of Tanjung Piai.

Anchorage is prohibited within the port area outside the designated anchorages.

9.61 North of Tanjung Kupang is a range of hills, the highest of which is Woody Hill; it is conspicuous and is 119m high to the tops of the trees on its summit. Bukit Kupang, 84m high, stands about 0.4 mile NNW of Woody Hill. Sentinel Hill, 58m high, well-wooded and conspicuous, rises about 0.8 mile SW of Woody Hill. On the E side of the entrance to the strait are similar but lower hills; many of these hills are cleared, but those near the coast are densely wooded.

From close E of Pulau Merambong, the most conspicuous landmarks are Woody Hill and a conspicuous 29m high hill on the N side of the entrance to the **Sungai Pendas** (1˚23'N., 103˚38'E.).

Tanjong Teritip (1˚18'N., 103˚40'E.), a low point with coconut palms, lies about 0.6 mile NW of Tanjong Gul.

Tanjong Iluas (1˚19'N., 103˚39'E.) lies about 1 mile NW of Tanjong Teritip.

Alert Shoal (1˚17'N., 103˚37'E.), with a depth of 4.9m, lies close SW of the reclaimed land in the vicinity of Tanjung Gul and is marked by a light on its W edge.

Pulau Merambong (1˚19'N., 103˚37'E.), marked by a light, is an islet 23m high to the tops of the trees. A ridge, which dries in places, extends about 2 miles NNE of the islet. Kolek Rocks, a group of drying boulders, lie about 0.2 mile NE of the islet.

9.62 **West Reach** (1˚20'N., 103˚37'E.) extends from Pulau Merambong to the entrance of the **Sungai Perfat** (1˚26'N., 103˚41'E.), on the W side of the strait, about 9 miles NNE. In places the channel is narrow and intricate, and great care is necessary, since the current is strong and the shoals numerous, the least depth in the reach is 5.5m about 0.5 mile above Kolek Rocks.

The W shore of the strait between Tanjong Kutang and the entrance to the **Sungai Pendas** (1˚23'N., 103˚38'E.), 2.8 miles NE, is composed of mud and sand, backed by mangroves.

Tanjong Karang (1˚20'42"N., 103˚38'18"E.), the N entrance point of Sungai Blukang, is a narrow promontory, with a red cliff, 7.6m high on its W face. A drying rocky patch lies 0.3 mile N of the point. A buoy is situated about 0.3 mile NW of the point.

Tanjong Pasir Laba (1˚21'24"N., 103˚38'36"E.) lies about 0.7 mile NNE of Tanjong Karang; the headland is bare and rises on its N face to a white cliff with an elevation of 17m.

The hills E of the point art densely wooded. The entrance to the Sungai Tengeh lies between the two points.

Foul ground, with depths of less than 5.5m, extends about 0.2 mile from the shore at a point about 0.3 mile NE of Tanjong Pasir Laba.

The hills in the SW part of Singapore Island are conspicuous. Bukit Chao Kang, a cleared hill 87m high, rises about 3 miles E of Tanjong Pasir Laba.

Tanjong Chenting (Tanjong Bajau) (1˚22'N., 103˚39'E.) lies about 1 mile NE of Tanjong Pasir Laba. It is a red cliff 7m high, with the entrance to the Sungai Bajau lying between the two points; the shore of the bay has some low, red cliffs.

A 3.5m patch lies about 0.3 mile N of Tanjong Chenting; this patch nearly joins a long sand spit which fronts the shore between the Sungai Berih and Pulau Pergam.

Tanjong Berih (Tanjong Skopek) (1˚23'N., 103˚40'E.) lies about 0.7 mile NE of Tanjong Chenting, with the entrance to the Sungai Berih lying between the two points.

Tanjong Murai (1˚24'33"N., 103˚40'01"E.) lies about 2 miles NNE of Tanjong Berih. Bukit Pergam, 85m high, is a fairly conspicuous bare hill located about 0.6 mile E of Tanjong Murai.

9.63 **Pulau Pergam** (1˚24'N., 103˚40'E.), about 21m high, lies on a mud bank on the E side of the strait about 1.7 miles N of Tanjong Berih. **Lucy Rock** (1˚24'N., 103˚39'E.), with a depth of 5m, lies in the center of the fairway about 0.3 mile WSW of Pulau Pergam, a buoy lies close SW of the rock.

Tanjong Gedong (1˚25'32"N., 103˚40'34"E.) lies about 1.2 miles NNE of Tanjong Murai; the coast between the two points is steep-to.

In **Putri Narrows** (1˚26'N., 103˚41'E.), from **Tanah Runtoh** (Tanjong Tebing Runtoh) (1˚25'22"N., 103˚40'12"E.) for a distance of about 1.7 miles NE to a point about 0.3 mile beyond **Tanjong Setajam** (Tanjong Tajam) (1˚26'36"N., 103˚41'28"E.), on the N side of the strait, the bottom is very foul and great caution is necessary.

Three channels are reported to lead through the Putri Narrows, as follows:

1. North Channel is considered the most direct and the easiest but should not be used by vessels with a draft of greater than 4.3m.
2. Middle Channel is considered the principal channel. It is narrow and tortuous, but has the greatest depth in it..
3. South Channel is a channel that is not recommended.

On the W side of the strait at Tanah Runtoh are 61m high cliffs. There is a jetty close S of the point, with a village 0.4 mile N of the point.

A white bungalow with a red roof, and with a jetty near it, is situated about 0.5 mile NNE of the point.

Bukit Tajam (Bukit Setajam), 44m high and cultivated, rises about 0.6 mile ENE of Tanjong **Anak Datok** (1˚26'N., 103˚41'E.), the E entrance point of the Sungai Perfat, and is a prominent landmark.

Caution.—Between Tanjong Setajam and Pulau Sarimbun, about 0.5 mile SSW, confused eddies exist. Currents up to 3.5 knots can be expected.

An ammunition dumping ground is situated about 0.2 mile SE of Tanjong Setajam.

9.64 The entrance area going into the **Sungai Karang** (1˚25'26"N., 103˚40'40"E.), on the E shore lies close N of Tanjong Gedong, and about 0.5 mile farther NE is the entrance to the **Sungai Sarimbun** (1˚25'54"N., 103˚41'12"E.).

Pulau Sarimbun (1˚26'04"N., 103˚41'12"E.), 39m high to the tops of the trees and densely wooded, lies on the S side of the strait, close off the mouth of the Sungai Sarimbun.

Foul ground extends 91m SE and 137m E, respectively, from the island.

Batu Addis, with a depth of 1.2m, lies close to the end of the latter foul ground, but elsewhere the island is steep-to.

May Rock (1˚26'N., 103˚41'E.), with a depth of 5.5m, lies about 0.3 mile W of Pulau Sarimbun.

Sarimbun Rocks, two drying patches, lie on an extensive area of foul ground NE of Pulau Sarimbun. The W rock is marked by a beacon while the E patch is marked S by a buoy.

An isolated rocky patch, with a depth of 3.2m, lies about 0.1 mile NE of the beacon.

An ammunition dumping ground, 179 with a radius of 114m, lies with its center about 0.3 mile ENE of the beacon.

Herald Rock, with 5m, lies 0.3 mile E of Pulau Sarimbun and 160m from the S shore of Johore Strait.

Horseshoe Reef, over which there are depths of 3.2 to 5m; is a narrow ridge of rocks extending across the middle of Johor Strait near the NE end of Sarimbun Rocks.

Between the N end of this reef and the N end of the strait are several patches with depths of 3.8 to 5m.

The **Sungai Melaya** (1˚27'N., 103˚42'E.) flows into the NW side of the strait. On **Tanjong Melaya** (1˚27'N., 103˚42'E.), the SW entrance point of the river, there is a cliff 6m high, and a village.

Pulau Buloh (1˚27'N., 103˚44'E.) lies at the mouth of the Sungai Buloh, on the SE side of the strait about 2 miles E of Tanjong Melaya.

9.65 Town Reach (1˚26'N., 103˚44'E.) extends from Putri Narrows E to the causeway. About 1.2 miles ENE of the Sungai Melaya is **Tanjung Danga** (1˚28'N., 103˚43'E.), on which there is a bungalow and a pier that dries. Tanjong Danga is the S and W entrance points, respectively of the Sungai Danga and the Sungai Sekudai.

An extensive bank, with depths of less than 5.5m and on which there is a drying patch, extends across the mouth of the Sungai Danga; the channel into the Sungai Sekudai is well over on the E shore.

The land on the N side of Town Reach, E of the Sungai Sekudai, is from 37 to 61m high, and consists of two ranges of hills, on which are the houses and bungalows of the residents of Johor Bahru.

The most conspicuous object in Johor Strait is the tower of the government offices, 88m high, standing about 0.5 mile WNW of the N end of The Causeway; this tower can be seen from a great distance.

Other conspicuous objects on the N shore are the two white water towers; the mosque, with four domes, about 0.5 mile W of the government office tower; and the tower of the Sultan's Palace. A hotel lies about 0.8 mile WNW of the mosque; close W of the hotel is the wharf of the Marine Department Depot.

On the S side of the strait, between **Tanjong Buloh** (1˚27'N., 103˚44'E.) and the mouth of the **Sungai Kranji** (Kranji Reservoir) (1˚26'21"N., 103˚44'33"E.), about 0.7 mile SE, the shore is bordered by dense mangroves and swamps.

The mouth of the Sungai Kranji is closed by a dam, within which is a reservoir.

Kampong Kranji (1˚26'09"N., 103˚45'30"E.) stands about 1 mile ESE of the mouth of the Sungai Kranji.

Woodlands (1˚27'N., 103˚46'E.), about 1.2 miles NE of Kampong Kranji, is situated at the S end of the causeway. The land in the vicinity has been partly cleared.

The railway station is situated very close to The Causeway area. There is a village close SW of the railway station.

The Causeway, which extends across the strait close E of Johor Baharu, carries the railroad and highway. A lock at the N end of The Causeway is closed to navigation.

Shoals, with depths of 10.7 and 11m, lie about 0.6 mile and 0.5 mile WSW, respectively, of the Marine Department Depot.

9.66 Causeway Shoal (1˚27'N., 103˚45'E.), with a least depth of 4.3m, lies in mid-channel S of Istana Garden.

The E end of the shoal is connected to the N shore of Johor Strait by a spit, which has depths of 4 to 7m. A 4.9m patch lies about 0.2 mile W of the N end of The Causeway; a 6.4m rocky patch lies about 183m W of the S part of The Causeway.

Tides—Currents.—In Johor Strait, before the construction of The Causeway, the tidal currents were mainly diurnal, as in the approach to Singapore, but they are now mainly semi-diurnal.

Slack water generally occurs four times in each lunar day and the greatest variations in rate follow the moon's phases.

Owing to the number of sizable rivers flowing into the strait, the rate of the ebb current is increased, and the flood current decreased, during and after heavy rains.

The ebb current runs from about 1 hour after HW at Singapore until about 5 hours before the following HW, at an average maximum rate of 1.6 knots at springs and 0.8 at neaps.

The flood current runs from about 5 hours before HW at Singapore until about 1 hour after HW, at an average maximum rate of 1.4 at springs and 0.7 knots at neaps.

No appreciable differences were found in the rates of the current at the two positions where observations were obtained.

In Town Reach the rate of the current, especially if the flood, decreases as the causeway is approached.

Pilotage.—Pilots can be obtained at Singapore, but their knowledge of the W portion of Johor Strait is limited.

Directions.—Directions for North Channel and Middle Channel are, as follows:

1. Middle Channel.—After passing Tanah Runtoh, keep slightly over to the NW side of the strait and bring **Sarimbun Rocks Beacon** (about 1˚26'18"N., 103˚41'24"E.) in line with Johor water tower bearing 058˚.

   Steer on this line until abreast Pulau Sarimbun, then alter course to 093˚, to pass S of Sarimbun buoy, allowing for the tidal current.

   When the S point of Pulau Sarimbun bears 239˚ and is just open of the land on the Singapore Island side SW of it, alter course to 060˚ to clear Horseshoe Reef.

   After passing Horseshoe Reef, alter course to the N and steer for the water tower, bearing 060˚, until the Sultan's bungalow on **Tanjong Danga** (1˚28'N., 103˚43'E.) bears 348˚, then haul gradually to the E and steer 103˚ for the S part of the causeway, anchoring off the Istana.

2. North Channel.—Follow directions for Middle Channel until clear of **May Rock** (1˚26'06"N., 103˚40'52"E.), then haul to the N, and pass midway between Sarimbun Rocks Beacon and **Tanjong Setajam** (Tajam) (1˚26'36"N., 103˚41'28"E.), with the water tower bearing 059˚. Caution is necessary to guard against a set toward the foul ground to the S.

Anchorage.—Anchorage may be obtained anywhere in Johor Strait S of Tanah Runtoh, except that near Pulau Merambong, there is at times a heavy sea.

The holding ground is generally good, consisting of stiff mud and sand.

Anchorage between **Tanah Runtoh** (1˚25'22"N., 103˚40'12"E.) and **Horseshoe Reef** (1˚26'N., 103˚41'E.) is not recommended, but farther E it can be obtained anywhere in stiff mud.

A convenient anchorage to Johor Baharu is in 13.7m, about 0.1 mile S of the Istana. Anchorage should not be made E of this point, because of eddies and tide rips made by the causeway.

Caution.—The directions for the W portion of Johor Strait, described above, should be used with caution. It was reported that the range marks are no longer visible.

Johor Strait—East Entrance

9.67 This entrance between **Tanjong Changi** (1˚23'N., 104˚00'E.) and Tanjong Kopok, about 3 miles N, is divided into two channels by Pulau Ubin. Serangoon Harbor, the S channel, is deeper and better. Nenas Channel is the N channel.

That part of Johor Strait between Tanjung Punggol and the mouth of the Sungai Tebrau is known as Tebrau Reach. From there to The Causeway, it is known as Ordnance Reach.

The general harbor area between the E entrance point of Johor Strait N and W to The Causeway, which includes Naval Dockyard, Nenas Channel, Serangoon Harbor, Tebrau Reach, and Ordnance Reach, is known as Port of Singapore North.

Pulau Ubin (1˚25'N., 103˚58'E.), the island that divides the E entrance to Johor Strait into two channels, has a length of 4 miles in an E and W direction and a maximum width of 1 mile. The island consists of hills, most of which are thickly wooded, fronted and intersected by extensive mangrove swamps. The soil on the high parts of the island has a red color.

Nenas Channel (1˚25'N., 103˚58'E.), located on the N side of Pulau Ubin, is entered from the E between Tanjung Balai, the NE extremity of Pulau Ubin, and Tanjung Kopok, about 1.2 miles NE. Foul ground, with depths of as little as 3.9m, extends up to about 0.3 mile NNE of Tanjung Balai.

Henderson Shoal (1˚25'N., 103˚59'E.), with a least depth of 6.7m, lies NW of Tanjung Balai.

9.68 Pulau Nenas (1˚25.6'N., 103˚58.7'E.), on the N side of the channel, 1.3 miles W of Tanjung Kopok, is intersected with granite quarries and becomes conspicuous from the SE when it opens clear of the NE point of Pulau Ubin, because of the red soil covering the quarry.

A drying bank extends about 0.2 mile E of Pulau Nenas; at its outer end is a rock 0.9m high. Drying rocks also lie close off the SW side of the island.

Dawes Rock, which dries, is located on a sunken coral reef about 2 miles W of Pulau Nenas and about 0.1 mile off the N shore. The rock is marked by a light.

Tanjung Gemok (1˚26'N., 103˚56'E.), the N point of The Narrows, is located about 2.2 miles W of Pulau Nenas. The point, with a conspicuous red cliff on its W side, rises steeply to a round hill 18m high to the tops of the trees.

An obstruction, with 9.1m, lies about 0.5 mile SE of Tanjung Gemok.

Tanjung Tajam (1˚25'N., 103˚56'E.), the W extremity of Pulau Ubin, is marked by a lighted beacon.

Fan Shoal (1˚26'N., 103˚56'E.) extends from the NW side of Pulau Ubin across the W end of Nenas Channel. Depths of less than 5.5m, with a small drying patch, extend up to 0.3 mile NW of Tanjung Tajam. There are general depths of 7.3 to 9.1m on the shoal, except for a 5.5m patch lying in mid-channel on the E end of the shoal.

Directions.—If entering Johor Strait through Nenas Channel, steer 340˚ for Tanjung Kopok, which leads to the entrance of Nemas Channel. Pass N of Henderson Shoal and then keep in mid-channel, passing S of Dawes Rock and Tanjung Gemok. The N side of Pulau Ubin is marked by four beacons, the positions of which may best be seen on the chart.

Caution.—Fishing stakes are reported in both entrances to Nemas Channel. Shoaling has also been reported in both entrances.

9.69 Serangoon Harbor—North shore.—Tanjung Chek Jawa (1˚25'N., 104˚00'E.), the SE extremity of Pulau Ubin, is the N entrance point of Serangoon Harbor. The point is marked by a light; a beacon stands 183m SE of the light.

Pulau Sekudu, a 5.5m high rocky islet with some bushes on it, lies on a drying reef about 0.2 mile SW of Tanjung Chek Jawa. Malang Papan, a drying rock marked close SW by a light, lies about 0.1 mile S of Pulau Sekudu.

Tanjung Jelutong (1˚24'N., 103˚57'E.), the E point of the S entrance to Ketam Channel, lies about 2 miles ESE of Tanjung Chek Jawa.

Squance Bank (1˚24'N., 103˚58'E.), on which there is a least depth of 1.4m and which is marked close S by a lighted buoy, extends S and then E of Tanjung Jelutong.

Pulau Ketam (1˚24'N., 103˚51'E.), a mangrove island about 18m high to the tops of the trees, is separated from the SW side of Pulau Ubin by Ketam Channel. Both entrances to Ketam Channel are obstructed by bars with depths of 3 to 4m.

Off the NW side of Pulau Ketam, drying rocks form the SE edge of the N entrance to Ketam Channel; drying rocks extend 0.2 mile offshore from the NW edge of the channel.

The N shore of Serangoon Harbor continues 1.5 miles NW from the NW end of Pulau Ketam to Tanjung Tajam. The drying mud flats and reefs along this stretch of shoreline may best be seen on the chart.

Caution.—There is considerable shoal water on the N side of the E entrance of Serangoon Harbor, formed by a bank extending E from the E end of Pulau Ubin. Depths of 1.8m and less extend 0.5 mile E of Tanjung Chak Jawa.

9.70 Serangoon Harbor—South shore.—Tanjung Changi (1˚23'N., 104˚00'E.) is the S point of the E entrance to Serangoon Harbor.

Fairy Point (1˚23'N., 103˚58'E.) is located about 2 miles W of Tanjung Changi. A conspicuous water tower, 38m high, and from which four red lights are shown, stands about 0.7 mile SSW of Fairy Point.

A conspicuous radio tower stands on a hilltop about 0.4 mile E of Fairy Point; a radar scanner stands on another hilltop about 0.2 mile further E.

Batu Puteh, marked by a light, is a group of gray granite rocks, about 2.4m high, lying about 0.1 mile NNW of Fairy Point. The rocks have deep water around and between them.

Two drying rocks, about 46m apart, are located about 0.1 mile SSE of Batu Puteh.

Tidal currents, especially E, are strong in the vicinity of Batu Puteh.

In **Serangoon Harbor** (1˚24'N., 103˚57'E.) (World Port Index No. 49995)**,** there are depths of at least 12.8m. The fairway has a least width of 0.2 mile and as much as about 0.4 mile between the 10m curves.

Loyang Jetty extends about 0.2 mile NNW from a position on shore about 0.5 mile SW of Fairy Point. There are depths of 7.2 to 8.1m at its head. There are depths of 6.6m and 5.7m on the N and S sides of the inner arm, respectively. Numerous small craft moorings lie in the vicinity of the jetty.

Serangoon Harbor—Loyang Jetty

From Loyang Jetty, an extensive bank, which contains many obstructions, foul areas, marine farms, and other hazards to navigation which are best seen on the chart, extends W and then NW to Tanjung Punggol. On this bank, extending 1.5 miles SE from Tanjung Punggol, is a strip of reclaimed land.

Serangoon Harbor affords excellent anchorage in any convenient depth. The holding ground is stiff mud.

9.71 Tebrau Reach (1˚28'N., 103˚51'E.) is E of a line joining Tanjung Punggol to Pulau Tukang, about 0.7 mile NNE. A least depth of 11.3m can be carried from abreast Tanjung Punggol to The Causeway.

The W part of this reach, W of the entrance to the **Sungai Tebrau** (1˚29'N., 103˚48'E.), is known as Ordnance Reach.

Pasir Gudang Port (Johor Port) (1˚26'N., 103˚54'E.) is located on the N side of Tebrau Reach.

The depth in the main channel E of Johor Straits permits a maximum draft of 11.6m.

Depths—Limitations.—There is no limitation imposed on the size of vessels passing through the fairway except the draft. The main channel in the East Johor Strait has a depth of water up to approximately 12.5m.

The port covers over an area of more than 500 acres and is surrounded by a vast industrial complex.

The two coastal berths have a total length of 220m, with alongside depths of 5.5m, and can accommodate vessels up to 20,000 dwt.

The two general cargo berths have a total length of 732m, with an alongside depth of 11m, and can accommodate vessels up to 30,000 dwt.

The Container Terminal situated at the W end of the port has three berths. The berths, numbered CT1 throughCT1 3, are 253m in length and have an alongside depth of 15m. Each can accommodate vessels up to 140,000 dwt.

The Hazardous Bulk Liquid Terminal lies close SE of the container terminal. The berths, numbered DCJ 1 through DCJ 4, range from 105 to 405m in length and have alongside depths of 9 to 13m.

The Edible Oil Terminal lies close E of the hazardous cargo jetty and has four berths. The berths, numbered OJT 1 through OJT 4, range from 130 to 215m in length and have alongside depths of 10 to 11m.

Situated between the Edible Oil Terminal and the Multipurpose Terminal is the Dry Bulk Terminal. The terminal has three berths, numbered W3 through W6, and have lengths ranging from 192 to 217m. There depths from 12.7 to 13.0m alongside.

The Dry Bulk Berth is 410m long, with an alongside depth of 12.8m, and can accommodate vessels up to 60,000 dwt.

The Oil Berth has an outer face, 179m long with 9m alongside, and an inner face, 179m long with about 11m alongside. Tankers up to 30,000 dwt can be accommodated.

The Dangerous Cargo Jetty is 216m long, with 11m alongside, and can accommodate vessels up to 35,000 dwt.

The Setia Jaya Woodchip Jetty is 200m long, with a depth of 10.8m alongside.

The Sultan Iskander Power Station Jetty is 250m long, with a depth of 11.3m alongside.

The Malaysia Shipbuilding Drydock, close NW of the Power Plant Jetty, can accommodate a vessel of up to 400,000 grt.

Pasir Gudang Port (Johor Port)—Berthing Limitations

Berth	Maximum vessel length	Depth alongside	Vessel size
Container Terminal			
CT1	253m	15.0m	104,000 dwt
CT2	253m	15.0m	104,000 dwt
CT3	253m	15.0m	104,000 dwt
Hazardous Liquids Bulk Terminal			
DCJ 1	200m	11.0m	40,000 dwt
DCJ 2	105m	9.0m	7,000 dwt
DCJ 3	405m	13.0m	120,000 dwt
DCJ 4	240m	13.0m	95,000 dwt
Edible Oil Terminal			
OJT 1	215m	11.0m	32,000 dwt
OJT 2	215m	10.0m	2,660
OJT 3	195m	11.0m	53,300
OJT 4	130m	10.0m	2,660
Dry BulkTerminal			
W 4	192m	12.7m	78,000 dwt
W 5	217m	12.9m	78,000 dwt
W 6	214m	13.0m	78,000 dwt
Multipurpose Terminal			
W 7	195m	12.8m	80,000 dwt
W 8	195m	13.5m	80,000 dwt
W 9	195m	13.5m	80,000 dwt
W 10	195m	13.5m	80,000 dwt
W 11S	230m	11.0m	13,000 dwt
W 11N	120m	5.0m	13,000 dwt

Pilotage.—Pilotage is compulsory for vessels over 45m in length and is available 24 hours. Pilotage exemption may be granted to vessels over 45m by application to the Marine Manager. All vessels are required to notify the port authority 24 hours before arrival at the pilot station. Pilot boards 2 miles SW of Tanjung Setapa Light.

9.72 Tanjung Punggol (1˚25'N., 103˚55'E.) is marked close N by a light. The remains of a conspicuous building stand about 0.7 mile W of the point.

The tidal range of Tanjung Punggol is 2.5m at springs and 0.9m at neaps.

A bay is formed on the S shore of Tebrau Reach from Tanjong Punggol to a point about 4 miles NW.

Pulau Seletar (1˚26'N., 103˚52'E.), a mangrove island about 24m high to the tops of the trees, lies at the NW end of the bay. From the NE side of the island, Alang Perimbi, a narrow shoal of sand and mud, which dries in places, extends SE to within 1 mile of Tanjong Punggol and fronts the bay.

Tides—Currents.—In Johor Strait before the construction of the causeway, the tidal currents were mainly diurnal, as in the approach to Singapore, but they are now mainly semi-diurnal. Slack water occurs about four times in each lunar day and the greatest variations in rate follow the moon's phases.

Owing to the number of sizable rivers flowing into the strait, the rate of the ebb current is increased, and that of the flood current decreased, during and after heavy rains.

Calder Harbor, in mid-channel off **Tanjong Pengelih** (1˚22'N., 104˚06'E.), the ebb current runs from about the time of HW at Singapore until about 6.2 hours after HW, at an average maximum rate of about 1.2 knots. The flood current runs from about 6.2 hours after HW until the time of the following HW at an average maximum rate of about 1 knot.

The Sungai Johor, in mid-channel between **Tanjong Surat** (1˚28'N., 104˚02'E.) and the shoal W, the ebb current runs from about 30 minutes after HW at Singapore until about 5 hours 30 minutes before the following HW at an average maximum rate of about 1.2 knots. The flood current runs from about 5 hours 30 minutes before HW until 30 minutes after HW at an average maximum rate of 1 knot.

In Kuala Johore, in a position about 2 miles WSW of Tanjong Pengelih, the tidal current is chiefly rectilinear. The ebb current runs SE from about 30 minutes after until about 5 hours before HW at Tebrau Reach. Its maximum rate of about 1.2 knots at springs and 0.7 knot at neaps is reached about 4 hours after HW at Tebrau Reach.

The flood current runs NW from about 5 hours before until about 30 minutes after HW at Tebrau Reach. Its maximum rate of about 1.3 knots at springs and 0.7 knot at neaps is reached about 2 hours before HW at Tebrau Reach.

Off **Loyang** (1˚23'N., 103˚58'E.), in a position about 0.3 mile W of Fairy Point, the tidal current is chiefly rectilinear.

The ebb current runs ENE from about 30 minutes after until about 6 hours after HW at Tebrau Reach. Its maximum rate of 1.2 knots at springs and 0.6 knot at neaps is reached about 3 hours after HW at Tebrau Reach.

The flood current runs WSW from about 5 hours 30 minutes before until 30 minutes before HW at Tebrau Reach. Its maximum rate of about 1.4 knots at springs and 0.7 knot at neaps is reached about 2 hours before HW at Tebrau Reach.

Off Tanjung Punggol, in a position about 0.4 mile N of Punggol Light, the tidal current is chiefly rectilinear. The ebb current runs E from about 30 minutes after until about 6 hours after HW at Tebrau Reach. Its maximum rate of about 1.6 knots at springs and 0.9 knot at neaps is reached about 3 hours 30 minutes after HW at Tebrau Reach.

The flood current runs W from about 5 hours 30 minutes before until the time of HW at Tebrau Reach. Its maximum rate of about 1.6 knots at springs and 0.9 knot at neaps is reached about 2 hours before HW at Tebrau Reach.

Off Singapore Naval Base, in a position about 0.5 mile SW of **Kanan Lighted Beacon** (1˚28'39"N., 103˚50'30"E.), the tidal current is chiefly rectilinear. The ebb current runs ESE from about 30 minutes after until about 6 hours after HW at Tebrau Reach. It reaches a maximum rate of about 0.4 knot at springs about 3 hours 30 minutes after HW at Tebrau Reach.

The flood current runs WNW from about 6 hours before until about the time of HW at Tebrau Reach. It reaches a maximum rate of about 0.3 knot at springs about 2 hours 30 minutes before HW at Tebrau Reach.

9.73 Felkin Spit (1˚27'N., 103˚52'E.), with depths of 5.2 to 9.1m, is an extension of the shore bank NE of Pulau Seletar.

Its SE end lies about 0.6 mile to the NE of the S end of the island. A lighted buoy is moored on the NE side of Felkin Spit, about 0.6 mile ENE of the NW end of Pulau Seletar.

Off the N shore of Johor Strait, ENE of the N end of Pulau Seletar, is a rocky patch with depths of 3 to 5.2m, extending about 0.2 mile offshore.

About 0.7 mile farther NW is a narrow shoal bank, fronting the **Sungai Masai** (1˚28'N., 103˚52'E.), with depths of 7.3 to 9.1m, about 0.4 mile from the coast.

Lavis Shoal (1˚28'N., 103˚51'E.), with depths of 1.2 to 5.5m, extends about 0.2 mile from the S shore between a position about 0.7 mile NW of Pulau Seletar and the West Stores Basin. A lighted buoy is moored about 0.7 mile NNW of the N end of Pulau Seletar.

Beaulieu Shoal (1˚28'N., 103˚50'E.) fringes the shore immediately E of the entrance of the Naval Stores Basin; a lighted buoy is moored off the shoal.

Between the NW end of Pulau Seletar and Beaulieu House, a conspicuous house is situated on the S shore close SE of the shipyard. The approach to the drying coastal bank is foul and encumbered by numerous stranded wrecks, fish traps and piles. There is an obstruction with a depth of 0.3m that lies about 91m NE of a pier situated close by the conspicuous house. Two more obstructions with depths of 2.7 and 1.5m lie within a distance of about 0.1 mile SE of this pier.

9.74 Sembawang Shipyard (Sembawang Terminal) (1˚28'N., 103˚50'E.) is situated on the S shore of Tebrau Reach, about 2 miles NW of Pulau Seletar. The multi-basin complex encompasses numerous berths, dry docks, floating dry docks, and graving docks. Alongside depths range from 9.2 to 11.7m.

Sembawang Shipyard

http://www.sembship.com

The tidal range is about 2.5m at springs and about 1.1m at neaps.

Sembawang Shipyard—Berthing Limitations (2003)

Dry Docks

Berth	Length	Width	Max. depth
Premier Dock	384m	64.0m	-5.5m
George VI	319m	39.6m	-10.3m

Sembawang Shipyard—Berthing Limitations (2003)			
Floating Dock			
Berth	**Length**	**Width**	**Max. depth**
Republic	202m	42.0m	
President	290m	48.0m	
Berths			
Berth	**Length**	**Depth alongside**	**Remarks**
No. 8	350m	9.0m	
No. 9	240m	9.0m	
No. 10/11	250m	9.1m	
Finger Pier	350m	8.7m	
No. 12	—	—	
No. 12A	250m	10.2m	
No. 14	250m	10.9m	
No. 16	220m	9.6m	
Service Piers			
Berth	**Length**	**Depth alongside**	**Remarks**
No. 17	230m	10.4m	With dolphins
No. 18	230m	10.6m	
No. 19	230m	12.7m	
No. 20	290m	11.6m	

The Bethlehem Steel Company Jetty, which extends 0.1 mile from shore, has depths of 6 to 6.7m along its E side. This jetty is situated on the far W side of the complex.

There are four floating docks, which can accommodate vessels from 9,000 to 150,000 dwt. King George VI graving dock can accommodate a vessel up to 100,000 dwt. Primier dry dock can accommodate vessels up to 400,000 dwt. Range lights, which are shown if required, lead to the dry docks.

Sembawang Terminal lies within an open basin consisting of seven berths numbered S1 through S7. Berth S6 and Berth S7 have been dredged to 11.6m and frequently accommodate naval vessels. Berth S7, which is the longest berth, has a length of 230m. A container yard lies along the E wall.

The pilot will board vessels, proceeding to Sembawang, in the vicinity of Changi Naval Base and remain onboard until the vessel is pierside.

Regulations.—A prohibited area encloses the Sembawang wharves and the approach to it. All vessels are restricted from entering, anchoring, mooring, transiting or being in the area for any other purposes unless specific approval had been obtained from the Port Master. In granting approval, the Port Master may impose further time or location specific restrictions and conditions.

Caution.—Less depths than those charted have been reported in the vicinity of the terminal.

9.75 Rumah Merah (Red House) (1˚28'N., 103˚49'E.), a house with a red roof, is conspicuous and stands on piles close off the S shore, about 0.5 mile W of the shipyard. A shoal, with a depth of 0.6m, lies 137m offshore about 0.2 mile WNW of Rumah Merah.

A group of six radio towers, each 61m high and marked by a light, is situated about 1 mile SSW of Rumah Merah. Several other radio towers, each 37m high, are situated N and S of the main towers.

Denman Shoals, swept to 7m but reported (1994) to have depths of as little as 6.3m, is a rocky area W of Rumah Merah; it extends as far as about 0.3 mile off the S shore. A lighted buoy is moored on the NW edge of Denman Shoals, 0.9 mile WNW of Rumah Merah.

Red Cliff (1˚29.0'N., 103˚49.5'E.), a conspicuous red bluff, 11m high and covered with scrub and bush, rises on the N shore opposite Rumah Merah. Close within the bluff is a large dome-shaped tree and a white house with a green roof.

A bank, with depths of 8.5 to 11m, extends about 0.2 mile S from Red Cliff. Another bank, with a depth of as little as 8.2m, extends WSW from Red Cliff almost to mid-channel.

Range lights, which lead through Dockyard Reach, are situated at the mouth of the Sungai Tebrau, about 2 miles W of Red Cliff.

Anchorage.—Anchorage can be obtained in any part of Tebrau Reach where the depth is convenient, except in the vicinity of submarine cables and pipelines.

9.76 Ordnance Reach (1˚28'N., 103˚47'E.) extends SW from the Sungai Tebrau to The Causeway. Range beacons, which lead through the fairway, stand about 0.6 mile W of Red Cliff.

The Estana Pasir Plangi, a prominent chocolate-colored house with a small water tower reported nearby, is situated about 1 mile SW of the rear range beacon at the mouth of the Sungai Tebrau.

The **Sultan Ismail Power Station** (1˚27.5'N., 103˚46.5'E.) jetty stands at the end of Ordnance Reach about 0.5 mile NE of The Causeway. The T-head, which is occasionally marked at each end by a light, is 366m long with a depth of 10.9m alongside. Vessels up to 183m long, with a maximum draft of 9.45m, can be accommodated. An 8.2m depth, marked S by a lighted buoy, lies off the jetty.

The **Senoko Power Station** (1˚28'N., 103˚48'E.), on the S side of Ordnance Reach, stands about l.2 miles WSW of Rumah Merah and is marked by three conspicuous chimneys.

Armament Jetty (1˚27.7'N., 103˚47.5'E.), about 0.3 mile SW of the Senoko Power Station, is a T-headed jetty with a depth of 7.3m alongside. Lights are shown from each end of the T-head.

The **RMN Jetty** (1˚27.2'N., 103˚46.7'E.), an L-shaped pier, with an outer arm 215m long and marked at each end by a light, stands about 1 mile SW of Armament Jetty.

Woodlands Oil Pier (1˚27.2'N., 103˚46.5'E.), close SW of the RMN Jetty, is a T-headed jetty with a dolphin on each side of its head. The jetty is 175m long and has a depth of 8.8m alongside. A mooring buoy lies about 0.3 mile NW of the jetty.

A buried gas pipeline extends from the power station NNE across Ordnance Reach to a point close E of the entrance to the Sungai Tebrau.

The coastal bank, with depths of 3.7m and less, extends for about 0.1 mile between the S end of The Causeway and a point located about 0.9 mile NE of the S end of The Causeway.

Obstructions, with depths of as little as 1.5m and which may best be seen on the chart, lie on this bank.

Directions.—If proceeding through Serangoon Harbor, keep the summit of **Bukit Mandai** (1˚24'15"N., 103˚46'12"E.) on Singapore Island, bearing 272˚ and open just S of the S extremity of Pulau Ketam.

When the **Pavilion** (1˚22'58"N., 103˚56'54"E.) on the pier about 2 miles WSW of Fairy Point bears 247˚, alter course toward it to bring **Malang Papan Lighted Beacon** (1˚24'06"N., 103˚59'21"E.) to bear 065˚, astern, and pass S of Squance Lighted Buoy.

Course should be altered NW to bring **Loyang Lighted Beacon** (1˚22'58"N., 103˚57'56"E.) bearing 131˚, astern, and at night keeping within the white sector of the directional light.

On approaching **Serangoon Lighted Buoy** (1˚24'03"N., 103˚56'22"E.), course should be altered to pass SW of Tanjung Tajam, until the conspicuous water tower at Sembawang Terminal bears 291˚.

The vessel should then steer on this mark, and pass NE of Perimbi Lighted Buoy.

When **Siniop Light** (1˚28'15"N., 103˚51'12"E.) bears 317˚ steer for it on that bearing. Having passed NE of Felkin Lighted Buoy and Lavis Lighted Buoy steer in mid-channel until Tebrau Range Lights come in range. This range leads in mid-channel abreast Sembawang Terminal.

If proceeding to an anchorage off the causeway and having reached a position abeam of **Rumah Merah** (1˚28'15"N., 103˚49'53"E.), steer to pass N of Denman Lighted Buoy.

Then steer with the range beacons situated about 0.5 mile W of **Red Cliff** (1˚29'00"N., 103˚49'30"E.) bearing astern. This course leads through the fairway of Ordnance Reach, passing SE of the 8.2m patch, marked by Ordnance Middle Ground buoy, moored about 1 mile from the causeway.

Anchorage.—Due to the existence of telegraph cables, anchorage is prohibited in **Kuala Sungai Johor** (Kuala Johor) (1˚20'N., 104˚05'E.) within the limits indicated by dashed lines on the chart.

Caution.—The maximum vessel speed permitted in East Johor Strait is 12 knots; however, vessel speed shall not exceed 6 knots in the vicinity of the following facilities:

1. Changi Sailing Club (1˚23.6'N., 103˚58.8'E.).
2. Pasir Gudang Port.
3. Malaysia Shipbuilding and Engineering Yard.
4. Sembawang Shipyard.

Vessels elsewhere reduce speed as necessary to avoid damage to boat moorings, ferry terminals, etc.

The N shore of the strait from close W of Pasir Gudan Port to within 1 mile of The Causeway, and the S shore from the Sungai Seletar to Sembawang Terminal, is heavily encumbered with large bamboo fish traps which extend as much as 0.4 mile offshore in places as far as the 10m curve. A number of these fish traps cover at HW.

Less water than charted has been reported in the basin at the SE end of Sembawang Shipyard.

Traffic Information System for Vessels Transiting Serangoon Harbor

9.77 The following vessels are required to participate in the Traffic Information System (TIS) when entering, leaving, or transiting the Traffic Information Area (TIA) in East Johor Strait:

1. Vessels of 2,000 grt and over.
2. Vessels with a height above the waterline of 30m.
3. Tugs, when engaged in towing or pushing, when the combined gross tonnage of the tugs and tows or vessels being pushed is 2,000 grt or more; or when any of the tug's or tow's height exceeds 30m.

The approximate boundaries of the TIA are, as follows:

a. Punggol Lighted Beacon.
b. 1˚24.22'N, 103˚55.95'E.
c. Loyang Lighted Beacon.
d. Fairy Lighted Beacon.
e. Changi Lighted Buoy.
f. 1˚23.2'N, 104˚00.4'E.
g. Angler Lighted Buoy.
h. 1˚21.40'N, 104˚04.15'E.
i. Malang Tiga Lighted Buoy.
j. 1˚25.10'N, 104˚01.13'E.
k. Tanjung Todak.
l. 1˚25.00'N, 103˚59.57'E.
m. Chek Jawa Lighted Beacon.
n. 1˚23.90'N, 103˚57.97'E.
o. 1˚23.90'N, 103˚57.37'E.
p. 1˚24.60'N, 103˚56.45'E.
q. Tajam Lighted Beacon.
r. Punggol Lighted Beacon.

The call sign for the Port of Singapore Authority (PSA) Control Station, Changi is Sembawang Control.

All VHF traffic is to be conducted on VHF channel 21 and vessels will keep a continuous watch on this channel when entering, leaving, transiting, or when anchoring in the traffic information area. The reserve channel is VHF channel 13. In the event that VHF channel 21 is inoperative, vessels shall check with Port Operations Control Center on VHF channel 12 for instructions.

Every vessel shall report, giving the following information, and obtain clearance from Sembawang Control before entering, leaving, or maneuvering within Johor Strait:

1. Vessel name.
2. Call sign.
3. Present location.
4. Destination (i.e., the location in the port or bound for sea).
5. Draft.
6. Height.
7. Remarks, if any (i.e., any other relevant information on the vessel which would affect its navigation).
8. The ETA, used for the coordination of air traffic, at the following locations:

a. The line joining Tanjong Todak (1˚25.5'N., 104˚01.2'E.) and the NE point of Pulau Ubin (1˚25.0'N., 103˚59.6'E.) or longitude 103˚59.6'E, extending N of the E end of Pulau Ubin.
b. Malang Tiga Lighted Buoy.

c. Paku Lighted Buoy.
d. Malang Papang Lighted Beacon.
e. Seletar Lighted Buoy.

Vessels update and confirm the above ETAs to Sembawang Control when passing the following locations:

1. Northbound or westbound vessels—Angler Lighted Buoy.
2. Eastbound vessels—Punggol Lighted Beacon and Squance Lighted Buoy.
3. Eastbound vessels entering the TIA via Nenas Channel—before entering Nenas Channel.
4. Southbound vessels from the Sungai Johor—when underway.

Vessels shall monitor their ETAs and immediately report to Sembawang Control, as follows:

1. When the ETA for Malang Tiga Lighted Buoy, Paku Lighted Buoy, Malang Papang Lighted Beacon, Tanjong Todak, or N of Pulau Ubin differs by 2 minutes.
2. When ETA for Seletar Lighted Buoy differs by 15 minutes.

Caution.—No vessel is permitted to stop or anchor within the TIA. If a vessel has to stop or anchor in an emergency situation, the vessel shall report immediately to Sembawang Control.

No vessel should proceed S of the line between the CAAS Lighted Buoy No. 1 and CAAS Lighted Buoy No. 2.

These reporting procedures for East Johor Strait are in addition to the general reporting procedures for the Singapore Vessel Traffic Information Service (VTIS) found in paragraph 9.3.

Indonesian

INDONESIAN	English
A	
ack, aer, air, ajer	water, steam, river
adian	mountain
air masin	salt water
alangan	bar
arus	current
B	
bandar	port, trading town
bantjah	marsh
barat	west, western
batang	river
batu	rock
besar	large, great
beting	shoal, bank
biru	blue
bukit	hill
D	
dalam	deep
darat	land, the interior
deleng	mountain
dolok	mountain
G	
gosong	shoal, reef, islet
gunung	mountain
H	
hidjau	green
hili	mountain
hitam	black, dark
hulo	island
hutan	jungle, forest
I	
indano	stream
K	
kali	river
kampung	village
karang	coral, reef
kitjil	small, little
kering	dry
koho	hill
kuala	mouth of a river or confluence of two rivers
kuning	yellow
L	
labuhan	anchorage
laut	sea, seaward
lumpur	mud
M	
mas	golden
merah	red
muara	mouth of a river
N	
negeri	town, state
P	
paja	marsh, swamp
pamatang, pematang	hillock
pangkalan	landing place
pantai	coast, seaboard, beach
parit	ditch, stream
pasir	sand, beach
pekan	town, market
perahu	boat
pohon	tree
propinsi	province
pulau	island
putih	white
R	
rawang	marsh
rehdah	low
rimbo	forest
rumah	house
S	
selat	channel, strait
selatan	south, southern
sungai	river
T	
talu	bay, inlet
tanah	land, country
tangah	central
tanjung, tandjung	cape, headland, point, promontory
teluk	bay, bend of a river
tepi laut	coast, seaboard
terusan	connecting channel
timur	east
tinggi	high
tjetek	shallow
tjukah	cape
tohor	shallow
tor	mountain

INDONESIAN	English
tua	old
ture	point, cape
U	
utara	north
W	
wai	river

Malay

MALAY — English

A

alangan ..... bar
arus ..... current
ayer ..... water, steam
ayer masin ..... salt water

B

bagan ..... landing place
baharu ..... new
bandar ..... port, trading town
barat ..... west, western
batang ..... river
batu ..... rock
besar ..... large, great
beting ..... shoal, bank
biru ..... blue
bukit ..... hill

C

changkat ..... hillock, shoal
chetek ..... shallow

D

dalam ..... deep
darat ..... land, the interior

G

gosong, gusong ..... shoal, reef, islet

H

hijau ..... green
hitam ..... black, dark
hutan ..... jungle, forest

K

kampong ..... village
karang ..... coral, reef
kechil ..... small, little
kering ..... dry
kuala ..... mouth of a river or confluence of two rivers
kuning ..... yellow

L

labuan ..... anchorage
laut ..... sea, seaward

MALAY — English

M

malang ..... rock, reef, or shoal
mas ..... golden
merah ..... red
muara ..... mouth of a river

N

negri ..... town, state

P

paya ..... marsh, swamp
pangkalan ..... landing place
panjang ..... long
pantai ..... coast, seaboard, beach
pari ..... ditch, stream
pasir ..... sand, beach
pekan ..... town, market
pohon ..... tree
prau ..... boat
pulau ..... island
puteh ..... white

R

rendah ..... low
rumah ..... house

S

selat ..... channel, strait
selatan ..... south, southern
sungai ..... river

T

tanah ..... land, country
tanjong ..... cape, headland, point, promontory
telok ..... bay, bend in a river
terumbu ..... dangerous hidden shoal
terusan ..... connecting channel
timor ..... east
tinggi ..... high
tohor ..... shallow
tua ..... old
tukun ..... sunken rock

U

utara ..... north

Thai

THAI	English
A	
ao	bay, creek
B	
ban	house, or, if with a place name, village
bo	lake
bung	swamp
C	
chiang	town
chong	strait
chong khaep	narrow
D	
dam	black
deng	red
din-nieo	clay
din-sapong	chalk
doi	hill
don	high land
F	
fai	fire, light
fang	shore
H	
hard	beach
hardzai	sand beach
hin	rock
hlaem	cape, headland
ho	tower
hoioy	steam
hyai	great
K	
kao	old
kaho	white
khlon	mud
khlong	canal or creek
khok	hill
ko	island
L	
laem	cape, headland
lang	lower
lek	small
lom	wind
luang	large
lueng	yellow
M	
mae	river
mai	new
monthol, monthon	province or state
muang	town
N	
nai-kwa	inner
nakhon	town
noi	little
nok-kwa	outer
P	
pa dong	forest
pak	mouth
pak nam	mouth of a river
phra-chedi	pagoda
phukhao	mountain
pom	fort
S	
sai	sand, gravel
so-cloke	rock
T	
tam	low
thale	sea
thale sap	lake
thi samo	anchorage
thit nua	north
thit tai	south
thit tuan ok	east
thit tuan tok	west
tong koong	river bend
W	
wa	temple
Y	
yot	top

How to use the Index—Gazetteer

Geographic names of navigational features are generally those used by the nation having sovereignty and are listed alphabetically. Diacritical marks, such as accents, cedillas, and circumflexes, which are related to specific letters in certain foreign languages, are not used in the interest of typographical simplicity.

Geographic names or their spellings do not necessarily reflect recognition of the political status of an area by the United States Government. Positions are approximate and are intended merely as locators to facilitate reference to the charts.

To use as a Gazetteer note the position and Sector number of the feature and refer to the Chart Information diagram for the Sector. Plot the approximate position of the feature on this diagram and note the approximate chart number.

To use as an Index of features described in the text note the paragraph number at the right. To locate this feature on the best scale chart use the Gazetteer procedure above.

Index—Gazetteer

L